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The Journal of Shaheed Suhrawardy Medical College (JShSMC) is an open access, peer-reviewed official journal of Shaheed Suhrawardy Medical College Teachers' Association, Shaheed Suhrawardy Medical College, Sher-e-Bangla Nagar, Dhaka-1207, Bangladesh. This journal launched in June 2009 and still continue.

The aim of the JShSMC is to foster and promote the research activities on the area of medical science or discipline. This journal provides accessible rooms for the researchers of Shaheed Suhrawardy Medical College and the researchers of other institute in Bangladesh as well as the researchers of abroad.

This journal publishes as the peer-reviewed articles in English at biannual manner in June and December. Full text is freely accessible in PDF format at the web site of http://www.jshsmc.org or http://www. banglajol.org/jssmc.php.

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The following categories of manuscript are accepted for this journal

a. Original Research Articles
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It should be arranged into the following sections:

1. Title
2. Author(s)
3. Address
4. Structured Abstract
5. Key words
6. Introduction
7. Methodology
8. Results
9. Discussion
10. Conclusion
11. Acknowledgement
12. References
13. Tables
14. Figures

Title page

It should be paginated as page 1 of the paper. It should carry the title, authors' names and their affiliations, running title, address for correspondence including Email address & mobile number.

Title

Must be informative, specific and short and not exceed 100 words.

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It must start on a new page carrying the following information: (a) Title (without authors names or affiliations), (b) Abstract body, (c) Key words, (d) Running title. It should not exceed 350 words excluding the title and the key words. The abstract must be concise, clear and informative rather than indicative. New and important aspects must be emphasized. The abstract must be in a structured form consisting of background, objectives, methodology, result and conclusion briefly explaining what was intended, done, observed and concluded. Authors should state the main conclusions clearly and not in vague statements. The conclusions and recommendations not found in the text of the article should not be given in the abstract.

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It should start on a new page. Essentially this section must introduce the subject and briefly say how the idea for research originated. Give a concise background of the study. Do not review literature extensively but provide the most recent work that has a direct bearing on the subject. Justification for research aims and objectives must be clearly mentioned without any ambiguity. The purpose of the study should be stated at the end. It should not exceed 500 words.

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The details of statistical tests used and the level of significance should be stated. If more than one test is used it is important to indicate which groups and parameters have been subjected to which test.

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The results should be stated concisely without comments. It should be presented in logical sequence in the text with appropriate reference to tables and/or figures. The same data should not be presented in both tabular and graphic forms. Simple data may be given in the text itself instead of figures or tables. Avoid discussions and conclusions in the results section.

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This section should deal with the interpretation, rather than recapitulation of results. It is important to discuss the new and significant observations in the light of previous work. Discuss also the weaknesses or pitfalls in the study. New hypotheses or recommendations can be put forth. Avoid unqualified statements and conclusions not completely supported by the data. Repetition of information given under Introduction and Results should be avoided.

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Conclusions must be drawn considering the strengths and weaknesses of the study. They must be conveyed in the last paragraph under Discussion. Make sure conclusions drawn should tally with the objectives stated under Introduction.

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The number of table should be 3 or 4 in number. Each table must be self-explanatory and presented in such a way that they are easily understandable without referring to the text. It should be typed with double spacing and numbered consecutively with Arabic numerals. Provide a short descriptive caption above each table with foot notes and/or explanations underneath. The number of observations, subjects and the units of numerical figures must be

given. It is also important to mention whether the given values are mean, median, mean±SD or mean±SEM. All significant results must be indicated using asterisks. *Appropriate positions for the tables within the text may be indicated.

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Authors should report systematic reviews and meta-analyses in accordance with the **PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) statement.** For Systematic Reviews, both abstract and text of the manuscript should be subdivided into the following sequential sections:

1) **Context:** Provide a sentence or two explaining the importance of the review question.

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3) **Data Sources:** Succinctly summarize data sources, including years searched. Include in the search the most current information possible, ideally conducting the search several months before the date of manuscript submission. Potential sources include computerized databases and published indexes, registries, abstract booklets, conference proceedings, references identified from bibliographies of pertinent articles and books, experts or research institutions active in the field, and companies or manufacturers of tests or agents being reviewed. If a bibliographic database is used, state the exact indexing terms used for article retrieval, including any constraints (for example, English language or human subjects). If abstract space does not permit this level of detail, summarize sources in the abstract including databases and years searched, and place the remainder of the information in the "Methods" section of the text.

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7) **Conclusions:** Clearly state the conclusions and their applications (clinical or otherwise), limiting interpretation to the domain of the review.

Systematic reviews are welcome. They should be critical assessments of current evidence covering a broad range of topics of concern to those working in the specific field of journal. Systematic reviews should be 4000-5000 words (abstracts to be structured as above).

N.B.: For advice on writing systematic reviews consult:

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Meta-analysis of RCT: A MOOSE checklist is required for meta-analysis of ROT

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List the first six authors followed by et al. (Note: NLM now lists up. through 25 authors; if there are more than 25 authors, NLM lists the first 24, then the last author, then et al.)

Vega KJ, Pina I, Krevsky B. Heart transplantation is associated with an increased risk for pancreatobiliary disease. Ann Intern Med 1996 Jun 1;124(11):980-3

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Vega KJ, Pina I, Krevsky B. Heart transplantation is associated with an increased risk for pancreatobiliary disease. Ann Intern Med 1996;124: 980-3

More than six authors:

Parkin DM, Clayton D, Black RJ, Masuyer E, Friedl HP, Ivanov E, et al. Childhood leukaemia in Europe after Chernobyl: 5 year follow-up. Br J Cancer 1996;73:1006-12

2. Organization as author

The Cardiac Society of Australia and New Zealand. Clinical exercise stress testing. Safety and performance guidelines. Med J Aust 1996; 164: 282-4

3. No author given

Anonymous. Cancer in South Africa [editorial]. S Afr Med J 1994;84:15

4. Article not in English

(Note: NLM translates the title to English, encloses the translation in square brackets, and adds an abbreviated language designator.) Ryder TE, Haukeland EA, Solhaug JH. Bilateral infrapatellar seneruptur hostidligere frisk kvinne. Tidsskr Nor Laegeforen 1996;116:41-2.

5. Volume with supplement

Shen HM, Zhang QF. Risk assessment of nickel carcinogenicity and occupational lung cancer. Environ Health Perspect 1994;102Suppl 1:275-82.

6. Issue with supplement

Payne DK, Sullivan MD, Massie MJ. Women's psychological reactions to breast cancer. Semin Oncol 1996; 23(1 Suppl 2):89-97.

7. Volume with part

Ozben T, Nacitarhan S, Tuncer N. Plasma and urine sialic acid in non-insulin dependent diabetes mellitus. Ann Clin Biochem 1995;32(Pt3):303-6.

8. Issue with part

Poole GH, Mills SM. One hundred consecutive cases of flap lacerations of the leg in ageing patients. N Z Med J 1994;107(986 Pt 1):377-8.

9. Issue with no volume

Turan I, Wredmark T, Fellander-Tsai L. Arthroscopic ankle arthrodesis in rheumatoid arthritis. Clin Orthop 1995;(320):110-4.

10. No issue or volume

Browell DA, Lennard TW. Immuno-logic status of the cancer patient and the effects of blood transfusion on antitumor responses. Curr Opin Gen Surg 1993: 325-33.

11. Pagination in Roman numerals

Fisher GA, Sikic BI. Drug resistance in clinical oncology and hematology. Introduction. Hematol Oncol Clin North Am 1995 Apr;9(2):xi-xii.

12. Type of article indicated as needed

Enzensberger W, Fischer PA. Metronome in Parkinson's disease [letter]. Lancet 1996;347:1337.

Clement J, De Bock R. Hematological complications of hantavirus nephro-pathy (HVN) [abstract]. Kidney Int 1992;42:1285.

13. Article containing retraction

Garey CE, Schwarzman AL, Rise ML, Seyfried TN. Ceruloplasmin gene defect associated with epilepsy in EL mice [retraction of Garey CE, Schwarzman AL, Rise ML, Seyfried TN. In: Nat Genet 1994;6:426-31]. Nat Genet 1995;11:104.

14. Article retracted

Liou GI, Wang M, Matragoon S. Precocious IRBP

gene expression during mouse development [retracted in Invest Ophthalmol Vis Sci 1994; 35:3127]. Invest Ophthalmol Vis Sci 1994;35:1083-8.

15. Article with published erratum

Hamlin JA, Kahn AM. Herniography in symptomatic patients following inguinal hernia repair [published erratum appears in West J Med 1995; 162:278]. West J Med 1995; 162: 28-31. Books and Other Monographs (Note: Previous Vancouver style incorrectly had a comma rather than a semicolon between the publisher and the date.)

16. Personal author(s)

Ringsven MK, Bond D. Gerontology and leadership skills for nurses. 2nd ed. Albany (NY): Delmar Publishers; 1996.

17. Editor(s), compiler(s) as author

Norman IJ, Redfern SJ, editors. Mental health care for elderly people. New York: Churchill Livingstone; 1996.

18. Organization as author and publisher

Institute of Medicine (US). Looking at the future of the Medicaid program. Washington: The Institute; 1992.

19. Chapter in a book

Phillips SJ, Whisnant JP. Hypertension and stroke. In: Laragh JH, Brenner BM, editors. Hypertension: Pathophysiology, diagnosis, and management. 2nd ed. New York: Raven Press; 1995. p. 465-78.

20. Conference proceedings

Kimura J, Shibasaki H, editors. Recent advances in clinical neuro-physiology. Proceedings of the 10th International Congress of EMG and Clinical Neurophysiology; 1995 Oct 15-19; Kyoto, Japan. Amsterdam: Elsevier; 1996.

21. Conference paper

Bengtsson S, Solheim BG. Enforce-ment of data protection, privacy and security in medical informatics. In: Lun KC, Degoulet P, Piemme TE, Rienhoff O, editors. MEDINFO 92. Proceedings of the 7th World Congress on Medical Infor-matics; 1992 Sep 6-10; Geneva, Switzerland. Amsterdam: North-Holland; 1992. p. 1561-5

22. Scientific or technical report Issued by funding/sponsoring agency:

Smith P, Golladay K. Payment for durable medical equipment billed during skilled nursing facility stays. Final report. Dallas (TX): Dept. of Health and Human Services (US), Office of Evaluation and Inspections; 1994 Oct. Report No.: HHSIGOEI69200860.

Issued by performing agency:

Field MJ, Tranquada RE, Feasley JC, editors. Health services research: work force and educational issues. Washington: National Academy Press; 1995. Contract No.: AHCPR282942008. Sponsored by the Agency for Health Care Policy and Research.

23. Dissertation/Thesis

Kaplan SJ. Post-hospital home health care: the elderly's access and utilization [Dissertation/Thesis]. St. Louis (MO): Washington Univ.; 1995.

24. Patent

Larsen CE, Trip R, Johnson CR, in-ventors; Novoste Corporation, assignee. Methods for procedures re-lated to the electrophysiology of the heart. US patent 5,529,067. 1995 Jun 25. Other Published Material

25. Newspaper article

Lee G. Hospitalizations tied to ozone pollution: study estimates 50,000 admissions annually. The Washington Post 1996 Jun 21;Sect. A:3 (col. 5).

26. Audiovisual material

HIV+/AIDS: the facts and the future [videocassette], St. Louis (MO): Mosby-Year Book; 1995.

27. Legal material

Public law: Preventive Health Amendments of 1993, Pub. L. No. 103-183, 107 Stat. 2226 (Dec. 14, 1993). Unenacted bill: Medical Records Confidentiality Act of 1995, S. 1360, 104th Cong., 1st Sess. (1995) Code of Federal Regulations: Informed Consent, 42 C.F.R. Sect. 441.257 (1995).

Hearing: Increased Drug Abuse: the Impact on the Nation's Emergency, Rooms: Hearings Before the Subcomm. On Human Resources and Intergovernmental Relations of the House Comm. On Government Operations, 103rd Cong., 1st Sess. (May 26, 1993).

28. Map

North Carolina. Tuberculosis rates per 100,000 population, 1990 [demo-graphic map]. Raleigh: North Carolina Dept. of Environment, Health, and Natural Resources, Div. of Epidemiology; 1991.

29. Dictionary and similar references

Stedman's medical dictionary. 26th ed. Baltimore: Williams & Wilkins; 1995. Apraxia; p. 119-20.

30. Classical material

The Winter's Tale: act 5, scene 1, lines 13-16. The complete works of William Shakespeare. London: Rex; 1973.

31. In press

(Note: NLM prefers "forthcoming" because not all items will be printed.)

Leshner AI. Molecular mechanisms of cocaine addiction. N Engl J Med. In press 1996.

Electronic Material

32. Journal article in electronic format

Morse SS. Factors in the emergence of infectious diseases. Emerg Infect Dis [serial online] 1995 Jan-Mar [cited 1996 Jun 5]; 1(1):[24 screens].

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*Conflicts of interests if any, the details must be declared in a separate sheet.

Editorial

The Making of An Excellent Neurosurgeon

The career in neurosurgery is built on several corner stones: the personality and intellectual ability of the person, the level of the teacher, and the quality of the training program. For a successful career in neurosurgery, the basic education and training are of fundamental importance. There are two main concepts related to the philosophy of education in neurosurgery: in the first the focus is put on theory (study of textbooks guidelines, internet sources etc.), while in the second the focus is the practical training (or learning by doing – concept). The ideal training should be based on a balance between theory and practice.

Factors that influence the neurosurgical education are the ability of the educators and trainees on one hand, and the organization of the program and technical standards in the teaching center, on the other hand. The influence of an educator or mentor on the trainees is of paramount importance. His/her knowledge and behavior should be live examples to follow for the trainees. It is almost impossible to become a great neurosurgeon without having a teacher with a high level of moral and ethic – a person that demonstrates honesty in his professional behavior & both to his pupil and to his environment.

There are many parameters that could be considered as a prerequisite for a trainee to become a great neurosurgeon: family background; outstanding results at school; sports activity; ability to play a musical instrument, languages proficiency; social engagement; motivation for neurosurgery; knowledge how to write a good scientific paper; ability to present a project. But all these cannot substitute for the character of the person. Honesty & dedication to the patients from the beginning of the education will determine the success in the future.

Generally, it is believed that the skill of a neurosurgeon is equal to his manual dexterity. Those could make great careers who were dedicated and competent in all aspects, related to the patient's management: starting with the thorough history taking, complete examination and analytical evaluation of neurological, neurophysiological, neuroradiological findings, and laboratory findings. Besides, it is essential that the trainee has a profound interest in the social life, mental condition and expectations of the patient. Last but not least, the endurance, mental power and health condition of the trainees during surgeries influence the stability of their performance.

Training in allied specialties is also a key. To-day, with the development of imaging, patients are coming with their CD when asking our opinion. We should never forget we have to cure patients but not pictures. Therefore, good knowledge in medical neurology, neuroradiology and pathology is really helpful in taking a good decision on the indication for surgery.

Taking time to talk with the patient and family before and after surgery is the base of confidence. We should teach our trainees to avoid falling in computerized world and remind them that a patient is a human being waiting for clear explanations on the treatment and post-operative course. In addition, a patient has also an anxious family waiting for daily news. An excellent neurosurgeon should combine technical and heart qualities.

Excellence is also based on experience. Experience means success and pitfalls. Success in 100% of our surgeries does not exist and we should learn from our mistakes or pitfalls. Every complication should be analyzed and be a lesson for avoiding its repetition. Therefore, humbleness and honesty make a neurosurgeon greater. A colleague who declares he has no complication, no pitfalls, who has 100% success in his hands, is a danger for our specialty and should never be trusted. In a good neurosurgical center, the patient's welfare must be in the center of all consideration.

A great neurosurgeon has to continue in all his professional life the scientific research and keep the ambition to develop the further improvement of neurosurgery to the benefit of his patients. So, the combination of brain excellence and hand skillfulness is one of the characteristics of an outstanding neurosurgeon.

At the end, I conclude that an excellent neurosurgeon/teacher should be proud when he is surpassed or exceeded by his fellows.

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Professor Dr. Saumitra Sarkar
MS, MRCS, FRCS, Professor & HOD of Neurosurgery, Shaheed Suhrawardy Medical College, Dhaka, Bangladesh.
Email: saumitrasarkar1971@gmail.com

References

1. Madjid Samii, MD, PhD, President – International Neuroscience Institute, Rudolf Pichlmayr Str. 4, 30625, Hannover, Germany
2. Jacques Brotchi, MD, PhD, Professor, Department of Neurosurgery, Erasme Hospital –Universite libre de Bruxelles
3. Rashiduddin Ahmad, FRCS, Professor Emeritus of neurosurgery, BSMMU, Dhaka-1000, Bangladesh

Original Article

Full Endoscopic Decompression for Single Level Lumbar Stenosis: A Clinical Evaluation

Khan MN[1], Dey A[2], Mukarrabin AMM[3], Saha S[4], Shafiq S[5]

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ABSTRACT:

Objective: *This study aimed to evaluate the outcomes of full endoscopic decompression for single level lumbar spinal canal stenosis.*

Methods: *This observational study was conducted on a total of 370 patients selected by purposive sampling from January 2022 and December 2023, presenting with symptoms more than 3 months and non-responding to conservative treatment. The procedure was performed by placing the patient on a radiolucent Wilson frame with single-shot epidural analgesia. Outcome was measured in terms of pain reduction using Visual analog scale (VAS) before and after surgery, at 3rd, 6th month, and functional outcome was assessed using the Modified MacNab criteria at 6th month,*

Results: *The mean age of the patients was 56.1 years, with 63% male. The most common stenosis level was L4-L5 (36.5%). The mean operation duration was 53 minutes, and the postoperative complications were minimal. Significant improvement in pain levels was observed, with back pain reduced from a preoperative mean of 3.2 to 1.1 at six months, and leg pain from 7.2 to 1.0 ($p < 0.001$). According to the Modified MacNab criteria, 91.1% of patients reported excellent outcomes at six months, and 8.4% reported good outcomes.*

Conclusion: *Full endoscopic decompression is a highly effective and safe method for treating lumbar spinal stenosis, providing substantial pain relief and excellent functional outcomes with minimal complications.*

Key Words:
Full Endoscopic Spine Surgery, Spinal Canal Stenosis, VAS, MacNab

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1. Dr. Mohammad Nuruzzaman Khan, Associate Professor, Department of Neurosurgery, Shaheed Suhrawardy Medical College & Hospital, Dhaka
2. Dr. Avijit Dey, Registrar, Department of Neurosurgery, Shaheed Suhrawardy Medical College & Hospital, Dhaka
3. Dr. A. M. M. Mukarrabin, Asst. Registrar, Department of Neurosurgery, Shaheed Suhrawardy Medical College & Hospital, Dhaka
4. Dr. Shuvro Saha, Medical Officer, Department of Neurosurgery, Dhaka Medical College & Hospital, Dhaka
5. Dr. Sabrina Shafiq, Assistant Professor, Department of Laboratory Medicine, Bangabandhu Sheikh Mujib Medical University, Dhaka

Correspondence: Dr. Mohammad Nuruzzaman Khan, Associate Professor, Department of Neurosurgery, Shaheed Suhrawardy Medical College & Hospital, Dhaka; Email: drkhosru71@yahoo.com; Mobile: 01711372392

Introduction

Spinal canal stenosis is when the space within the spinal canal narrows and eventually compresses the spinal cord [1]. Degenerative lumbar spinal stenosis (LSS), a common pathology especially in the elderly over 60 years old, is usually caused by changes in spine structures, including discs, ligamentum flavum, and facet, which can anatomically affect the central canal, lateral recess, foramina, or a combination of the above. The prevailing symptom associated with lumbar canal stenosis is neurogenic claudication, which describes leg symptoms involving the buttock, groin, and anterior thigh, and radiates down usually from the back of the leg to the feet [2,6]. Both radicular symptoms and neurogenic claudication are best treated conservatively in the early stages, provided there is no neurological impairment with motor loss and

progressive deterioration for the early symptoms. In such circumstances, surgical intervention is advised. The conventional surgical approach for managing LSS has a potential unintended consequence of further spinal instability, which may necessitate surgical intervention to achieve stabilization. Since several studies have demonstrated comparable outcomes to open procedures, minimally invasive spine surgery (MISS) has grown in favor among spine surgeons in recent years [3, 4, 5]. Even though there are many advantages of MISS over open surgery, it also has possible drawbacks, including a constrained field of vision and workspace, a challenging learning curve, exposure to radiation, and high cost [2, 7].

Full endoscopic lumbar decompression is a MISS that is regarded as an essential alternative for a surgical approach, also popularly known as Percutaneous Stenoscopic Lumbar Decompression (PSLD). This uniportal unilateral approach allows bilateral decompression of lumbar canal stenosis, with smaller skin incisions, less muscle injury, less bleeding, less possibility of infection, shorter stay in the hospital, and early return to daily activities [8, 9].

This study was conducted to observe the surgical outcome of full endoscopic decompression for single-level lumbar canal stenosis through a large-bore stenoscope in terms of the reduction of pain assed by Visual analog scale (VAS) and functional outcome by Modified MacNab criteria.

Material and methods

Patient population

IRB (Institutional Review Board) of Anwer Khan Modern Medical College Hospital, Dhaka, has approved this study. A total number of 370 patients were selected by purposive sampling who underwent full-endoscopic decompression surgery for single-level lumbar spinal canal stenosis between January 2022 and December 2023. Patients having symptoms of less than three months, not responsive with conservative management and was image proved single level spinal canal stenosis were included in this study. Patients with the history of same level surgery, infections, spinal instability, multiple-level stenosis, cauda equina syndrome, traumatic or osteoporotic fracture, and cancer were excluded from this study.

Operative technique

The procedures were performed under single-shot epidural anesthesia without sedation on the radiolucent Wilson frame in a flexed prone position. A stab wound was made at the cutaneous entry point just beside the spinous process. The dilator was inserted down to the upper laminar surface of the pathological level via lateral fluoroscopic view. A working sleeve was inserted through this dilator, and then an endoscope was placed on the surface of the lamina through the working sleeve. A large-diameter endoscope (often termed as Stenoscope) with an integrated working channel having an outer diameter of 10 mm and a working channel of 7.1 mm was used. A radiofrequency probe was used for tissue ablation and bleeding control. An irrigation pump was used to maintain continuous water irrigation. Using a diamond burr, the lower part of the cranial lamina and the upper part of the caudal lamina were drilled until the edges of the ligamentum flavum were exposed. The medial part of the facet joint was drilled carefully to decompress the lateral recess. After the ipsilateral laminotomy, the base of the spinous process was drilled. The contralateral lamina was drilled similarly using the "over the top" technique. The ligamentum flavum was preserved till the bony drilling on both sides was completed. Then the attachment of the ligamentum flavum was detached all around and removed en-bloc. Adequate hemostasis was ensured with a radiofrequency probe. Few sheets of absorbable gelatin sponge were placed in the epidural space routinely and the tiny wound was closed without drain.

Demographic, clinical, and radiological data

A structured questionnaire was used to collect data on patients' demographic profile, the duration of their symptoms, the level of pathology, the amount of blood lost during surgery, and the length of the surgery. The outcome was measured in terms of their pain levels using a visual analog scale (VAS) for both back pain and leg pain before and on 0, 3, 6 months after surgery. After six months of surgery, we also assessed the functional outcome using the MacNab criteria. Moreover, X-ray of Lumbo-sacral spine including Dynamic X-rays, were used to exclude segmental instability and other pathologies.

Statistical analysis

Statistical analysis was analysed using the SPSS software

package (version 22). We used a t-test for quantitative variables and a chi-square test for qualitative variables to compare the data. If the p-value was <0.05, we considered the difference significant.

Result

Table 1: Distribution of cases based on demographic features and symptom duration

Variables		N (%)	Mean ± SD
Age group (years)	40-50	76 (20.6%)	56.1±12.2
	50-60	171 (46.2%)	
	>60	123 (33.2%)	
Gender	Male	231 (63%)	
	Female	139 (37%)	
Duration of symptoms (months)	3-6	181 (48.9%)	5.6±1.2
	6-12	113 (30.5%)	
	>12	76 (20.6%)	

370 patients were included in this study, with the majority falling within the age group of 50 to 60 years (46.2%). The second most common age group was over 60 (33.2%), followed by those between 40 and 50 (20.6%). The mean age of the participants was 56.1 years, with a standard deviation of 12.2. Gender distribution revealed a male predominance, with 231 male patients (63%) and 139 female patients (37%). Regarding symptom duration, nearly half of the patients (48.9%) experienced symptoms for 3 to 6 months before seeking medical intervention. A smaller percentage (30.5%) had symptoms lasting between 6 and 12 months, while 20.6% of the patients had symptoms persisting for more than 12 months. The mean symptom duration was recorded as 5.6 months.

Table 2: Distribution of Cases Based on Stenosis Level

Stenosis Level	Frequency
L1-L2	26 (7.0%)
L2-L3	37 (10%)
L3-L4	92 (24.9%)
L4-L5	135 (36.5%)
L5-S1	80 (21.6%)

The stenosis levels varied among patients, with the most common site of lumbar canal stenosis being at the L4-L5 level, affecting 135 patients (36.5%). This was followed by stenosis at the L3-L4 level in 92 patients (24.9%) and the L5-S1 level in 80 patients (21.6%). The L2-L3 and L1-L2 levels were less commonly involved, with 37 and 26 cases, respectively.

Table 3: Distribution of Cases Based on Perioperative VAS

VAS				
			Mean ±SD	P value
Back pain	Preoperative		3.2±1.9	< 0.001
	Postoperative	0 month	1.6±0.4	
		3 months	1.3±0.3	
		6 months	1.1±0.2	
Leg Pain	Preoperative		7.2±0.9	
	Postoperative	0 month	1.5±0.5	
		3 months	1.1±0.2	
		6 months	1.0±0.2	

The effectiveness of full endoscopic decompression was evaluated through changes in pain levels using the Visual Analog Scale (VAS) for both back pain and leg pain. The mean preoperative VAS score for back pain was 3.2 ± 1.9, which significantly reduced postoperatively to 1.6 ± 0.4 at 0 months, 1.3 ± 0.3 at 3 months, and 1.1 ± 0.2 at 6 months. Similarly, leg pain showed a dramatic decrease, with a preoperative VAS score of 7.2 ± 0.9, which dropped to 1.5 ± 0.5 immediately after surgery and further to 1.1 ± 0.2 and 1.0 ± 0.2 at 3 and 6 months, respectively. All these improvements were statistically significant, with P-values of less than 0.001.

Table 4: Distribution of Cases Based on Operation Duration and Complications

Duration of Surgery (Mean ± SD) In minutes		53±2.3
Complications (n)	Transient Dysesthesia	17
	Facet injury	6
	Minor dural tear	4
	Postoperative segmental instability	2
	Infection	0

The average duration of surgery was relatively short, with a mean time of 53 ± 2.3 minutes. Postoperative complications revealed 17 cases of transient dysesthesia, 6 cases of facet injury, 4 cases of dural tears, 2 cases of postoperative segmental instability, and no cases of infections.

Table 5: Distribution of Cases Based on Modified MacNab Criteria

Modified MacNab Grade	Number of Cases
Excellent	337 (91.1%)
Good	31 (8.4%)
Fair	2 (0.5%)
Poor	0 (0%)

Postoperative functional outcomes were assessed at 6 months using the Modified MacNab Criteria, which showed excellent outcomes in 337 cases (91.1%), while 31 patients (8.4%) reported good outcomes. Only 2 patients (0.5%) were classified as having a fair outcome, and none experienced a poor outcome.

Discussion

This study examined the demographic features, symptom duration, and clinical outcomes of patients undergoing full endoscopic decompression (FED) for lumbar canal stenosis (LCS). The results highlight significant patterns in age distribution, symptom duration, stenosis levels, and postoperative outcomes, contributing to our understanding of full endoscopic decompression for LCS in clinical practice.

Our findings reveal that most cases were observed in the 50-60 age group, accounting for 46.2% of participants, followed by those over 60 years (33.2%). This aligns with existing literature indicating that LCS predominantly affects older populations, likely due to age-related degenerative changes in the spine. The mean age of 56.1 years further underscores the prevalence of this condition in middle-aged to older adults. The findings were consistent with those of Barakat et al. [3], where 60.9% of the patients were over 50 years of age.

Additionally, the duration of symptoms varied among patients, with nearly half (48.9%) presenting with symptoms lasting between 3-6 months. This suggests that many individuals seek treatment relatively early in the disease progression, possibly due to the impact of neurogenic claudication on their quality of life. Early intervention may lead to better outcomes, as indicated by improved pain scores following surgery. The findings aligned with those of Shen et al. [4], where most patients (36.14%) experienced symptoms for less than 12 months.

Analysis of stenosis levels revealed that the L4-L5 segment was most commonly affected (135 cases), followed by L3-L4 (92 cases). The findings were consistent with those of Barakat et al. [3], where 73.9% of the patients had stenosis at the L4-L5 segment. These levels are frequently subject to degenerative changes due to mechanical stress and anatomical considerations [6, 10]. Understanding the specific levels of stenosis is crucial for tailoring surgical approaches and anticipating potential complications.

The perioperative Visual Analog Scale (VAS) scores demonstrated significant improvement post-surgery. Preoperative back pain averaged 3.2, decreasing to 1.6 at the 0-month mark and improving to 1.1 by 6 months. Similarly, leg pain, which presented a higher preoperative score of 7.2, dropped to 1.0 after 6 months. These results suggest that full endoscopic decompression for LCS alleviates pain and significantly enhances overall patient satisfaction and quality of life [11]. All the p-values of <0.001 indicate statistically significant differences between preoperative and postoperative VAS scores. The findings were consistent with those of Barakat et al. [3] and Shen et al. [4], showing a significant difference between preoperative and postoperative VAS scores ($P < 0.001$).

The mean duration of surgery was 53 (±2.3) minutes which indicates an efficient surgical process, essential for minimizing patient exposure to anesthesia and reducing hospital stay. Notably, complications were minimal, with only 17 cases of transient dysesthesia, 6 cases of facet injury, 4 cases of minior dural tears, 2 cases of postoperative segmental instability, and no cases of infections. This low complication rate emphasizes the safety of the surgical techniques and reinforces the importance of meticulous surgical practice [12]. Transient dysesthesia was self-limiting and was managed with oral pregabalin. Intraoperative minor dural tears were managed with the routine use of gelatin sponge (Gelfoam) pack. There were no cases of postoperative CSF leak. Two cases of segmental instability occurred which were assessed on 6 months after surgery as poor outcome, required spinal stabilization procedures at a later date. Barakat et al. [3] reported a 13% incidence of minor dural tears, while Shen et al. [4] documented 2.48%. Additionally, transient dysesthesia occurred in less than 1% of cases in Shen et al.'s study [4, 13].

The outcomes of this study were evaluated using the modified MacNab criteria at 6 months postoperatively, which provides a clear framework for assessing patient recovery following treatment for lumbar spinal stenosis. The results indicate a predominantly positive response to the interven-

tion. A striking 337 patients achieved an "Excellent" outcome: no pain, unrestricted mobility, and the ability to return to normal activities and work. This underscores the effectiveness of the surgical approach in alleviating symptoms and significantly enhancing the quality of life for most participants [14]. In addition to those with excellent outcomes, 31 patients (a noteworthy proportion) reported a "Good" outcome. This indicates that while they experience occasional non-radicular pain, they have experienced relief from their presenting symptoms and can return to modified work. This suggests that even in cases with residual discomfort, the overall improvement allows for greater functionality and participation in daily life [15]. The study documented only 2 cases classified as "Fair," indicating limited improvement in functional capacity. Their postoperative imaging revealed segmental instability requiring spinal stabilization procedures at a later date. Notably, the absence of cases rated as "Poor" reflects a low incidence of ongoing symptoms indicative of root involvement. These finding suggest that the full endoscopic decompression effectively address the primary issues associated with lumber canal stenosis (LCS) and highlighted the efficacy of this surgical approach in achieving favorable outcomes where a substantial majority of patients experiencing significant improvements in their conditions. The findings were similar to those of Dowling et al. [5], where 71.5% of patients had a good outcome based on the modified MacNab criteria.

Conclusion

This study shows that full endoscopic decompression is a highly successful treatment modalities of surgical treatment for lumbar spinal canal stenosis. This minimally invasive procedure is safe and effective, causing minimal tissue damage and allowing for a rapid recovery. It's a promising alternative to traditional surgical methods and could become the preferred choice for this condition. However, it requires specialized surgical skills and advanced medical equipments.

References

1. Victorio, 1,2; Shen, Robert3,4; Nasution, Mahdian Nur1,5; Mahadewa, Tjokorda Gde Bagus6. Full endoscopic percutaneous stenoscopic lumbar decompression and discectomy: An outcome and efficacy analysis on 606 lumbar stenosis patients. Journal of Craniovertebral Junction and Spine 15(2):p 247-253, Apr–Jun 2024. | DOI: 10.4103/-jcvjs.jcvjs_48_24

2. Barakat, Yosouf; El-Hawary, Magdy Asaad; Shokhaiby, Usama Mohamed El; and Abdou, Ahmed Kamal Abdel-Aaty (2024) "Endoscopic lumbar stenosis decompression through uniportal bilateral approach," Al-Azhar International Medical Journal: Vol. 5: Iss. 2, Article 5. DOI: https://doi.org/10.58675/2682-339X.2289

3. Barakat Y, El-Hawary MA, Shokhaiby UM, Abdou AK. Endoscopic lumbar stenosis decompression through uniportal bilateral approach. Al-Azhar International Medical Journal. 2024;5(2):5.

4. Shen R, Nasution MN, Mahadewa TG. Full endoscopic percutaneous stenoscopic lumbar decompression and discectomy: An outcome and efficacy analysis on 606 lumbar stenosis patients. J Craniovertebr Junction Spine. 2024;15(2):247-53.

5. Dowling Á, Lewandrowski KU, da Silva FH, Parra JA, Portillo DM, Giménez YC. Patient selection protocols for endoscopic transforaminal, interlaminar, and translaminar decompression of lumbar spinal stenosis. J Spine Surg. 2020;6(Suppl 1)

6. Komp M, Hahn P, Oezdemir S, Giannakopoulos A, Heikenfeld R, Kasch R, Merk H, Godolias G, Ruetten S. Bilateral spinal decompression of lumbar central stenosis with the full-endoscopic interlaminar versus microsurgical laminotomy technique: A prospective, randomized, controlled study. Pain Physician. 2015;18(1):61-70.

7. Tang S-H, Mok T, He Q, Lai X-D, Sin T-H, Deng J, Yu S, Li J, Wu H. Comparison of clinical and radiological outcomes of full-endoscopic versus microscopic lumbar decompression laminectomy for the treatment of lumbar spinal stenosis: A systematic review and meta-analysis. Ann Palliat Med. 2021. Available from: https://-doi.org/10.21037/apm-21-3921.

8. Lee C-W, Yoon K-J, Ha S-S. Comparative analysis between three different lumbar decompression techniques (Microscopic, Tubular, and Endoscopic) in lumbar canal and lateral recess stenosis: Preliminary report. Biomed Res Int. 2019;2019:6078469. Available from: https://-doi.org/10.1155/2019/6078469.

9. Kim J, Bae J, Lee DC, Shin S-H, Keum H, Choi YS, Eun S, Shin SH, Hong HJ, Kim JY, Kim TH, Lim W, Kim JH, Park S-M, Park H-J, Lee H. Evaluation of the efficacy and safety of conventional and interlaminar full-endoscopic decompressive laminectomy to treat lumbar spinal stenosis (ENDO-F trial): Protocol for a prospective, randomized, multicenter trial. PLoS One. 2023;18. Available from: https://-doi.org/10.1371/journal.pone.0283924.

10. Gatam AR, Gatam L, Phedy, Mahadhipta H, Ajsantoro, Aprilya D. Full Endoscopic Lumbar Stenosis Decompression: A Future Gold Standard in Managing Degenerative Lumbar Canal Stenosis. Int J Spine Surg. 2022;16:821-30. Available from: https://doi.org/10.14444/8303

11. Lee CH, Choi MN, Ryu D, Choi I, Kim C, Kim H, Sohn M. Efficacy and safety of full-endoscopic decompression via interlaminar approach for central or lateral recess spinal stenosis of the lumbar spine: A meta-analysis. Spine. 2018;43(1756-64). Available from: https://-doi.org/10.1097/BRS.0000000000002688.

12. Yang F, Chen R, Gu D, Ye Q, Liu W, Qi J, Xu K, Fan X. Clinical comparison of full-endoscopic and microscopic unilateral laminotomy for bilateral decompression in the treatment of elderly lumbar spinal stenosis: A retrospective study with 12-month follow-up. J Pain Res. 2020;13:1377-84. Available from: https://doi.org/10.2147/-JPR.S251019.

13. Yang J, Wu H, Kong Q, Wang Y, Peng Z, Zhang L, Yan Y, Guo C, Zhang D. Full endoscopic transforaminal decompression surgery for symptomatic lumbar spinal stenosis in geriatric patients. World Neurosurg. 2019. Available from: https://doi.org/10.1016/j.wneu-.2019.11.128.

14. Huang YH, Lien FC, Chao LY, Lin CH, Chen SH. Full endoscopic uniportal unilateral laminotomy for bilateral decompression in degenerative lumbar spinal stenosis: highlight of ligamentum flavum detachment and survey of efficacy and safety in 2 years of follow-up. World Neurosurg. 2019. Available from: https://doi.org/10.1016/-j.wneu.2019.08.129.

15. Heo D, Quillo-Olvera J, Park C-K. Can percutaneous biportal endoscopic surgery achieve enough canal decompression for degenerative lumbar stenosis? A prospective case-control study. World Neurosurg. 2018;120. Available from: https://doi.org/10.1016/j.wneu.2018.08.214.

Original Article

Comparative Study of Olmesartan versus Telmisartan, in Patient with Stage I Hypertension

Khan MMR[1], Khan MMR[2], Rahman MA[3], Akteruzzaman M[4], Roy US[5]

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ABSTRACT

Background: *Hypertension is one of the most common diseases in the world. It is defined as sustained increase in blood pressure ≥ 140/90 mmHg. The risk of both microvascular & microvascular complications including stroke, coronary artery disease, peripheral vascular disease, retinopathy, nephropathy & possibly neuropathy increases with hypertension. Olmesartan medoxomil is a non-peptide angiotensin II receptor antagonist. The drug acts by selectively blocking angiotensin II type 1 receptor. Telmisartan is angiotensin receptor blocker shows high affinity for the angiotensin II type 1 receptors. Objective of the study is to compare the efficacy of Olmesartan and Telmisartan in Patient with stage –I hypertension.*

Materials and methods: *This was a randomized, open label, parallel group, comparative study conducted in 120 patients of Stage I hypertension carried out from January 2021to June 2022. Patients were recruited from the cardiology outpatient department (OPD) of Shaheed Suhrawardy Medical College hospital.*

Results: *In olmesartan group there were 39 male and 21 female patients and in telmisartan group there were 36 male and 24 female patients. Both Olmesartan and Telmisartan are effective in lowering systolic & diastolic BP at different intervals of 2nd, 4th, 8th and 12th week. There was a statistically significant decrease in mean blood glucose level after 12 weeks of treatment in telmisartan group when compared to baseline. Serum total cholesterol, triglycerides, and low density lipoproteins decreased significantly after 12 week treatment with olmesartan and telmisartan.*

Conclusion: *Olmesartan and telmisartan are equally efficacious in reducing DBP. Olmesartan, when compared to telmisartan is more efficacious in reducing SBP. Whereas Telmisartan shows the most favorable effects on FBG and lipid profile.*

Key Words:
Olmesartan, Telmisartan, Hypertension

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1. Dr. Md. Murshidur Rahman Khan, Associate Professor, Department of Cardiology, Colonel Malek Medical College, Manikganj
2. Dr. Md. Moshfequre Rahman, Associate Professor, Department of Cardiology, Shaheed Suhrawardy Medical College, Dhaka
3. Dr. Abdur Rahman, Assistant Professor, Department of Cardiology, Shaheed Suhrawardy Medical College, Dhaka
4. Dr. Md. Akteruzzaman, Assistant Professor, Department of Cardiology, Shaheed Suhrawardy Medical College, Dhaka
5. Dr.Udoy Shankar Roy, Professor, Department of Cardiology, Shaheed Suhrawardy Medical College, Dhaka

Correspondence: Dr. Md. Murshidur Rahman Khan, Associate Professor, Department of Cardiology, Colonel Malek Medical College, Manikganj
Email:kmurshid321@gmail.com, Mobile: 01819818163

Introduction

Hypertension is one of the most common diseases in the world. The term "essentially hypertonia", i.e. essential hypertension, was first quoted by the German physician Frank E in 1911 and continues to be used today [1]. It is defined as sustained increase in blood pressure ≥ 140/90 mm Hg, a criterion that characterizes a group of patients whose risk of hypertension related cardiovascular disease is high enough to merit medical attention.[2] It is associated with marked morbidity, mortality & places a high burden on health care system. The risk of both microvascular & microvascular complications including

stroke, coronary artery disease, peripheral vascular disease, retinopathy, nephropathy & possibly neuropathy increases with hypertension.[3]

The global prevalence of hypertension is projected to increase from 26% in 2000 to 29.2% by 2025 [4], which will be approximately 29% of the world's population. Hypertension is one of the major non-communicable diseases (NCDs) in the world. In 2019 an estimated 17.9 million people died from CVDs, representing 32% of all global deaths, among them 85% were due to heart attack and stroke [5]. Lowering the BP is prime target to prevent organ damage and consequence of hypertension [6]. It was found that every 2 mm Hg decrease in mean SBP results into 7% reduction in the risk of ischemic heart disease mortality, and a 10% reduction in the risk of stroke mortality.[7] Achieving blood pressure (BP) goals is a continuing challenging task.

Increased blood pressure will leads to acute complications like left ventricular failure, ischemic heart disease, cerebral haemorrhage. Delayed complications like atherosclerosis, tunica intimal damage with inflammation lacunars infarcts in brain, cerebral hemorrhage, chronic kidney disease, and decreased NO production [8,9]. To control blood pressure certain group of drugs are used they are alfa blockers, beta blockers, calcium channel blockers, angiotensin converting enzyme (ACE) inhibitors, angiotensin receptor blockers (ARB).

Healthy life style is mandatory. The life style modifications include weight reduction in overweight or obese patients (BMI<25kg/m2), dietary salt restriction (<6g/d), adopting DASH (Dietary approaches to stop hypertension), eating plan which is rich in fruits, vegetables, low fat dietary products with reduced content of saturated and total fat, moderation in alcohol consumption and mental relaxation techniques, physical activity with brisk walk for 30 mins daily [10,11].

Olmesartan medoxomil is a non-peptide angiotensin II receptor antagonist. The drug acts by selectively blocking angiotensin II type 1 receptor sites in vascular smooth muscle, thereby inhibiting the vasoconstrictor effects of angiotensin II.[12] It is a pro-drug that is rapidly hydrolyzed into Olmesartan & absorbed from the gastrointestinal tract into the body. The peak plasma concentration reaches in 1to 2 hrs.

Telmisartan angiotensin receptor blocker (ARB) shows high affinity for the angiotensin II type 1 (AT1) receptors. In addition to blocking these receptors, it acts as a selective modulator of peroxisome proliferator-activated receptor gamma (PPAR-γ), a central regulator of insulin and glucose metabolism.[13] Peak plasma levels are obtained 0.5-1 hour after oral administration and the plasma t1/2 is ~24 hours.

Materials and Methods

This was a randomized, open label, parallel group, comparative study conducted in 120 patients of Stage I hypertension carried out from January 2021to June 2022. Patients were recruited from the cardiology outpatient department (OPD) of Shaheed Suhrawardy Medical College hospital. Newly diagnosed patients of Stage I hypertension of either gender with age >18 years, willing to participate, and ready to give written informed consent were included in the study. After taking a thorough history, clinical examination and biochemical investigations patients were randomly allocated to two age and sex matched groups of 60 cases each. Group I patients were started on Olmesartan at a dose of 20mg/d.

Group II patients were put on Telmisartan at a dose of 40 mg/d. Blood pressure was measured in supine and sitting positions at all the visits. Patients fulfilling the inclusion criteria after verifying exclusion criteria were included. Inclusion and exclusion criteria were as follows:

Inclusion criteria

1) Patients with stage I hypertension.

2) Adult male/ female aged 21 years or older and nonpregnant females not planning for conception.

3) Patient should not be on any other antihypertensive medication.

Exclusion criteria

1) Patient with history of hypersensitivity to Olmesartan or Telmisartan.

2) Pregnant / lactating/ women planning to conceive.

3) Patient with history of refractory, secondary or malignant hypertension.

4) Patient with history of renal and hepatic disease.

5) Patient unwilling or unable to comply with the study proceedings to give informed written consent.

6) Patient with history of stroke, myocardial infarction, cerebral

7) Haemorrhage and hypertensive encephalopathy Blood pressure, both systolic and diastolic was recorded by mercury sphygmomanometer and efficacy assessment was done by measuring blood pressure in supine and sitting positions on right arm after 10 min of rest. Blood pressure was measured at baseline and at every 2 weeks for 16 weeks.

Statistical Analysis

Clinical manifestations were expressed with mean ± SD and percentage. Reduction of BP, FBS and lipid profile before and after treatment in each groups the paired unpaired't' test was used. Statistical analysis was performed using SPSS software version 20.

Result

A total of 120 patients of stage 1 hypertension were enrolled from January 2021 to June 2022 from cardiology outpatient department of Shaheed Suhrawardi Medical College Hospital. Patients were divided into two group. Group I patients were on Tab. Olmesartan 20mg tablet and group II patients were put on tab. Telmisartan at a dose of 40mg / day.

Sl. No	Particular	No of patients	Percentage
1	Chest pain	30	25
2	Fatigue	27	22.5
3	Severe headache	22	18.3
4	Difficulty in breathing	20	16.6
5	Confusion	13	10.8
6	Irregular heart beat	15	12.5
7	Vision problems	10	8.3

Table 1: The clinical manifestations of essential hypertensive patients chest pain 30(25%) fatigue 27(22.5%), severe headache 22(18.3%) difficulty in breathing 20(16.6%) confusion13 (10.8%), irregular heart beat 15(12.5%) and vision problem 10(8.3%)

Characteristics	Olmesartan (n=60)	Telmisartan (n=60)	P
Age	46.1±8.60	48.56±9.55	0.56
Gender Men Women	 39 21	 36 24	
DBP	92.07±2.545	92.53±2.345	.469
SBP	147.67±3.407	149.00±2.545	.092
FBGL	89.85±12.60	93.86±11.65	.072
TC	170.6±6.28	185.9±7.68	.06
TG	165.9±7.82	169.8±8.82	.048
HDL	47.5±5.46	48.64±5.27	.061
LDL	125.64±6,05	138.62±5.27	.016

Table 2: Baseline demographic data and clinical characteristics of hypertensive patients in two groups.

Values are expressed as mean (SD). Age in years, BP measured in mmHg and lipid profile in mg/dl. FBGL=-Fasting blood glucose level, TC=Total cholesterol, TG=Triglycerides, HDL=High density lipoprotein, LDL=Low density lipoprotein, DBP=Diastolic blood pressure, SBP=Systolic blood pressure, SD=Standard deviation, BP=Blood pressure

In our study age of the patients were 46.1±9.55 in Olmesartan and Telmisartan group respectively. Male patients were 39 and 36 and female patients were 21 and 24 in Olmesartan and Telmisartan group. Fasting blood sugar were 89.85±12.60 and 93.80±11.65 mg in group-I and group-II. Serum lipid profiles were almost similar in both group.

Drug	Parameters	Baseline	2 weeks	4 weeks	8 weeks	12 weeks
Olmesartan (n=60)	DBP	92.07±2.545	86.60±2.415	85.20±2.074	81.73±2.016	80.30±2.179
	SBP	147.67±3.407	141.60±2.749	135.87±2.029	131.60±1.923	127.95±2.993
Telmisartan (n=60)	DBP	92.53±2.345	89.93±2.258	86.33±2.039	82.73±1.779	81.13±1.008
	SBP	149.00±2.545	143.734±3.139	136.80±1.789	131.67±1.583	127.73±3.0
P value		0.469	0.031	0.057	0.046	0.113
		0.092	0.007	0.064	0.0078	0.798

Table 3: Comparison of Olmesartan and Telmisartan on the parameters of DBP and SBP at certain period.

In The study of mean value of base line in DPB 92.07(SD±2.545) in olmesartan, 92.53. (SD±2.345) in Telmisartan, P value (P>0.92) is insignificant. similarly the mean value of SBP was 147.67 (SD±3.407)in olmesartan 149(SD±2.545) in Telmisartan and P value was in significant (P>0.08) In the study of 2nd week, the mean value of olmesartan in DBP was 86.60(SD±2.415), 89.93(SD2.258) in Telmisartan and P value was highly significant (P<0.01) In study of SBP mean value of olmesartan was 141.60(SD±2.74), 143.743(SD±3.139) Telmisartan and P value was highly significant (P<0.01) In the 4th week, the mean value of DBP in the olmesartan was 85.20(SD±2.415) 86.33(SD2.029) Telmisartan and P value was highly significant (P<0.01). in SBP mean value of SBP in olmesartan was 135.87(SD±2.074) 136.80 (SD±1.789) Telmisartan and P value was highly significant (P<0.01). In the study of 8th week comparison olmesartan and telmisartan – Mean value of DBP in olmesartan was 81.73(SD±2.016) 82.73 (SD±1.779) and P value was highly significant (P<0.01). In SBP study mean value of olmesartan 131.60(SD±1.923) 131.67 (SD±1.583) P value was highly significant (P<0.01). In the 12th week of the study the mean value of DBP

80.30(SD±2.175) in olmesartan, 81.13 (SD±1.008)

Telmisartan and P value was highly significant (P<0.01). In SBP study the mean value in Olmesartan patients 127.93(SD±2.993) 127.73 (SD±3,0) Telmisartan and P value was highly significant (P<0.01)

Sl. No.	Particular	Olmesartan	Telmisartan
1	Headache	3(5.0%)	-
1	Dizziness	-	2 (3.33%)

Table 4: The study adverse effects were headache 3(5.0%) observed with olmesartan and dizziness 2(3.33%) observed in telmisartan.

Overall, the study drugs were well tolerated. No serious adverse events related to treatment were reported. The percentage of patients experiencing adverse events considered to be related to treatment was 5% in the olmesartan and 3.3% in telmisartan group

Table 5: Comparison of changes in blood glucose and lipid profile from baseline to 12 weeks in treatment groups

Parameters	Olmesartan	Telmisartan	P value
FBGL	2.65±0.53	3.80±.88	.001
TC	12.65±2.25	8.93±2.75	.001
TG	5.65±0.51	8.82±0.91	.001
HDL	0.65±.08	0.92±0.03	.001
LDL	8.10±1.83	15.60±1.82	.001

There was statistically significant decrease in mean blood glucose level ($P < 0.001$) after 12 weeks of treatment only in telmisartan group which was not seen in olmesartan group when compared to baseline. However, it was observed that serum total cholesterol (TC), triglycerides (TGs), and low density lipoproteins (LDL) decreased significantly after 12 weeks treatment with olmesartan and telmisartan.

Discussion

The principal finding of our study indicates that in patients with Stage I hypertension, treatment with Olmesartan and telmisartan provided significant antihypertensive effect at 2, 4, 8, and 12 weeks. This is consistent with the findings from previous studies. [14,15,16] In our study, there was significant difference in reduction of cuff DBP, between olmesartan and telmisartan. It indicates that olmesartan and telmisartan is more efficacious in reducing cuff DBP. These observations are in line with the findings of previous studies[17] The characteristic effect of telmisartan in decreasing the diastolic BP may be related to its long half-life.[12] The greater efficacy of olmesartan in reducing trough cuff DBP may be related to its relatively long half-life of 12–18 hrs. [14,18]

The long half-life of drug such as olmesartan may minimize the effect of missed or delayed dosing of medication.[19] McMahon et al. reported that a reduction in DBP of 5 mmHg is associated with reductions of at least 21% in the incidence of CHD and at least 34% in the incidence of stroke.[20] However, there was no significant difference in the reduction of cuff DBP between olmesartan and telmisartan group suggesting that both the drugs are equally efficacious in reducing DBP. Arao et al. found no difference between olmesartan and telmisartan group with respect to the antihypertensive effect on the BP.[21] Olmesartan shows high selectivity and strong binding to AT1 receptors while telmisartan has been reported to have a longer residence time on AT1 receptors that contributes to a more sustained antihypertensive effect.[22] In our study, there was significant difference in reduction of SBP between olmesartan and Telmisartan group. Our findings are consistent with findings from previous studies. [23] In our study, telmisartan significantly reduced the FBGLs at 12 weeks which was not seen with Olmesartan.

Previous studies have also shown that telmisartan (40 mg) once daily results in a significant improvement in glucose metabolism in insulin-resistant subjects with improvement in beta-cell function.[24] Blockade of angiotensin II receptor can promote adipocyte differentiation and this may contribute to the antidiabetic effect.[25] However, among ARBs, only telmisartan has blood glucose-lowering effect, indicating that telmisartan has pleiotropic effect on glucose metabolism independent of the angiotensin II receptor antagonist effect.[26] Recently, telmisartan has been shown to function as a partial agonist of peroxisome proliferator-activated receptor-gamma (PPAR-γ) while other ARBs did not have effect on PPAR-γ activity.[24] Many studies have shown that PPAR-γ plays an important role in regulation of carbohydrate and lipid metabolism and that activation of PPAR-γ can improve insulin sensitivity.[27] Results of our study indicated that telmisartan significantly reduced serum TGs and LDL cholesterol. Telmisartan significantly reduced LDL cholesterol when compared with olmesartan. However, the reduction of serum TG is not signif-

icant in telmisartan group when compared with olmesartan group. Telmisartan activates PPAR-γ, which regulates lipid metabolism.

Conclusion

Olmesartan and telmisartan are equally efficacious in reducing DBP. Olmesartan, when compared to telmisartan is more efficacious in reducing SBP. Whereas Telmisartan shows the most favorable effects on FBG and lipid profile. However, long term studies are needed to confirm are this effect.

References

1. Esunge PM. From blood pressure to hypertension: the history of research. Journal of the Royal Society of Medicine 199;84(10):621.
2. Michel T, Hoffman B. Treatment of Myocardial Ischemia and Hypertension. In: Brunton LL, Chabner BA, Knollmann BC editors. Goodman & Gilman's The Pharmacological Basis of Therapeutics. 12th ed. New York: McGraw Hills; 2011.p. 766.
3. Venkateswaramurthy M, Dileep M, Perumal P. Management of Hypertension in patients with Diabetes. Asian J Pharm Clin Res 2011;4 Suppl(2):40-41.
4. Lim SS, Vos T, Flaxman AD, Danaei G, Shibuya K, Adair-Rohani H, et al. A comparative risk assessment of burden of disease and injury attributable to 67 risk factors and risk factor clusters in 21 regions, 1990-2010: a systematic analysis for the Global Burden of Disease Study 2010. The Lancet. 2012; 380(9859): 2224–60.
5. World Health Organization. (n.d.). Cardiovascular diseases (cvds). World Health Organization. Retrieved August 2, 2022, from https://www.who.int/news-room/fact-sheets/detail/cardiovascular-diseases-(cvds)
6. Dahlof B, Devereux RB, Kjeldsen SE, Julius S, Beevers G, de Faire U, Fyhrquist F, Ibsen H, Kristiansson K, Lederballe-Pedersen O, Lindholm LH, Nieminen MS, Omvik P, Oparil S, Wedel H. Cardiovascular morbidity and mortality in the Losartan Intervention For Endpoint reduction in hypertension study (LIFE): a randomised trial against atenolol. Lancet. 2002; 359: 995–1003.
7. Lewington S, Clarke R, Qizilbash N, et al. Age-specific relevance of usual blood pressure to vascular mortality: a meta-analysis of individual data of one million adults in 61 prospective studies. Lancet. 2002; 360: 1903–13.
8. McGhan Williams F. Introduction to Pharmacoeconomics. In: Arnold Renee JG, editors. Pharmacoeconomics from theory to practice. 10th ed. USA: Boca Raton CRC Press; 2010. p.4.
9. Dzay VI, Theodore, Copper- Tissue angiotensin and pathology of vascular disease a important hypothesis. Hypertension 2001, 37,1047-52
10. Zhang C, Hein TW- Divergent roles of angiotensin II AT1, and AT2 receptors in modulations coronary micro vascular function circ. Res.2003,92,322-329
11. Chobanian AV, Bakris GL, Black HR, Cushman C, Green Lee A, Izzo JL. et al. The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure: The JNC 7 Report. JAMA 2003;289(19):560-72.
12. Norwood D, Evans B III, Smith B, Honeywell M. Olmesartan Medoxomil for Hypertension: A Clinical Review. Drug Forecast 2002,27:611-18.
13. Yamagishi S, Takeuchi M. Telmisartan is a promising cardiometabolic sartan due to its unique PPAR-gamma inducing activity. Med hypotheses 2005;64.
14. Oparil S, Williams D, Chrysant SG, Marbury TC, Neutel J. Comparative efficacy of olmesartan, losartan, valsartan, and irbesartan in the control of essential hypertension. J Clin Hypertens (Greenwich) 2001;3:283 91, 318.
15. Akat PB, Bapat TR, Murthy MB, Karande VB, Burute SR. Comparison of the efficacy and tolerability of telmisartan and enalapril in patients of mild to moderate essential hypertension. Indian J Pharmacol 2010;42:153 6.
16. Kumbla DK, Kumar S, Reddy YV, Trailokya A, Naik M. WIN OVER study: Efficacy and safety of olmesartan in Indian hypertensive patients: Results of an open label, non comparative, multi centric, post marketing observational study. Indian Heart J 2014;66:340 4.
17. Samra SS, Dongre N, Ballary C, Desai A. Comparison of the efficacy, safety and tolerability of telmisartan with losartan in Indian patients with mild to moderate hypertension: A pilot study. J Indian Med Assoc 2003;101:327 8.
18. Schwocho LR, Masonson HN. Pharmacokinetics of CS 866, a new angiotensin II receptor blocker, in healthy subjects. J Clin Pharmacol 2001;41:515 27
19. MacMahon S, Peto R, Cutler J, Collins R, Sorlie P, Neaton J, et al. Blood pressure, stroke, and coronary heart disease. Part 1, prolonged differences in blood pressure: Prospective observational studies corrected for the regression dilution bias. Lancet 1990;335:765 74.
20. Arao T, Okada Y, Mori H, Nishida K, Tanaka Y. Antihypertensive and metabolic effects of high dose olmesartan and telmisartan in type 2 diabetes patients with hypertension. Endocr J 2013;60:563 70
21. Burnier M, Brunner HR. Angiotensin II receptor antagonists. Lancet 2000;355:637 45
22. Wang L, Zhao JW, Liu B, Shi D, Zou Z, Shi XY. Antihypertensive effects of olmesartan compared with other angiotensin receptor blockers: A meta analysis. Am J Cardiovasc Drugs 2012;12:335 44.
23. Benson SC, Pershadsingh HA, Ho CI, Chittiboyina A, Desai P, Pravenec M, et al. Identification of telmisartan as a unique angiotensin II receptor antagonist with selective PPARgamma modulating activity. Hypertension 2004;43:993 1002.
24. Benson SC, Pershadsingh HA, Ho CI, Chittiboyina A, Desai P, Pravenec M, et al. Identification of telmisartan as a unique angiotensin II receptor antagonist with selective PPARgamma modulating activity. Hypertension 2004;43:993 1002.
25. Sharma AM, Janke J, Gorzelniak K, Engeli S, Luft FC. Angiotensin blockade prevents type 2 diabetes by formation of fat cells. Hypertension 2002;40:609 11.
26. Goebel M, Clemenz M, Unger T. Effective treatment of hypertension by AT(1) receptor antagonism: The past and future of telmisartan. Expert Rev Cardiovasc Ther 2006;4:615 29.
27. Berger JP, Petro AE, Macnaul KL, Kelly LJ, Zhang BB, Richards K, et al. Distinct properties and advantages of a novel peroxisome proliferator activated protein [gamma] selective modulator. Mol Endocrinol 2003;17:662 76.

Original Article

Correlation of degree and pattern of contrast enhancement on Magnetic Resonance Imaging with histopathological grade of intracranial astrocytoma

Khan MN[1], Shafiq S[2], Razzaque SS[3], Hossain SS[4]

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ABSTRACT:

Background/Objective: *Astrocytomas, a type of glioma, require accurate grading to guide treatment. This study evaluates the correlation between MRI contrast enhancement and histopathological grades of astrocytomas.*

Methods: *A cross-sectional study of 37 patients with biopsy-confirmed astrocytomas was conducted. Non-probability or purposive sampling was carried out. MRI scans assessed contrast enhancement characteristics, and tumors were classified radiologically and histopathologically.*

Results: *The age range of the patients was 11 to 74 years and mean age was 40.25±16.04 years. The male to female ratio was 4:1. Headache was the most common presenting symptoms (95%). Most of the tumors were located at the cerebral hemispheres (78%). None or slight contrast enhancement was found in 17 (46%) and the pattern of contrast enhancement was heterogeneous in 24 (65%) patients. Maximum 20 (54%) patients had high grade astrocytoma. In the present study, 85% high grade astrocytoma showed moderate to marked whereas 82.4% low grade astrocytoma showed none or slight contrast enhancement. Sensitivity & specificity of contrast enhanced MRI was 82.4% and 85% respectively. The overall accuracy was 83.78%.*

Conclusion: *MRI is a reliable non-invasive tool for grading astrocytomas, with strong correlation between contrast enhancement and tumor grade, supporting its use in clinical decision-making.*

Key Words:
Intracranial astrocytoma,
MRI contrast enhancement

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1. Dr. Mohammad Nuruzzaman Khan, Associate Professor, Department of Neurosurgery, Shaheed Suhrawardy Medical College & Hospital, Dhaka
2. Dr. Sabrina Shafiq, Assistant Professor, Department of Laboratory Medicine, Bangabandhu Sheikh Mujib Medical University, Dhaka
3. Dr. Syed Shahreor Razzaque, Assistant Professor, Department of Neurosurgery, Shaheed Suhrawardy Medical College & Hospital, Dhaka
4. Dr. Sk. Sader Hossain, Ex-Professor and Head of the Department of Neurosurgery, Dhaka Medical College & Hospital, Dhaka

Correspondence: Dr. Mohammad Nuruzzaman Khan, Associate Professor, Department of Neurosurgery, Shaheed Suhrawardy Medical College & Hospital, Dhaka; Email: drkhosru71@yahoo.com; Mobile: 01711372392

Introduction

Astrocytomas are a common type of primary central nervous system tumor, originating from astrocytic glial cells, which are part of the brain's supportive tissue. These tumors represent approximately 50- 80% of all gliomas, which collectively account for 35-50% of intracranial tumors [1]. Astrocytomas are highly heterogeneous in terms of cellularity, vascular proliferation, mitotic activity, and necrosis— characteristics that influence both their classification and clinical behavior [2].

The World Health Organization (WHO) classifies astrocytomas from Grade I to Grade IV, depending on their degree of malignancy. Grade I tumors, such as pilocytic astrocytomas, are typically benign and often found in pediatric populations. In contrast, Grade IV astrocytomas, known as glioblastoma multiforme (GBM), are among the most aggressive and fatal forms of brain tumors [2]. The therapeutic management and prognosis for astrocytoma patients heavily depend on the accurate distinction between high-grade (Grade III-IV) and low-grade (Grade I-II) tumors [1].

Magnetic Resonance Imaging (MRI) has become an essential tool for the non-invasive diagnosis and grading of astrocytomas due to its superior soft tissue contrast and ability to provide detailed images of the tumor's structure and surroundings [4]. Contrast enhancement on MRI is particularly valuable for determining tumor grade, typically indicating disruption of the blood-brain barrier, which is more pronounced in high-grade astrocytomas [5]. Recent studies have shown that advanced MRI techniques, such as dynamic contrast-enhanced MRI, can enhance the reliability of differentiating astrocytoma grades. For example, a study using deep learning to improve the arterial input function during dynamic contrast-enhanced MRI found an increase in diagnostic performance for astrocytoma grading [6].

Moreover, recent evidence suggests that the level of vascular endothelial growth factor (VEGF) expression correlates well with MRI contrast-enhanced imaging findings, providing a useful biomarker for tumor progression. This study found that VEGF expression was significantly related to increased signal intensity and tumor angiogenesis [7]. Another study highlighted the importance of pharmacokinetic parameters obtained from dynamic susceptibility contrast-enhanced MRI as valuable biomarkers for predicting disease progression in anaplastic astrocytoma patients [8].

Despite the utility of MRI, the grading of astrocytomas can still present challenges, particularly when distinguishing between Grade III and Grade IV tumors, which often share overlapping imaging characteristics [9]. Asari et al. developed an MRI scoring system based on nine imaging criteria, including the degree of contrast enhancement and heterogeneity, to improve the accuracy of non- invasive tumor grading [9]. These criteria have been validated by subsequent studies and have shown a consistent correlation between imaging scores and histopathological grades, suggesting their usefulness in clinical practice [9]. The recent advancements in MRI technologies are proving to be a game-changer in the way clinicians can assess tumor severity and prognostic outcomes effectively.

The main objective of the study is to evaluate the relation between the degree & pattern of contrast enhancement on MRI of intracranial astrocytomas and its histopathologic grade.

Methodology

This study was a cross-sectional observational study conducted at Dhaka Medical College Hospital and Bangabandhu Sheikh Mujib Medical University from June 2008 to May 2009. The aim was to evaluate the correlation between MRI contrast enhancement and the histopathological grade of intracranial astrocytomas.

A total of 37 patients with biopsy-confirmed astrocytomas were included in this study. Non-probability or purposive sampling was carried out. Inclusion criteria were patients of all ages diagnosed with intracranial astrocytomas who were eligible for both MRI and subsequent biopsy. Patients with recurrent astrocytomas or previous surgical or radiotherapy treatments were excluded to avoid any influence on the grading accuracy.

The MR studies were performed on 1.5T imager mostly, though in some cases it was done by lower imager (0.3T) also. T1-weighted and T2-weighted and contrast enhanced axial, sagittal and coronal images along with FLAIR images were obtained. The MRI of all cases were reviewed preoperatively in respect to their contrast enhancement characters (degree and pattern of contrast enhancement). The contrast enhancement characters (degree and pattern of contrast enhancement) scored on a scale as described by Asari et al. (1994) and Riemann et al. (2002), is summarized in Table 1. [9,10]

Table 1: Contrast Enhancement Criteria and Score

Contrast Enhancement Character		Score
Degree of Contrast Enhancement	None	0
	Slight	1
	Moderate	2
	Marked	3
Pattern (Heterogeneity) of Contrast Enhancement	None	0
	Homogeneous	1
	Heterogeneous	2

By using the contrast enhancement characters on MRI, the astrocytomas were divided into two-tier grading system: radiologically low- versus high-grade (Table - 2) (Law et al. 2003). The radiological diagnosis (low- versus high-grade) was then compared statistically with the histological diagnosis (low- versus high-grade) [11].

Table 2: Degree of Contrast Enhancement and Radiological Grade

Degree of Contrast Enhancement	Radiological Grade
None or Slight Enhancement	Low Grade
Moderate or Marked Enhancement (Homogeneous or Heterogeneous)	High Grade

Biopsy material was collected during surgery or by endoscopic procedure. The Neoplasms were assigned the tumor grade, ranging from I to IV, according to the criteria of the revised WHO classification. For the purposes of this study, the histological diagnosis was categorized into low-grade (Grade-I & II) and high grade (Grade-III & IV) tumors. The radiological diagnosis (low versus high grade) was then compared statistically with the histological diagnosis (low versus high grade).

Statistical Analysis

Statistical analysis was carried out using the SPSS software package (version 22). The MRI scores were presented as mean ± standard deviation (SD). An unpaired Student t-test was used to evaluate statistical differences between groups. To evaluate the diagnostic performance of MRI in predicting the histopathological grade, sensitivity, specificity, and accuracy were calculated.

Results

The study included a total of 37 patients whose ages ranged from 11 to 74 years, with a mean age of 40.25 ± 16.04 years. The peak incidence was observed in the age group of 31-40 years, accounting for 30% of the patients (11 cases). The male-to-female ratio was approximately 4:1, with 30 males (81%) and 7 females (19%) Table 3 summarizes the demographic and clinical characteristics of the patients, including age, sex, mode of presentation, tumor location, and biopsy technique.

Table 3: Distribution of Patients by Demographic and Clinical Characteristics

Vaiable	Criteria	Frequency	Percentage (%)
Age Group	11-20	5	14
	21-30	6	16
	31-40	11	30
	41-50	4	11
	51-60	7	19
	61-70	3	8
	71-80	1	3
Sex	Male	30	81
	Female	7	19
Mode of Presentation	Headache	35	95
	Vomiting	23	62
	Visual Disturbance	17	46
	Seizure	17	46
	Hemiparesis	14	38
	Dysphasia	5	14
	Mental Dysfunction	8	22
	Cerebellar Dysfunction	4	11
	Long Tract Sign/Cranial Nerve Palsy	3	8
Location of Astrocytoma	Hemispheric/Lobar	29	78
	Diencephalic	4	11
	Cerebellar	4	11

The most common presenting symptom was headache, which was reported by 35 patients (95%). Other common symptoms included vomiting (62%), visual disturbances (46%), and seizures (46%). Hemispheric or lobar tumors were the most common, observed in 29 patients (78%), while the remaining tumors were found in the diencephalon and cerebellum (11% each).

24% patients showed no enhancement whereas 8 (22%) patients showed slight contrast enhancement. Moderate and marked contrast enhancement on MRI was demonstrated in 4 (11%) patients and 16 (43%) patients respectively. Regarding pattern (heterogeneity) of contrast enhancement, homogeneous and heterogeneous contrast enhancement were found in 4 (11%) and 24 (65%) patients respectively (Table-04).

Table 4: The distribution of the pattern (heterogeneity) of contrast enhancement on MRI

Pattern heterogeneity of contrast enhancement	Frequency	Percentage
None	9	24
Heterogeneous	4	11
Heterogeneous	24	65

The tumors were radiologically graded based on their MRI contrast enhancement characteristics as either low-grade or high-grade. Radiologically, 17 tumors (46%) were classified as low-grade due to the absence or slight degree of contrast enhancement, while 20 tumors (54%) were classified as high- grade due to moderate or marked enhancement. Histopathological examination following biopsy confirmed 17 tumors (46%) as low-grade (WHO Grade I and II) and 20 tumors (54%) as high-grade (WHO Grade III and IV). Table 5 provides a summary of the distribution of radiological and histopathological grading.

Table 5: Distribution of Radiological and Histopathological Grades

Criteria		Frequency	percent
Radiological Diagnosis (MRI)	No/slight enhancement (Low-grade)	17	46
	Moderate to marked enhancement (High-grade)	20	54
Histopathological Grade	Low Grade (WHO Grade I & II)	17	46
	High Grade (WHO Grade III & IV)	20	54

Histopathological examination further classified the tumors into specific WHO grades (table-6). Among the 37 patients, 7 (19%) had WHO Grade I astrocytomas (pilocytic astrocytomas), 10 (27%) had WHO Grade II astrocytomas, 10 (27%) were diagnosed with WHO Grade III astrocytomas (anaplastic astrocytomas), and another 10 (27%) had WHO Grade IV astrocytomas (glioblastoma multiforme).

Table-6: Histopathological WHO grade of astrocytomas

WHO grade	Frequency	percent
WHO Grade I (pilocytic astrocytomas)	7	19%
WHO Grade II (astrocytomas)	10	27%
WHO Grade III (anaplastic astrocytomas	10	27%
WHO Grade IV (glioblastoma multiforme)	10	27%

The mean MR imaging scores of degree of contrast enhancement showed LGA had a significant lower value than that of high grade astrocytomas (grade III, P .005 and grade IV, P .003). However, there was no significant difference between high grade astrocytomas (grade III & IV, P .051). Same result came out in case of degree and pattern of contrast enhancement (Table 7).

Table 7: Mean MRI Scores of Contrast Enhancement by Pathological Grade

Pathological Grade	Mean MRI Scores of degree of contrast enhancement	Mean MRI scores of pattern of contrast enhancement
WHO Grade I & II (LGA)	0.82 ± 1.01	0.82 ± 0.88
WHO Grade III (AA)	2.10 ± 1.10	1.80 ± 0.63
WHO Grade IV (GBM)	2.90 ± 0.32	2.00 ± 0.00

Statistical analysis using the unpaired Student's t-test revealed significant differences in the mean MRI scores for contrast enhancement between low-grade and high-grade astrocytomas ($p < 0.05$). Specifically, there was a significant difference between low-grade astrocytomas and both WHO Grade III ($p = 0.005$) and Grade IV ($p = 0.003$) astrocytomas. However, no significant difference was observed between WHO Grade III and Grade IV astrocytomas ($p = 0.051$). Similar results were found for the pattern of contrast enhancement, with significant differences between low-grade and high-grade astrocytomas, but no significant difference between Grade III and Grade IV, as shown in Table 8.

Table 8: Statistical Analysis of MRI Scores (Unpaired Student's t-test)

Group Comparison		P value (Degree of Contrast Enhancement)	P value (Pattern of Contrast Enhancement)
LGA	AA	.005	.003
LGA	GBM	.003	.001
AA	GBM	.051	.343

The diagnostic accuracy of MRI in determining tumor grade was assessed by comparing radiological and histopathological findings. MRI correctly identified the grade in 14 out of 17 patients with low- grade astrocytomas

(82.4%) and in 17 out of 20 patients with high-grade astrocytomas (85%). The sensitivity of MRI for identifying high-grade astrocytomas was 82.4%, while the specificity for identifying low-grade astrocytomas was 85%. The overall accuracy of MRI in grading astrocytomas was 83.78%. Table 9 provides a cross-tabulation of radiological and histopathological findings, demonstrating that MRI was effective in identifying the correct grade for the majority of tumors.

Table 9: Correlation of Radiological Diagnosis and Histopathological Grade (Cross-tabulation)

Radiological diagnosis (MRI) Count (% within radiological diagnosis)	Histopathological grade		Total
	Low grade	High grade	
Low grade	14 (82.4%)	3 (17.6%)	17 (100.0%)
High grade	3 (15.0%)	17 (85.0%)	20 (100.0%)
Total	17 (45.9%)	20 (54.1%)	37 (100.0%)

Discussion

Gliomas are the most common form of intracranial neoplasm, accounting for between 35-50% of all intracranial tumors, with astrocytomas constituting 50-80% of gliomas [3]. The management and prognosis of astrocytomas heavily depend on distinguishing between high-grade and low-grade varieties. Magnetic Resonance Imaging (MRI) has established itself as a critical non-invasive diagnostic tool for evaluating patients with astrocytomas, helping clinicians make crucial decisions regarding treatment planning [12].

Patient Characteristics and Presentation

In the present study, the patient age ranged from 11 to 74 years, with a mean age of 40.25 ± 16.04 years, which is consistent with the typical presentation of astrocytomas seen in clinical practice. The highest incidence was in the 31-40-year age group (30%), which aligns with the understanding that benign astrocytomas tend to present earlier than malignant ones, with incidence declining after the age of fifty [3]. The male-to-female ratio in this study was 4:1, which is higher compared to the 3:1 ratio noted in standard literature [5]. This finding might be attributed to regional or sample-specific variations.

The clinical presentation of astrocytomas varies based on tumor location and grade. In this study, 95% of patients presented with headache, followed by vomiting (62%), visual disturbances (46%), and seizures (46%). These findings are in line with previous observations that supratentorial gliomas typically present with symptoms of raised intracranial pressure (ICP), seizures, or focal neurological deficits [5]. Most tumors were located in the cerebral hemispheres (78%), with the remainder found in the diencephalon (11%) and cerebellum (11%). This supports the common understanding that supratentorial regions are a prevalent site for high-grade astrocytomas [5].

MRI Contrast Enhancement and Grading

The grading of astrocytomas in this study was conducted using both radiological and histopathological criteria. The World Health Organization (WHO) grading system was used, which classified 19% of the tumors as Grade I (pilocytic astrocytomas) and 27% as Grade II astrocytomas. WHO Grade III (anaplastic astrocytomas) and Grade IV (glioblastoma multiforme, GBM) each accounted for 27% of the cases. These findings are consistent with those from Riemann et al. (2002), where 31.25% of cases were low-grade and 68.75% were high-grade [10].

In this study, MRI-based contrast enhancement characteristics were used to determine tumor grade. The mean MRI score for the degree of contrast enhancement significantly increased with tumor grade. Low- grade astrocytomas had significantly lower enhancement scores compared to high-grade astrocytomas (Grade III, $p < 0.01$; Grade IV, $p < 0.01$). These results align well with previous findings by Asari et al. (1994) and Riemann et al. (2002), who both reported that higher grades of astrocytomas exhibited greater degrees of enhancement [9,10]. Tervonen et al. (1992) also demonstrated a direct correlation between contrast enhancement and tumor grade, further validating the use of MRI as a reliable method for non-invasive tumor grading [11]. Similar to the degree of contrast enhancement, the pattern (heterogeneity) of contrast enhancement also differed significantly between low- and high-grade tumors.

Figure 1a and 1b illustrate a pre-contrast and post-contrast T1-weighted (T1W) image, respectively, showing no visible enhancement. The histopathological analysis confirmed this tumor as WHO Grade I (pilocytic astrocytoma).

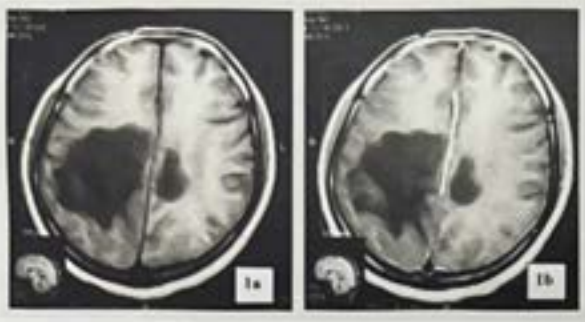

Figure 1a: Pre-contrast T1W image showing no contrast enhancement. Histopathology confirmed WHO Grade I (pilocytic astrocytoma). Figure 1b: Post-contrast T1W image showing no contrast enhancement. Histopathology confirmed WHO Grade I (pilocytic astrocytoma).

Similarly, Figures 2a and 2b represent a pre-contrast and post-contrast T1W image, respectively, demonstrating slight heterogeneous contrast enhancement. The histopathological examination revealed this as a WHO Grade II astrocytoma.

Figure 2a: Pre-contrast T1W image showing slight heterogeneous contrast enhancement. Histopathology revealed WHO Grade II astrocytoma. Figure 2b: Post-contrast T1W image showing slight enhancement. Histopathology revealed WHO Grade II astrocytoma.

Diagnostic Accuracy of MRI

The diagnostic performance of contrast-enhanced MRI in grading astrocytomas was evaluated, revealing a sensitivity of 82.4%, specificity of 85%, and an overall accuracy of 83.78%. These findings indicate that MRI is a valuable tool for preoperative grading, offering significant insights into tumor aggressiveness and guiding treatment decisions. The sensitivity and specificity observed in this study are comparable to those reported by Riemann et al. (2002), who found a sensitivity of 91% and a specificity of 80%, with an accuracy of 88% [10]. This correlation supports the robustness of MRI as a diagnostic modality, though slight variations in findings may be attributed to differences in sample size and imaging quality.

Previous studies have similarly reported high sensitivity and specificity for MRI in determining tumor grade. Hakyemez et al. (2006) found that 88.5% of high-grade gliomas demonstrated moderate to extensive enhancement following contrast administration, while 88.8% of low-grade gliomas exhibited minimal or no enhancement [14]. Shin et al. (2002) reported that 90.9% of high-grade gliomas showed moderate to strong enhancement, whereas 71.4% of low-grade gliomas exhibited mild or no enhancement [15]. These findings are in line with our study, demonstrating the utility of MRI contrast enhancement in accurately predicting tumor grade.

Limitations and Future Directions

Despite the promising findings, there are limitations to this study that should be acknowledged. The sample size was relatively small, limiting the generalizability of the results. Moreover, the study used MRI machines with different field strengths (0.3 Tesla and 1.5 Tesla), potentially introducing variability in image quality and influencing the assessment of contrast enhancement. Additionally, the histopathological examination was not conducted in a single center, which could lead to variability in grading accuracy. Future studies with larger, multicentric cohorts and standardized imaging protocols could provide more definitive evidence of MRI's diagnostic value.

Conclusion

The study highlights that MRI is a reliable tool for the non-invasive grading of astrocytomas, with good agreement between radiological and histopathological findings. The degree and pattern of contrast enhancement are significant predictors of tumor grade, and MRI demonstrates high sensitivity and specificity in distinguishing low-grade from high-grade astrocytomas. Despite limitations such as sample size and variability in MRI quality, the findings support the role of MRI as an integral part of the diagnostic process for astrocytomas.

References

1. Tandon PN. Supratentorial astrocytoma. In: Ramamurthy B, Tandon PN, editors. Textbook of Neurosurgery. 2nd ed. Delhi: B.I. Churchill Livingstone; 1996. p. 888-905.
2. Kleihues P, Burger PC, Scheithauer BW. The new WHO classification of brain tumours. Brain Pathol. 1993;3(3):255-68.
3. Greenberg MS. Handbook of Neurosurgery. New York: Thieme Medical Publishers; 2001. p. 386-505.
4. Watanabe M, Tanaka R, Takeda N. Magnetic resonance imaging and histopathology of cerebral gliomas. Neuroradiology. 1992;34:463-9.
5. Holodny AI, Nusbaum AO, Festa S, Pronin IN, Lee HJ, Kalnin AJ. Correlation between the degree of contrast enhancement and the volume of peritumoral edema in meningiomas and malignant gliomas. Neuroradiology. 1999;41:820-5.
6. Choi K, You S, Han Y, Ye JC, Jeong B, Choi S. Improving the reliability of pharmacokinetic parameters at dynamic contrast-enhanced MRI in astrocytomas: A deep learning approach. Radiology. 2020; DOI: 10.1148/radiol.2020192763.
7. Roux A, Tran S, Edjlali M, et al. Prognostic relevance of adding MRI data to WHO 2016 and cIMPACT-NOW updates for diffuse astrocytic tumors in adults. Brain Pathol. 2020; DOI: 10.1111/bpa.12929.
8. Kim HS, Kwon SL, Choi S, et al. Prognostication of anaplastic astrocytoma patients: application of contrast leakage information of dynamic susceptibility contrast-enhanced MRI and dynamic contrast-enhanced MRI. Eur Radiol. 2020; DOI: 10.1007/s00330-019-06598-7.
9. Asari S, Makabe T, Katayama S, Itoh T, Tsuchida S, Ohmoto T. Assessment of the pathological grade of astrocytic gliomas using an MRI score. Neuroradiology. 1994;36:308-10.
10. Riemann B, Schuierer G, Huk W. MR assessment of tumor heterogeneity and angiogenesis in gliomas. J Comput Assist Tomogr. 2002;26(6):923-32.
11. Tervonen O, Ramsay L, Myllylä V, Lapinlampi T, Kurki T, Kalviainen R. Contrast enhancement and glioma grading: correlation with tumor proliferation. Neuroradiology. 1992;34:459-63.
12. Rees JH, Smirniotopoulos JG, Jones RV, Wong K. Glioma grading: correlation with histopathologic classification—MR imaging study. Radiology. 1996;201:481-9.
13. Law M, Oh S, Babb JS, Young RJ, Pollack E, Johnson G, et al. Low-grade gliomas: dynamic susceptibility-weighted contrast-enhanced perfusion MR imaging—prediction of patient clinical response. Radiology. 2003;229(1):172-80.
14. Hakyemez B, Erdogan C, Gokalp G, Dusak A, Parlak M. High-grade and low-grade gliomas: differentiation by using perfusion MR imaging. Clin Radiol. 2006;61(11):811-9.
15. Shin JH, Lee HK, Kwun BD, Kim JS, Kang W, Choi CG, et al. Prediction of oligodendroglioma grading using perfusion weighted MRI and correlation with histopathologic vascular density. AJR Am J Roentgenol. 2002;179(3):783-9.

Original Article

Pelvic Organ Prolapse Suspension (POPS) for Obstructive Defecation Syndrome (ODS) : Functional Outcome

Fatema MB[1], Onni SA[2], Shaha KP[3], Shaheed N[4], Farhad-Ul-Hassan ASM[5], Habib MA[6]

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ABSTRACT:

Background: *Genital apparatus represents the anatomical support for the bladder and rectum, therefore, inevitably the genital prolapse implies serious anatomical and functional alterations of these organs. Pelvic organ prolapse is one of the most common pathological conditions in postmenopausal women.Pelvic organ prolapse suspensions (POPS) is a recent surgical procedure for one-stage treatment of multiorgan female pelvic prolapse.*

Methods: *This observational study evaluated the preliminary results of POPS of 42 women with a mean age of 50 within 4 years of period. Patients underwent posterior colpoperineorrhaphy to correct residual rectocele and hiatal enlargement at the same time.*

Results: *We had no relapses and the preliminary results were excellent. We evaluated the patients after 6 months follow-up and confirmed the validity of our treatment. The technique is simpler than traditional treatments with an important reduction or completely disappearance of the pre-operative symptoms.*

Conclusion: *Uterus-preserving pops operation was found to be safe and effective with high patient satisfaction rates and simultaneous correction of anterior prolapse. Significant improvements in patients quality of life.*

Key Words:
POPS (Pelvic Organ Prolapse Suspension); ODS (Obstructive defecation syndrome); colpoperineorrhaphy, QOL(Quality of life)

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1. Dr. Most. Bilkis Fatema, Assistant Professor, Department of Colorectal Surgery, Dhaka Medical College, Dhaka
2. Dr. Sabrin Akter Onni, Phase B Resident of Colorectal Surgery, Department of Colorectal Surgery, Bangabandhu Sheikh Mujib Medical University, Dhaka.
3. Dr. Krisna Pada Shaha, Assistant Professor, Department of Colorectal Surgery, Bangabandhu Sheikh Mujib Medical University, Dhaka.
4. Dr. Nusrat Shaheed, Assistant Professor, Department of Surgery, Abdul Malek Ukil Medical College, Noakhali, Bangladesh
5. Dr. A.S.M Farhad-Ul-Hassan, Consultant, Department of Surgery, Shaheed Suhrawardy Medical College, Dhaka.
6. Dr. Md. Ahsan Habib, Associate Professor, Department of Surgery, Dhaka Medical College, Dhaka.

Correspondence: Dr. Most. Bilkis Fatema, Assistant Professor, Department of Colorectal Surgery, Dhaka Medical College, Dhaka
E-mail: drbilkisfatema@yahoo.com, Mobile no- 01711392740

Introduction

Obstructive defecation syndrome (ODS) is one type of primary functional constipation. About 50 percent of patients of constipation suffer from this syndrome.[1] The term "Obstructive defecation syndrome" includes difficult evacuation, feeling of incomplete evacuation, excessive straining during defecation, use of mechanical aids such as enemas, digitation of the vaginal vault / perineum, manual evacuation of stool. Prolonged time needed to defecate. This syndrome may result from a rectocele, rectoanal or rectorectal intussusception, paradoxical puborectalis contraction, pelvic organ prolapse, sigmoidocele, or enterocele. ODS patients who are having pelvic organ prolapse, 11% of women need pelvic organ prolapse surgery.[2] Now-a-days many options for pelvic organ prolapse surgery are available such as Sacro-colpopexy, uterosacral ligament suspension and rectocolposacropexy, but none of them has excellent result on terms of long term follow up and

treating urinary and fecal incontinence. Rather the percentage of ODS following all these procedures is not acceptable and the persistend ODS causing more pressure on the pelvic organ and associated ligaments resulting in higher recurrence rate.[3] In order to cure ODS and improve the QOL, POPS surgery is a recent one-stage treatment for multi-compartmental female pelvic organ prolapse. POPS improve tri-compartmental descent without obliterating pouch of Douglas. But there is the presence of redundant rectocele and intussusception. For this correction, both transanal STARR and transvaginal posrerior colpoperineorrhaphy are being performed. The transvaginal rectocele repair (TVR) has been the technique performed by the Colon and Rectal Clinic of Orlando for 15 years for the treatment of ODS. Results with the transvaginal technique have been very good, but there is concern about the rate of dyspareunia, wound complications, and recurrence.[4] In 2004 Longo described a new technique for treatment of ODS caused by rectocele and rectal intussusception called stapled transanal rectal resection (STARR). He proposed the use of two circular staplers to correct the anterior rectal wall muscle defect by reducing the bulging rectocele and/or intussusception anteriorly in addition to the posterior intussusception and posterior rectocele, when present. Overall the results for the STARR procedure have been promising; however, recurrence and the complications profile have been a concern [5,6].

Gynecologists have treated rectocele with Transvaginal posterior colpoperineorrhaphy for over a century whereas coloproctologists use transanal route. Colorectal surgeons have focused on improvement of bowel functions and gynecologists to restoration of anatomy when assessing results of rectocele repair [7,8].

Methods

This was a observational study conducted at three different hospitals in Dhaka city in Bangladesh operated by single surgeon. Female patients with pelvic organ prolapse were included in this study and study period was four years (February' 2018- January' 2022).

Our goal was to obtain the simultaneous correction of prolapse of all three compartments and resolution of the related symptoms. We set out to obtain the most anatomical, physiological, and minimal invasive surgical correction.

Prior to data collection, both verbal and written consent were taken from the patients.

Data would expresssed as mean ± SD and frequency percentages. Statistical analyses of the results have done by using computer based statistical software SPSS version 26.

Paired "t" test used to compare data between before and after intervention and Chi squared ($\chi 2$) test or Fisher's exact test for qualitative variable. Statistical significance would be set at p

≤ 0.05 and confidence interval at 95% level.

Procedure

All patients were subjected to proper history taking and full general and local examination. ODS was evaluated with Longo ODS score. Detailed continence history and assessment was done according to wexner incontinence score (0-20). The Quality of life was investigated with EQ-5D questionnaire. MR defecography has performed to evaluate the pelvic organ prolapse in all patients preoperatively. Colonoscopy was done for women over 45 years.

Laparoscopic Pelvic Organ Prolapse Suspension (POPS) with Posterior Colpoperineorrhaphy:

Under general anaesthesia, patient was positioned in modified Lloyd Davis position. The skin was prepped and drapped.

1. The pneumoperitoneum was established via supra-umbilical open technique, and a 30°

laparoscope was introduced. One 10-mm trocar was inserted under vision through right iliac fossa and another 5-mm trocar was inserted symmetrically in the left side.

2. A vaginal valve pushed up the anterior fornix for adequate exposure into the pelvic peritoneum.

3. A 30× 30 cm prolene mesh, a V-shaped 25 cm length strips and 2 cm wide were prepared. The mesh was introduced into the abdominal cavity through 10-mm trocar.

4. Small incision was made at the apex of the anterior vaginal fornix and the mesh was fixed on the anterior vaginal vault or on the vaginal apex if the patient had hysterectomy by 1-0 polypropylene.

5. On both sides, two cutaneous incisions were made 2 cm above and 2 cm posterior to antero-superior iliac spine. The aponeurosis of the external oblique muscle was incised and dissecting the fibers of the internal oblique and transversus abdominis muscles, the sub-peritoneal tunnel was created. Through this incision, a laparoscopic forcep was introduced.

6. Under laparoscopic vision, a subperitoneal tunnel, in both sides, was created until the anterior fornix of the vagina reached. The tunnel passed through 2–3 cm below the insertion of the round ligament. Reaching the vaginal fornix, the two ends of V-mesh were taken outside through the sub-peritoneal tunnel.

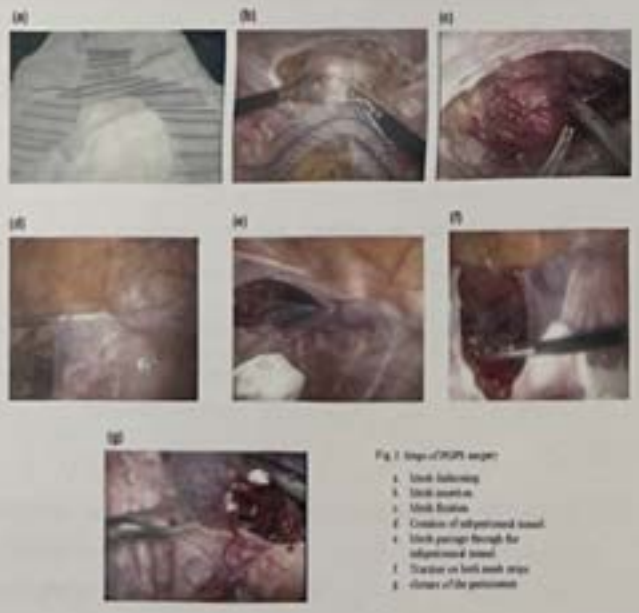
7. Mesh was fixed to both the lateral vaginal fornices by two stitches with no 1-0

8. Prolene. Pelvic organs suspension is achieved by making symmetrical tractions on both mesh strips.

9. 5 cm of excess mesh strip was positioned within the muscle's fascia, above the incision, and fixed by vicryl 2/0. Skin was sutured by 3-0 Polypropylene.

10. The POPS corrects the rectal prolapses but not the rectocele. For correcting the rectocele, we did posterior colpoperineorrhaphy through vaginal incision in lithoto-my position.

Picture shows steps of POPS procedure (Figure-I):



Results

Table 1: Distribution of the participants according to age (n=42)

Age (year)	Number	Percentage
	n	%
30-40	8	17.6
41-50	22	52.9
51-60	10	23.5
61-70	2	5.9
Total	42	100.0

From this study it was found that 52.9% patients are under POPS group who are in between the age group 41-50 year(Table-1).

Table 2: Distribution of the participants according to clinical presentation(n=42)

Clinical presentation	Total participants	
	n	%
Rectal prolapse	42	100
Recto-rectal intussusception	2	5.9
Recto-anal intussusception	35	82.4
External prolapse	5	11.7
Rectocele	42	100
Mild	2	5.9
Moderate	20	47.1
Severe	20	47.1
Genital Prolapse(POP-Q)	42	100
Stage III	25	58.8
Stage IV	17	41.2

From the clinical findings among 42 patient it was found that 82.45% have rectal prolapse , more than 80% have the Rectocele and near about 59% have genital prolapse-stage-III(Table- 2).

Table 3: Distribution of the participants according to ODS score

ODS score	ODS score
	Mean ± SD
Pre-operative	33.5±2.3
Postoperative	3.8±0.9

In aspect of ODS score of POPS group, mean value was found 33.5±2.3(Table-3).

Table 4: Distribution of the participant according to Wexner incontinence score

Wexner incontinence score	Wexner incontinence score
	Mean ± SD
Pre-operative	3.5 ± 2.1
Postoperative	0.0 ± 0.0

It was observed that mean value of pre-operative Wexner incontinence score in POPS group 3.5 ± 2.1(Table-4).

Table 5: Distribution of the participant according to MR defecographic measurement(n- 42)

MR defecographic measurement	MR defecographic measurement		Inference
	Pre-operative	Post-operative	P value
Rectocele	35 (83.54%)	3 (5.34%)	
Rectal prolapse	39 (92.23%)	2 (4.30%)	P<.05
Fecal incontinence	10(23.96%)	0 (0.00%)	
Enterocele	32 (75.32%)	5 (11.66%)	

It was observed from MR defecographic measurements(cm.) Pre-operative rectocele was about 84% wheres post operative only 5%. Another findings like retal prolapse, fecal incontinence and enterocele also found accordingly 92%,24%, & 75% in preoperative patients(Table-5).

Table 6: distribution of the participants according to operative time, pain score & hospital stay(n=42)

Variables	Variables
	Mean ± SD
Operative time(in minutes)	122.9 ± 3.3
Post operative pain	3.2 ± 0.9
Hospital stay(in days)	3.2 ± 0.4

Among POPS group it was found mean time of operation (in minute)122.9 ± 3.3. post operative pain mean value 3.2 ± 0.9 and Hospital stay(in days) 3.2 ± 0.4(Table-6).

Table 7: Distribution of the participant according to postoperative complications(n=42)

Postoperative complications	Postoperative complications	
	n	%
Chronic pelvic pain	5	11.90
Dragging pain and pain at anterior superior iliac spine	1	5.9
Dyspareunia	2	04.77
Mesh erosion	0	0.0
Mesh infection	0	0.0
Sepsis	0	0.0
Fistula	0	0.0
Obstruction	0	0.0
Recurrence	0	0.0

It was found that only about 11.9% patients have chronic pelvic pain and 5.9% patients have post operative dragging pain at anterior superior iliac spine. Two patient (4.77%) complaints of dyspareunia (Table-7).

Table 8: Distribution of the participants according to follow-up clinical presentation(n=42)

Follow-up clinical presentation	POPS group	
	n	%
Residual rectal prolapse	0	0.0
Correction of rectocele	42	100.0
Correction of Genital Prolapse	42	100.0

From follow-up observation it was found 100% corrected rectocele & genital prolapse(Table- 8).

Discussion

Though several studies have been done regarding pelvic organ prolapse surgery throughout the world, there is no such study like outcome of laparoscopic POPS with posterior colpoperineorrhaphy for the treatment of middle and posterior pelvic compartment prolapse. Thus, this study will generate more detailed novel knowledge regarding the outcome of laparoscopic POPS with posterior colpoperineorrhaphy in the management of ODS patient.

We notice that in our study 52.9% patients under POPS group are in between the age group 41- 50 year. Among 42 patients having rectal prolapse , more than 80% have the Rectocele and near about 59% have genital prolapse.In aspect of ODS score of POPS group mean value was found 33.5±2.3. That finding is in line with the findings carried out by Ceci F. in which they found rectocele and rectal prolapse respectively 90.74% & 83.33% patients.[3]

It was observed from MR defecographic measurements(cm.) Pre-operative rectocele was about 84% wheres post operative only 5%. Another findings like retal prolapse, fecal incontinence and enterocele also found accordingly 92%,24%, & 75% in preoperative patients. The findings are nearly similar the findings of the study carried out by Ceci F. where they were using preoperative X-ray cined-efecography where they found rectocele and rectal prolapse respectively in 90.74% and in 83.33% patients. Enterocele was detected in 70.37%, but it is likely in some cases, the occlusion of the pelvis by the uterus may hampered the visibility of these alterations.1 Mattsson NK. Et al. reported on their study that total of 84% were satisfied with POPS outcome and 90% reported an improvement in comparison with the preoperative state.[8]

In our stydy group it was found the mean time of operation 123 minute and the mean Hospital stay 3 day. The

finding also in line the result of another study where mean operative time in patients with POPS without additional procedures was 85 minutes.[1]

Ceci F. et al. Reported on their study all patients who have preoperative affliction reported cure or significant improvement. The anatomical results evaluated clinically by "Half way system" were excellent, in particular enterocele was well corrected in 100% of cases. POPS confirmed the excellent anatomical results at 6th month, one patient found with residual recto- anal intussusception and a residual rectocele after postoperation.[1] That findings are near

similar to my study result. We found that 05 patients(11.9%) have chronic pelvic pain and about 6% patients have post operative dragging pain at anterior superior iliac spine. Maximum have no post operative complications.At follow-up observation it was found 100% correction of rectocele & genital prolapse. Another study finding was not in line of my result where 0.45% were admitted to an intensive care unit; 4.4% of the patients underwent surgery for the recurrence of prolapse & 4.6% of the patients required secondary surgery for urinary incontinence; obesity was a risk factor.[7]

Conclusion

There is reasonably good evidence in favor of Laparoscopic Pelvic Organ Prolapse Suspension (POPS) with Posterior Colpoperineorrhaphy for ODS score, QOL improvement, operative time, length of hospital stay, post-operative pain.

Thus, POPS with Posterior Colpoperineorrhaphy can be used as an easier, faster option to treat middle and posterior compartment prolapse with ODS symptoms.

Limitations

Short period of study was a limitation of the study.The study conducted in three different hospitals in Dhaka city though all the operations were performed by single surgeon. Long- term effects could not be assessed.

Recommendation

A Large scale, multicenter study should be undertaken to draw a more precise conclusion.

References

1. Li, C., Dai, Z. and Shu, H. "Laparoscopic inguinal ligament suspension versus laparoscopic sacrocolpopexy in the treatment of pelvic organ prolapse: study protocol for a randomized controlled trial," Trials. Springer Science and Business Media. 2018; LLC. doi:10.1186/s13063-018-2494-x.
2. Rao SSC. Dyssynergic defecation. Gastroenterology Clinics of North America. 2001 Jun 9;30(1):97-114. doi: 10.1016/S0889-8553(05)70169-2
3. Mairesse S, Chazard E, Giraudet G, Cosson M, Bartolo S. Complications and reoperation after pelvic organ prolapse, impact of hysterectomy, surgical approach and surgeon experience. Int Urogynecol J. 2020;31(9):1755-1761. doi:10.1007/s00192-019-04210-6
4. Mattsson NK, Karjalainen PK, Tolppanen AM, et al. Pelvic organ prolapse surgery and quality of life-a nationwide cohort study. Am J Obstet Gynecol. 2020;222(6):588.e1- 588.e10. doi:10.1016/j.ajog.2019.11.1285
5. Higgins PD, Johanson JF. Epidemiology of constipation in North America: a systematic review. Am J Gastroenterol. 2004;99(4):750-759. doi:10.1111/j.1572-0241.2004.04114
6. Ceci F, Spaziani E, Corelli S, et al. Technique and outcomes about a new laparoscopic procedure: the Pelvic Organ Prolapse Suspension (POPS). G Chir. 2013;34(5-6):141-144. doi:10.11138/gchir/2013.34.5.141
7. Harris MA, Ferrara A, Gallagher J, DeJesus S, Williamson P, Larach S. Stapled transanal rectal resection vs. transvaginal rectocele repair for treatment of obstructive defecation syndrome. Dis Colon Rectum. 2009;52(4):592-597. doi:10.1007/DCR.0b013e31819edbb1
8. Khaikin M, Wexner SD. Treatment strategies in obstructed defecation and fecal incontinence. World J Gastroenterol. 2006;12(20):3168-3173. doi:10.3748/wjg.v12.i20.3168
9. Podzemny V, Pescatori LC, Pescatori M. Management of obstructed defecation. World J Gastroenterol. 2015 Jan 28;21(4):1053-60. doi: 10.3748/wjg.v21.i4.1053. PMID: 25632177; PMCID: PMC4306148.
10. Pucciarello A, O'Connell PR, Hahnloser D, Gallo G, Munoz-Duyos A, Schwandner O, Sileri P, Milito G, Riss S, Boccasanta PA, Naldini G, Arroyo A, de laPortilla F, Tsarkov P, Roche B, Isbert C, Trompetto M, d'Hoore A, Matzel K, Xynos E, Lundby L, Ratto C, Consten E, Infantino A, Panis Y, Terrosu G, Espin E, Faucheron JL, Guttadauro A, Adamina M, Lehur PA, Altomare DF. Obstructed defaecation syndrome: European consensus guidelines on the surgical management. Br J Surg. 2021 Oct 23;108(10):1149- 1153. doi: 10.1093/bjs/znab123. PMID: 33864061

Original Article

Association of Dairy Foods in Acne Vulgaris

Sathi FR[1], Bhuiyan I[2], Hossain MS[3], Hossain MM[4], Alahi MN[5], Islam S[6]

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ABSTRACT:

Background: *Acne vulgaris is one of the most commonly found skin problems affecting teenagers and adolescents. Dietary foods particularly dairy products consist of milk or any of its food made from milk are frequently regarded by patients and clinicians as a cause or aggravator of acne. As there are very limited studies found on this regard, this study was aimed to find the association of dairy foods in acne vulgaris.*

Methods: *This wasa cross-sectional analytical study and was carried out in the Dermatology and Venereology department of Shaheed Suhrawardy Medical College Hospital. Total 260 patients were selected by appropriate inclusion criteria equally into two groups: Group A (diagnosed with acne vulgaris, n=130) and group B (patients not having acne vulgaris, n=130). A thorough history of every patient and face to face interview was taken by a predesigned questionnaire after getting the written informed consent of the patient. Data were collected in predetermined data collection form. Result were subjected to standard statistical evaluation and were analyzed by SPSS-24.*

Results: *According to the age group, majority of the acne patients were between 10-20 years (75.4% in group A and 63.8% in group B, p<0.05), though mean age in both groups were statistically similar (18.53±5.78 and 17.29±4.59 years, respectively). Also, female respondents were predominant in both groups (80.8% and 72.3%). The risk was increased in those with a family history of acne in siblings (OR2.449, p=0.021;95% CI,1.145-5.238) and the risk was reduced in subjects doing physical exercise. Papules (35.4%) and comedones (27.7%) were most common lesion and mostly found in forehead (74.6%) and left (68.5%) and right (63.1%) cheeks. According to global acne severity grading, majority had mild form of acne (83.1%) and use of cosmetics (43.8% vs. 30%), topical steroid (34.6% vs. 16.9%), taking fastfood (24.6% vs. 14.6%) and less water intake (36.9% vs. 18.5%) also significantly higher among acne patients. Multivariate regression analysis showed, dairy products such as whole milk (OR 1.984, p=0.022), chocolate (2.490, p=0.004), chips (OR 3.207, p<0.001), Pizza (OR 2.388, p=0.021) and red meat (OR 3.055, p=0.009) were significant risk for developing acne vulgaris. Also, whole milk (3.050, p=0.01), chocolate (3.817, p=0.004) and pizza (3.822, p=0.005) were independent risk factors for moderate to severe acne.*

Conclusion: *This study found an association between high dairy product consumption and acne in adolescents, indicating that dairy consumption may be a contributing factor for developing acne vulgaris.*

Key Words:
Retinoid, Pilosebaceous, Propionibacterium, Hyperinsulinemia, Glycemic Indexe

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1. Dr. Farzana Rahman Shathi, Assistant registrar, Department of Skin & VD, Shaheed Suhrawardy Medical College
2. Dr. Ishrat Bhuiyan, Associate professor, Department of Skin & VD, Shaheed Suhrawardy Medical College
3. Dr. Md. Shahadat Hossain, Professor, Department of Skin & VD, Ex. Shaheed Suhrawardy Medical College
4. Dr. Md. Motiul Hossain, Assistant professor, Department of Skin & VD, Shaheed Suhrawardy Medical College
5. Dr. Mohammad Niamat Alahi, Assistant professor, Department of Skin & VD, Shaheed Suhrawardy Medical College
6. Dr. Shiropa Islam, Assistant professor, Department of Skin & VD, Shaheed Suhrawardy Medical College

Correspondence: Dr.Ishrat Bhuiyan, Associate Professor, Department of Skin & VD, Shaheed Suhrawardy Medical College Hospital, Dhaka.
Email: ishratskin@yahoo.com; Mobile: 01711822551

Introduction

Acne vulgaris is a common chronic inflammatory disease of the pilosebaceous unit which is characterized by the formation of non-inflammatory open and closed comedones & inflammatory papules, pustules, nodules and cysts.[1] It is the eighth most prevalent disease worldwide and estimated almost 9.4% of the global population are affected by acne vulgaris.[2] Previous studies enquiring into the potential link between diet and acne vulgaris have shown controversial results.[5] There have been an increasing number of investigations about the role of diet as one of the underlying causes of acne vulgaris and the effects of ingesting certain dairy products, carbohydrates, glycemic index (GI) and high glycemic load (GL) diet in exacerbating acne vulgaris. It has been hypothesized that what is eaten may affect the skin.[6]

The influence of environmental factors, such as diet, in the pathogenesis of acne is still being clarified. Again, the precise mechanisms of acne are not known but there are major pathophysiologic factors including excessive sebum production, follicular hyper keratinization and proliferation of Propionibacterium acnes with direct or indirect inflammation.[7]

Diet is considering as one of the main factors involving in acne generation and numerous studies were conducted to evaluate the effect of some types of food like chocolate, milk and fatty diet.[11] Specially milk was a determinant for acne in many types of research that identified an association between all types of milk such as skimmed milk and high-fat milk with acne development and suggested that hormones and bioactive molecules present in milk might be linked to this association.[12,13] It is proposed that high glycemic indexes lead to hyperinsulinemia and a resulting cascade of endocrine consequences, including increased androgens, increased IGF-1, and altered retinoid signaling pathways, that mediate acne. The severity of acne is correlated with facial sebum secretion and it has been hypothesized that foods high in fat or carbohydrates may exacerbate acne by production of more comedogenic sebum.[14]

Based on previous studies, it hypothesized that high glycemic load diet, milk and dairy products intake, high body mass index (BMI) as well as increase body fat percentage may be the risk factors of acne vulgaris. Knowledge on how diet and acne vulgaris is related, enables the identification and management of the condition and community education in preventing and improving the acne condition, besides the primary systemic and topical treatment. In Bangladesh, little studies are found regarding this matter. Therefore, this study was designed to determine the relationship between dairy food products and acne vulgaris.

Rationale of the study

Acne leads to a reduced quality of life comparable to chronic conditions and as such associated with social and psychological problems. Diet is considering as one of the main factors involving in acne generation and numerous studies were conducted to evaluate the effect of some types of food like chocolate, milk and fatty diet. The research supporting an association between milk product and acne show some of the more consisting and convincing results but it is still inconclusive. Unfortunately, very few studies have focused the issues among the people in Bangladesh. On this regard,the main focus of this study was to find out the association of dairy foods in acne vulgaris.

Research Question: Is there any association of dairy food with acne vulgaris?

Objectives

General Objective:

To determine the association of dairy foods in acne vulgaris.

Specific Objectives:

- To find out the socio-demographic characteristics of the participants.
- To evaluate the dietary habit of the participants.
- To examine which types of dairy food products mostly involved with acne vulgaris of the participants.

Materials and Methods

Study Design: Cross sectional analytical study.

Place of Study: Department of Dermatology & Venereology, Shaheed Suhrawardy Medical College Hospital.

Study Period:1 year.

Study population: All patients visiting the indoor and outdoor facilities of Dermatology & Venereology department in ShSMCH.

Group A: Patients diagnosed with acne vulgaris

Group B: Patients without acne vulgaris

Sampling Method: Purposive sampling.

Sample size: For this study, sample size calculation was done by following statistical formula. n = P(1-P)Z2/(error)2

For this study, 130 patients diagnosed with acne vulgaris were in group A and 130 patient with no acne vulgaris were included in group B. Total 260 patients were considered as sample for this study.

Inclusion criteria

Group A:

- Patients aged >10 years
- Both gender
- Diagnosed cases of acne vulgaris
- Willing to participate

Group B:

- Patients aged >10 years
- Both gender
- Patients came for skin problem other than acne vulgaris
- Willing to participate

Exclusion criteria

- Subjects previously diagnosed with eating disorder
- Patients with diabetes mellitus and coronary artery diseases
- Women previously diagnosed with polycystic ovarian syndrome and on hormonal therapy
- Other foods such as Oily food, sugar & other aggravating factors like drugs – Oral corticosteroids, Anti tubercular drugs & other drugs causing acneiform eruption.

Study variable

a. Main outcome variables:

- Socio-demographic characteristics.
- Association of dairy food product with acne vulgaris.

b. Confounding variable:

Not Applicable

Acne vulgaris grading: 36 Graded by using a simple grading system as follows:

- Grade 1 - comedones, occasional papules
- Grade 2 - papules, comedones, few pustules
- Grade 3 - predominant pustules, nodules, abscess
- Grade 4 - mainly cysts, abscess, widespread scarring

Global Acne Severity Scale (GEA Scale):37

0	Clear. No lesions	Residual pigmentation and erythema may be seen
1	Almost clear or no lesions	A few scattered open or closed comedones and very few papules
2	Mild	Easily recognizable: less than half of the face is involved. A few open or closed comedones and a few papules & pustules
3	Moderate	More than half of the face is involved. Many papules and pustules, open or closed comedones
4	Severe	Entire face is involved, covered with many papules and pustules, open or closed comedones and a few nodules or cysts
5	Very Severe	Highly inflammatory acne covering the face with presence of numerous nodules and cysts

Study procedure

Data were collected by following procedure:

1. Before commencement of the study, formal ethical approval was taken from the ethical review committee (ERC) of ShSMCH.

2. All patients with skin problem who visited the indoor and outdoor facilities of Dermatology & Venereology department in ShSMCH during the study period were approached for this study. About 130 diagnosed cases with acne vulgaris (group A) and 130 patients having skin problem rather than acne vulgaris (group B) were included in this study. Written informed consent were obtained from the patients and/or guardian. One dermatologist evaluated the severity of acne using the Global Acne Severity Scale.

3. Face to face interview was conducted by using a semi-structured questionnaire containing socio-demographic parameters and relevant information.

4. Demographical data (age, sex, education, occupation, etc.) and siblings' history of acne was collected. The food consumption habits were recorded using a food frequency questionnaire. Investigated food included, whole milk

(milk whose fat content is unaltered), low fat milk (milk whose fat content is reduced), cream of milk, ice-cream, cheese, chocolate, cake, fresh fruit, fresh vegetable, meat, chicken and egg.

5. Weight and height were measured with light clothes and without shoes using a standardized method. Body mass index was computed as weight (Kg)/height (m^2).

6. History of physical exercise and history of being on diet of the participant were collected and recorded in the data collection sheet. Physical exercise was categorized as regular and occasional. Diet was evaluated if participant is on diet for a year.

7. Data collection was carried out by the investigator himself by using separated a case record form.

8. Data analysis were done by SPSS 24 windows 10 version

9. Association of dairy food products with acne vulgaris was assessed. A p-value less than 0.05 was considered as significant.

Informed consent: Written informed consent was taken from every patient

Ethical issues

The researcher was concerned about the ethical issues related to the study. In this study the following criteria were followed to ensure maintaining the ethical values.

A. Formal ethical clearance was taken from the ethical review committee of the Shaheed Suhrawardy Medical College Hospital for conducting the study.

B. Confidentiality of the person and the information was maintained, observed and unauthorized persons didn't have any access to the data.

C. Informed written consent was taken from the subject.

D. The content of the consent requirements was as such:

i. Explanation of the nature & purpose of the study.
ii. Explanation of the procedure of study.
iii. Explanation that they have the right to refuse, accept & withdraw to participate in the study.

E. The participants didn't gain financial benefit from this study.

Data Processing and Analysis:

After collection of all the required data, these were checked, verified for consistency and tabulated using the SPSS/PC 24 software. Also, univariate and multivariate logistic regression were done to find out the independent risk factors. A p-value of <0.05 was considered significant.

Results

This cross-sectional analytical study was conducted in the Department of Dermatology & Venereology, Shaheed Suhrawardy Medical College Hospital, Dhaka. After careful history taking, examination and appropriate investigations fulfilling inclusion and exclusion criteria, 130 patients with Acne vulgaris were included in group A and other 130 patients visiting the indoor and outdoor facilities who did not had Acne Vulgaris, were included as group B in this study. The main aim of the study was to evaluate the association of dairy food products with acne vulgaris of the participants.

Table-1: Socio-demographic status of respondents (n=260)

Variables	Group A n=130 (%)	Group B n=130 (%)	P value
Age group			0.033*
10-20	98(75.4)	83(63.8)	
21-30	25(19.2)	43(33.1)	
>30	7(5.4)	4(3.1)	
Mean age (SD)	18.53±5.78	18.76±5.09	0.724**
Gender			0.107*
Male	48(36.9)	36(27.7)	
Female	82(63.1)	94(72.3)	
Residence			0.264*
Rural	63(48.5)	72(55.4)	
Urban	67(51.5)	58(44.6)	
Marital status			0.150*
Unmarried	93(71.5)	103(79.2)	
Married	37(28.5)	27(20.8)	

Table-2: Family economic condition and occupational status of respondents (n=260)

Variables	Group A n=130(%)	Group B n=130(%)	P value*
Family economical condition			0.177
<10000 tk	21(16.2)	24(18.5)	
10000-20000 tk	39(30)	52(40)	
20000-40000 tk	47(36.2)	32(24.6)	
>40000 tk	23(17.7)	22(16.9)	
Occupational status			0.144
Govt employee	7(5.4)	4(3.1)	
Non-govt employee	15(11.5)	6(4.6)	
Housewife	17(13.1)	17(13.1)	
Student	91(70)	103(79.2)	

Table-3: Factors related to Acne Vulgaris among respondents (n=260)

Variables	Group A n=130 n(%)	Group B n=130 n(%)	P value
Mean duration of sleep (hours)	5.68±1.12	6.45±0.79	**<0.001****
Physical exercise			**0.006***
No exercise	95(73.1)	72(55.4)	
Regular	24(18.5)	32(24.6)	
Occasional	11(8.5)	26(20)	
On diet plan			0.512*
Yes	10(7.7)	13(10)	
No	120(92.3)	117(90)	
Sibling history of acne			**0.001***
Yes	31(23.8)	11(8.5)	
No	99(76.2)	119(91.5)	

*Chi-square test and ** student t-test;Group A= with Acne, Group B= without Acne

Figure-1: Distribution of clinical lesions of Acne Vulgaris (n=130)

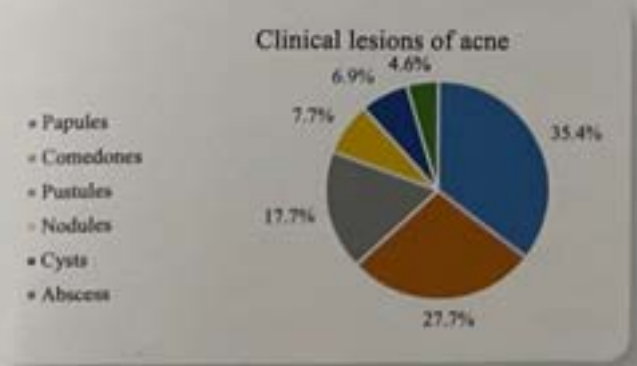

Figure-2: Distribution of clinical stages of Acne Vulgaris (n=130)

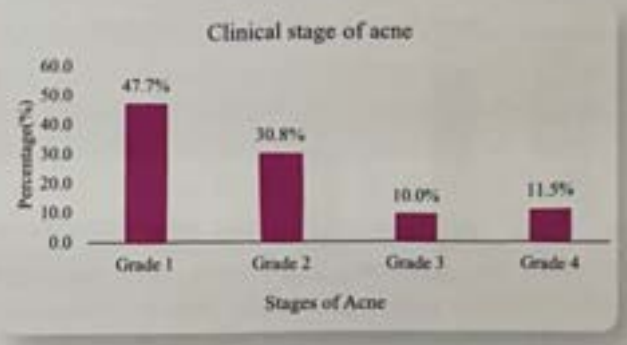

Table-4: Distribution of site and duration of the Acne Vulgaris (n=130)

	Frequency (n)	Percentage (%)
Site of Acne		
Left cheek	89	68.5
Right cheek	82	63.1
Forehead	97	74.6
Chest and upper back	27	20.8
Nose	10	7.7
Duration of Acne (days)	13.25±7.69	

Table-5: Distribution of Factors aggravating Acne Vulgaris (n=260)

Variables	Group A n=130 n(%)	Group B n=130 n(%)	P value*
Use of cosmetics	57(43.8)	39(30)	**0.021**
Topical steroid	45(34.6)	22(16.9)	**0.001**
Intake of steroid	11(8.5)	8(6.2)	0.475
Premenstrual flare up	21(16.2)	13(10)	0.141
Taking fast food	32(24.6)	19(14.6)	**0.042**
Smoking habit	9(6.9)	8(6.2)	0.802
Taking less water	48(36.9)	24(18.5)	**0.001**

Figure-3: Distribution of Acne Vulgaris Severity by GEA score (n=130)

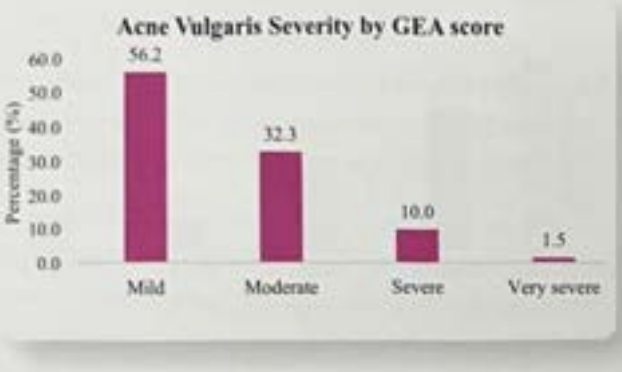

Table-6: Association of food intake frequency with acne vulgaris (n=260)

Variables		Group A n=130 (%)	Group B n=130(%)	P value*
Whole milk	< 3 days	56(43.1)	86(66.2)	**<0.001**
	≥3 days	74(56.9)	44(33.8)	
Low fat milk	< 3 days	73(56.2)	89(68.5)	**0.041**
	≥3 days	57(43.8)	41(31.5)	
Cream milk	< 3 days	88(67.7)	106(81.5)	**0.010**
	≥3 days	42(32.3)	24(18.5)	
Ice cream	< 3 days	83(63.8)	103(79.2)	**0.006**
	≥3 days	47(36.2)	27(20.8)	
Yogurt	< 3 days	59(45.4)	66(50.8)	0.385
	≥3 days	71(54.6)	64(49.2)	
Egg	< 3 days	71(54.6)	90(69.2)	**0.015**
	≥3 days	59(45.4)	40(30.8)	
Cake	< 3 days	48(36.9)	76(58.5)	**0.001**
	≥3 days	82(63.1)	54(41.5)	
Chocolate	< 3 days	44(33.8)	66(50.8)	**0.006**
	≥3 days	86(66.2)	64(49.2)	
Chips	< 3 days	38(29.2)	67(51.5)	**<0.001**
	≥3 days	92(70.8)	63(48.5)	
Pizza	< 3 days	92(70.8)	110(84.6)	**0.007**
	≥3 days	38(29.2)	20(15.4)	
Fresh Veg	< 3 days	73(56.2)	54(41.5)	**0.018**
	≥3 days	57(43.8)	76(58.5)	
Cooked veg	< 3 days	29(22.3)	27(20.8)	0.763
	≥3 days	101(77.7)	103(79.2)	
Dry fruit	< 3 days	104(80)	116(89.2)	**0.039**
	≥3 days	26(20)	14(10.8)	
Chicken	< 3 days	45(34.6)	59(45.4)	0.076
	≥3 days	85(65.4)	71(54.6)	
Red meat	< 3 days	99(76.2)	115(88.5)	**0.009**
	≥3 days	31(23.8)	15(11.5)	

Table-7: Results of the logistics regression analysis of the variables associated with acne (n=260)

Variables		OR	P value	95%CI
Age (year)	10-20	1.734	**0.044**	1.015-2.964
	>20	Ref		
Gender	Male	Ref		
	Female	0.654	0.112	0.387-1.105
Physical exercise	No exercise	2.187	**0.003**	1.301-3.676
	Regular/occasional	Ref		
Siblings with acne	Yes	3.388	**0.001**	1.620-7.084
	No	Ref		
Whole milk	< 3 days	Ref		
	≥3 days	2.583	**<0.001**	1.563-4.269
Low fat milk	< 3 days	Ref		
	≥3 days	1.695	**0.041**	1.021-2.814
Cream milk	< 3 days	Ref		
	≥3 days	2.108	**0.011**	1.185-3.749
Ice cream	< 3 days	Ref		
	≥3 days	2.160	**0.006**	1.241-3.761
Egg	< 3 days	Ref		
	≥3 days	1.870	**0.016**	1.125-3.107
Chocolate	< 3 days	Ref		
	≥3 days	2.016	**0.006**	1.222-3.324
Chips	< 3 days	Ref		
	≥3 days	2.575	**<0.001**	1.545-4.292
Pizza	< 3 days	Ref		
	≥3 days	2.272	**0.008**	1.237-4.173
Red meat	< 3 days	Ref		
	≥3 days	2.401	**0.011**	1.225-4.703

Table-8: Results of the multivariate logistics regression analysis of the variables associated with acne (n=260)

Variables		OR	P value	95%CI
Age (year)	10-20	1.653	0.130	0.863-3.166
	>20	Ref		
Physical exercise	No exercise	1.345	0.354	0.719-2.516
	Regular/occasional	Ref		
Siblings with acne	Yes	2.985	0.018	1.208-7.373
	No	Ref		
Whole milk	< 3 days	Ref		
	≥3 days	1.984	**0.022**	1.106-3.557
Low fat milk	< 3 days	Ref		
	≥3 days	1.465	0.277	0.789-2.722
Cream milk	< 3 days	Ref		
	≥3 days	1.870	0.071	0.948-3.690
Ice cream	< 3 days	Ref		
	≥3 days	1.809	0.084	0.924-3.540
Egg	< 3 days	Ref		
	≥3 days	1.713	0.081	0.937-3.131
Chocolate	< 3 days	Ref		
	≥3 days	2.490	**0.004**	1.707-4.623
Chips	< 3 days	Ref		
	≥3 days	3.207	**<0.001**	1.707-6.023
Pizza	< 3 days	Ref		
	≥3 days	2.388	**0.021**	1.138-5.011
Red meat	< 3 days	Ref		
	≥3 days	3.055	**0.009**	1.326-7.040

Table-9: Results of the Multivariate logistics regression analysis of the variables associated with moderate to severe acne (n=260)

Variables		OR	P value	95%CI
Age (year)	10-20	2.221	0.132	0.786-6.279
	>20	Ref		
Gender	Male	1.286	0.563	0.548-3.017
	Female	Ref		
Siblings with acne	Yes	2.169	0.150	0.755-6.232
	No	Ref		
Whole milk	< 3 days	Ref		
	≥3 days	3.050	**0.010**	1.298-9.525
Chocolate	< 3 days	Ref		
	≥3 days	3.817	**0.004**	1.529-9.525
Chips	< 3 days	Ref		
	≥3 days	0.266	0.366	0.266-1.629
Pizza	< 3 days	Ref		
	≥3 days	3.822	**0.005**	1.486-9.827
Red meat	< 3 days	Ref		
	≥3 days	2.539	0.061	0.956-6.742

Discussion

Acne vulgaris is a multifactorial dermatosis which occurs most often during puberty.[25] Both high glycemic load and dairy-rich foods increase the levels of insulin-like growth factors (IGF)-1 and can reduce insulin sensitivity.[29] This may lead to androgen-mediated increases in sebum production and in turn attributes to the manifestation of acne vulgaris, as excess sebum is one of the vital mechanisms in the pathophysiology of acne vulgaris.[29] On this regard, the main aim of the study was to evaluate the association of dairy food products with acne vulgaris of the participants. In this study, 130 patients with Acne vulgaris were included as group A and other 130 patients visiting the indoor and outdoor facilities who did not had Acne Vulgaris, were included as group B.

According to this study, respondents between 10-20 years old were more found among acne group of respondents (75.4%) compared to non-acne respondents (63.8%, $p<0.05$). Yet, mean age were quite similar in both groups (18.53±5.78 and 17.29±4.59 years, respectively) as respondents were selected as per inclusion and exclusion criteria. This findings were coincided with the mean ages of the participants in the case and control groups were 21.58±4.69 and 21.74±5.19 years, respectively in Bajelan et al.33 The Also, female respondents were predominant (80.8% and 72.3%) and mostly were unmarried (71.5% and 79.2%) in this study. However, in the study conducted in Malaysia, there were more male patients (n=34; 59.6%) compared to female patients (n=23, 40.4%).[15] This finding differ from our study, probably due to androgenic effect of acne and environmental difference from this study place. Yet, in this study, majority of the respondents resided from urban area among Acne vulgaris respondents, more respondents of non-Acne vulgaris respondents resided from rural area (55.4%).

Regarding family economical condition, Acne vulgaris respondents mostly were from upper middle class (36.2%), while, most of the non-Acne vulgaris respondentswere from lower middle class (40%). However, most of the respondents were student in both groups (70% and 79.2% respectively), similar to previous study.[33]

Personal history regarding duration of sleep, physical exercise and siblings having acne were also assessed in this study. Where, it was found that, the mean duration of sleep was significantly lower among respondents having acne compared to non-Acne vulgaris respondents. Also, physical exercise and sibling with history of acne had significant relation with respondents. It showed that, among respondents having acne, mostly did not had any exercise (73.1%) compared to non-Acne vulgaris respondents. Although, majority of the respondents in groups had no siblings with history of acne, about 18.5% respondents having acne vulgaris had siblings with acne, while only 8.5% respondents in non-Acne vulgaris respondents had that. This was also found in another study, as the majority of patients (n=43, 75.4%) had at least one immediate family members with a history of acne vulgaris; which was more than the controls.[15]

Among 130 respondents who had Acne Valgaris, majority of them had papules (35.4%) and comedones (27.7%) in this study. Also, pustules (17.7%), nodules (7.7%), cysts (6.9%) and abscess (4.6%) were to be found. About more than half respondents had Acne Vulgaris over face (53.1%), while, 30% had over forehead, 9.2% had over chest and 7.7% had over back. However, the mean duration of Acne diagnosis was 13.25±7.69 days. Cheek (85%) was the predominant site of involvement of acne according to previous study.[16]

Clinical stages of Acne Vulgaris presented, most of the respondents had grade 1 Acne (47.7%), other were followed by grade 2 (30.8%), grade 3 (10%) and grade 4 (11.5%). Global Evaluation of Acne score were also

assessed among acne group of respondents and most of the respondents had mild acne (56.2%). Also, about 32.3% respondents moderate acne, 10% had severe acne and 1.5% had very severe acne. Similar study showed acne severity was mild in 50%, moderate in 34%, severe in 14% and very severe in 2%.[17]

As aggravating factors, use of cosmetics, use of topical steroid, taking fast food and taking less water was found significantly more among respondents having Acne vulgaris than non-Acne vulgaris respondents. About 56.9% respondents among respondents having Acne vulgaris had consumed whole milk more than 3days a week, while, in nonAcne vulgaris respondents, it was only 33.8% ($p<0.001$). Also, low fat milk (43.8% vs. 31.5%), cream milk (32.3% vs. 18.5%), Ice cream (36.2% vs. 20.8%) and egg (45.4% vs. 30.8%) were mostly consumed by respondents having Acne vulgaris compared to non-Acne vulgaris respondents.Again, is was found that, respondents having Acne vulgaris had consumed chocolate (66.2%), chips (70.8%), Pizza (32.3%), dry fruits (20%) and red meat (22.3%) more comparative to non-Acne vulgaris respondents ($p<0.05$). However, there was no significant relation was found with yogurt, cooked vegetables and chicken consumption in between two groups.

According to logistic regression analysis, age between 10-20 years respondents had 1.734 time higher risk of Acne Vulgaris [p=0.004; 95%CI(1.015-2.964)]. This findings was similar to another study as they found the risk of acne increased with increasing age; OR (odds ratio) =1.39; 95 % CI (confidence interval: 1.14–1.68) (p=0.001).38 Also, Aalemi, Anwar and Chen showed, the consumption of whole milk (OR =2.36, 95% CI, 1.39–4.01) and low fat milk (OR 1.95 CI, 1.10–3.45) 3 days or more per week was associated with moderate to severe acne, and the risk was increased in those with a family history of acne in siblings (OR =4.13, 95% CI, 2.55–6.69).39 Nevertheless, this study findings were also presented that having no physical exercise had 2.187 and siblings with acne had 2.449 time higher risk for developing acne. Again, according to multivariate analysis in this study, consumption of whole milk more than 3 days had 1.984 times ($p<0.001$) and chocolate had 2.490 times higher risk for developing acne. The association might be explained by the presence of milk derived amino acids which promote insulin secretion and induce hepatic insulin like growth factor-1 (IGF-1) synthesis, which is considered as a key factor for acne pathogenesis. However, fast food like chips (OR 3.207, $p<0.001$), Pizza (OR 2.388, p=0.021) and red meat (OR 3.055, p=0.09) were found as significant risk for developing acne vulgaris in this study. These findings were agreed with another study, it showed, fatty and sugary dietary pattern such as milk, milk chocolate, sugary beverage etc. (aOR, 1.13; 95% CI, 1.05-1.18; $P < .001$) more likely to have acne vulgaris.34Also, these dietary habit had significant relation with severity of acne vulgaris. Whole milk (OR 3.050, p=0.010), chocolate (OR3.817,p=0.004) and pizza (OR3.822, p=0.005) also found as an independent risk factor for developing moderate to severe acne among respondents. Increased butter and chocolate consumption were linked to more severe forms of acne ($p = 0.049$ and $p = 0.005$ respectively).17The results of our study appear to support the hypothesis that the Western diet (rich in animal products and fatty and sugary foods) is associated with the presence of acne.

Conclusion

In conclusion, this study found that the associations between acne vulgaris and the dietary intake of chocolates and milk support the hypothesis that dietary factors may influence the development of acne vulgaris.Adolescent and female are most commonly affected by acne vulgaris. Besides, this study showed that the development of acne vulgaris is influenced by a family history of acne vulgaris and having regular exercise can limit the formation of acne. Severity of Acne also assessed by GRE score and most of them had mild form of acne throughout this study. However, whole milk, chocolate and fast food like pizza were risk factors for developing moderate to severe acne among respondents.

Limitations of the study

- The lack of detailed information regarding specific types of chocolate and milk consumed and there caloric values could not be measured.
- Also, recall bias among our respondents was possible.
- Long term follow up was beyond the scope of the study

Recommendations

1. Patient should be consulted on healthy diet to reduce the development of acne.
2. A multifaceted assessment which includes dietary patterns should help clinicians with acne vulgaris management.

References

1. Sairuddin M, Hasan MS, Sen SK, Alfazzaman M, Rahman MM, Rahman MM, et al. A Study on Factors In fluencing Acne among the Medical Students of Bangladesh. Med Today. 2017;29(2):30–2.
2. Tan JK, Bhate K. A global perspective on the epidemiology of acne. Vol. 172, British Journal of Dermatology. 2015;172(1):3–12.
3. Zaenglein AL, Pathy AL, Schlosser BJ, Alikhan A, Baldwin HE, Berson DS, et al. Guidelines of care for the management of acne vulgaris. J Am Acad Dermatol. 2016;74(5):945-973.
4. Khondker L, Wahab M, Khan M. Pattern of Acne Vulgaris in Women, Attending a Tertiary Care Hospital. Med Today. 2012;23(2):76–9.
5. Jabbar A, Al Subaihawi K, Mohammed T, Taher J. Milk consumption among patients with acne vulgaris. EurAsian J Biosci Eurasia J Biosci. 2020;14(10):3935–8.
6. Ismail NH, Manaf ZA, Azizan NZ. High glycemic load diet, milk and ice cream consumption are related to acne vulgaris in Malaysian young adults: a case control study. BMC Dermatol. 2012;12(13):1–8.
7. Tahir CM. T. Pathogenesis of acne vulgaris: Simplified. J Pakistan Assoc Dermatologists. 2010;20(2):93–7.
8. Jeremy AH, Holland DB, Roberts SG, Thomson KF, Cunliffe WJ. Inflammatory events are involved in acne lesion initiation. J Invest Dermatol. 2003;121(1):20–7.
9. Sultana T. Evaluation of Severity in Patients of Acne Vulgaris by Global Acne Grading System in Bangladesh. Clin Pathol Res J. 2017;1(1):1-6.
10. Gonšalves G, Amado JM, Matos ME, Massa A. The prevalence of acne among a group of Portuguese medical students. J Eur Acad Dermatology Venereol. 2012;26(4):514–7.
11. Juhl CR, Bergholdt HK, Miller IM, Jemec GB, Kanters JK, Ellervik C. Dairy intake and acne vulgaris: A systematic review and meta-analysis of 78,529 children, adolescents, and young adults. Nutrients. 2018;10(8):1–13.
12. LaRosa CL, Quach KA, Koons K, Kunselman AR, Zhu J, Thiboutot DM, et al. Consumption of dairy in teenagers with and without acne. J Am Acad Dermatol. 2016;75(2):318–22.
13. Ulvestad M, Bjertness E, Dalgard F, Halvorsen JA. Acne and dairy products in adolescence: results from a Norwegian longitudinal study. J Eur Acad Dermatology Venereol. 2017;31(3):530–5.
14. Davidovici BB, Wolf R. The role of diet in acne: facts and controversies. Clin Dermatol. 2010;28(1):12–6.
15. Suppiah TS, Sundram TK, Tan ES, Lee CK, Bustami NA, Tan CK. Acne vulgaris and its association with dietary intake: A Malaysian perspective. Asia Pac J Clin Nutr. 2018;27(5):1141–5.
16. Shah N, Shukla R, Chaudhari P, Patil S, Patil A, Nadkarni N, et al. Prevalence of acne vulgaris and its clinico-epidemiological pattern in adult patients: Results of a prospective, observational study. J Cosmet Dermatol. 2021;20(11):3672–8.
17. Mahmood A. The Influence of dietary components on acne; a case-control survey. Res Sq. 2022;1–13.
18. Shetty VH, Swathi D. Correlation of acne with dairy products - Fact or a Misconception. Indian J Clin Exp Dermatology. 2017;3(2):43–7.
19. Aslam M, Younas M. Association Between Dietary Practices and Acne in Young Adults; A Review. J Dermatology Res Rev Reports. 2020;1(4):1–8.
20. Saeed Alanazi M, Mohamed Hammad S, Elwan Mohamed A. Prevalence and psychological impact of Acne vulgaris among female secondary school students in Arar city, Saudi Arabia, in 2018. Electron Physician. 2018;10(8):7224–9.
21. Sattar A, Sumsuzzoha SM, Zaman S, Das AK. The Pattern of Skin Diseases in Patients Attending OPD of Dermatology and Venereology in a Tertiary Care Hospital in Bangladesh Annals of International Medical and Dental Research. Ann Int Med Dent Res. 2022;8(5):270–7.
22. Lynn D, Umari T, Dellavalle R, Dunnick C. The epidemiology of acne vulgaris in late adolescence. Adolesc Health Med Ther. 2016;7(1):13–25.
23. Makrantonaki E, Ganceviciene R, Zouboulis C. An update on the role of the sebaceous gland in the pathogenesis of acne. Dermatoendocrinol. 2011;3(1):41–9.
24. Iftikhar U, Choudhry N. Serum levels of androgens in acne & their role in acne severity. Pakistan J Med Sci. 2019;35(1):146–50.
25. Kucharska A, Szmurło A, Sinska B. Significance of diet in treated and untreated acne vulgaris. Postep Dermatologii i Alergol. 2016;33(2):81–6.
26. Ramli R, Malik AS, Hani AFM, Jamil A. Acne analysis, grading and computational assessment methods: An overview. Ski Res Technol. 2012;18(1):1–14.
27. Ramli R, Malik AS, Hani AF, Yap FB. Identification of acne lesions, scars and normal skin for acne vulgaris cases. 2011 Natl Postgrad Conf - Energy Sustain Explor Innov Minds, NPC 2011. 2011; 1-4.
28. Doshi A, Zaheer A, Stiller MJ. A comparison of current acne grading systems and proposal of a novel system. Ordinary Partial Differ Equ Routines C, C++, Fortran, Java, Maple, MATLAB. 2003;36(6):416–8.
29. Suda KM. Associations Among Acne Vulgaris and Western Diet. Physician Assist Sch Proj Posters. 2018;25(5):1–35.
30. Adebamowo CA, Spiegelman D, Berkey CS, Danby FW, Rockett HH, Colditz GA, et al. Milk consumption and acne in adolescent girls. Dermatol Online J. 2006;12(4):1–10.
31. Adebamowo CA, Spiegelman D, Berkey CS, Danby FW, Rockett HH, Colditz GA, et al. Milk consumption and acne in teenaged boys. Physiol Behav. 2008;58(5):787–93.
32. Kakroo SN, Jamal A, Beg MA. Evaluate an Association Between Diet and Acne Vulgaris: A Cross Sectional Study. Int Arch Biomed Clin Res. 2021;7(2):1–4.
33. Bajelan A, Ghaebi M, Javadi M, Barikani A, Beheshti A, Bargahi M, et al. The Association Between the Incidence of Acne Vulgaris and Lifestyle Factors Including Dietary Habits, Physical Activity, and Bathing Frequency. J Ski Stem Cell. 2021;7(3):6–11.
34. Penso L, Touvier M, Deschasaux M, Szabo De Edelenyi F, Hercberg S, Ezzedine K, et al. Association between Adult Acne and Dietary Behaviors: Findings from the NutriNet-Santé Prospective Cohort Study. JAMA Dermatology. 2020;156(8):854–62.
35. Aghasi M, Golzarand M, Shab-Bidar S, Aminianfar A, Omidian M, Taheri F. Dairy intake and acne development: A meta-analysis of observational studies. Clin Nutr. 2019;38(3):1067–75.
36. Adityan B, Kumari R, Thappa DM. Scoring systems in acne vulgaris. Indian J Dermatol Venereol Leprol. 2009;75(3):323–6.
37. Dreno B, Poli F, Pawin H, Beylot C, Faure M, Chivot M, et al. Development and evaluation of a Global Acne Severity scale (GEA scale) suitable for France and Europe. J Eur Acad Dermatology Venereol. 2011;25(1):43–8.
38. Alghamdi H, Alhemel AM, Bukhari IA. Effect of milk and dairy products consumption on acne risk and severity in young adult patients with Acne vulgaris attending the dermatology clinics at King Fahd Hospital of the University in Alkhobar, Saudi Arabia. Sci Med Sci. 2017;0(4 (12)):4–8.
39. Aalemi AK, Anwar I, Chen H. Dairy consumption and acne: A case control study in kabul, afghanistan. Clin Cosmet Investig Dermatol. 2019;12(7):481–7.

Original Article

Evaluation of Pharmaco-invasive PCI in Terms of in Hospital Clinical Outcome of Acute Anterior ST Segment Elevation Myocardial Infarction Patients Compared to Primary PCI

Dhar R[1], Momenuzzaman NAM[2], Ahmed MU[3], Hossain S[4], Kumar DU[5], Shuvon AAA[6]

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ABSTRACT:

Background: *The strategic reperfusion early after Myocardial Infarction trial and the French Registry of Acute Anterior ST segment elevation MI suggested that pharmaco-invasive strategy compares favorably with primary percutaneous coronary intervention (PPCI).*

Objectives: *To evaluate in hospital clinical outcome of patients with acute anterior ST segment elevation myocardial infarction undergoing Primary PCI and pharmaco-invasive PCI.*

Methods: *This cross sectional study was conducted in United Hospital, Dhaka. A total of 120 patients were studied. These patients were categorized into two groups. Those with acute anterior ST segment elevation MI who underwent primary PCI was denoted as group A (n= 55) and those with acute anterior ST segment elevation thrombolysed by streptokinase followed by PCI confined to pharmaco-invasive PCI was denoted as group B (n=65).*

Results: *Acute LVF was more in pharmaco-invasive group than in primary PCI group and was statistically significant (p= 0.032). 02 patients (3.6%) died in primary PCI group: one of which was due to ventricular fibrillation followed by asystole 3 hours after procedure and the other died due to cardiac arrest 10 hours after the procedure. No major bleeding incidence was found in both groups.*

Conclusion: *Acute anterior ST segment elevation myocardial infarction patients receiving pharmaco-invasive treatment compared with the Primary PCI had higher incidence of acute LVF and no significant discrepancy was observed regarding bleeding events, death, stent thrombosis, arrythymia, heart block and cardiac arrest.*

Key Words:
Pharmaco-invasive PCI, Primary PCI, Acute LVF, Ventricular fibrillation

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1. Dr. Rajib Dhar, Assistant Professor, Department of Cardiology, Enam Medical College and Hospital, Savar, Dhaka.
2. Dr. N A M Momenuzzaman, Professor and Chief Consultant, Department of Cardiology, United Hospital Limited, Dhaka.
3. Dr. Moeen U Ahmed, Professor and Head, Department of Cardiology, Enam Medical College and Hospital, Savar, Dhaka.
4. Dr. Solaiman Hossain, Professor, Department of Cardiology, Enam Medical College and Hospital, Savar, Dhaka.
5. Dr. Das Uttam Kumar, Assistant Professor, Department of Cardiology, Holy Family Red Crescent Medical College and Hospital, Dhaka.
6. Dr. Ashfak Al Arif Shuvon, RMO, New Life Medical Services, Nawabganj, Dhaka.

Correspondence: Dr. Rajib Dhar, Assistant Professor, Department of Cardiology, Enam Medical College and Hospital, Savar, Dhaka.
Email:www.drrajibmd2013@gmail.com, Mobile Number:01825151774

Introduction

Coronary artery disease (CAD) is the most common cause of mortality & morbidity in all over the world[1] . Deaths from cardiovascular disease (CVD) jumped globally from 12.1 million in 1990 to 20.5 million in 2021, according to a new report from the World Heart Federation (WHF). CVD was the leading cause of death worldwide in 2021, with four in five CVD deaths occurring in low- and middle-income countries (LMICs). The highest CVD death rates occur in the Central Europe, Eastern Europe, and Central Asia region.[2] In the United Kingdom (UK), more than 1.4 million suffer from angina [3] and 275,000 people have a heart attack annually while in United States of America (USA), 770,000 people suffer from new heart attacks each year [4]. Various studies have pointed out that South Asians have a higher prevalence of CAD as compared with other ethnicities with a higher rate at younger ages [5].

Acute STEMI is a clinical syndrome defined by characteristic symptoms of myocardial ischemia in association with persistent electrocardiographic (ECG) ST elevation and subsequent release of biomarkers of myocardial necrosis. Diagnostic ST elevation in the absence of left ventricular hypertrophy (LVH) or left bundle branch block (LBBB) is defined for the universal definition of Myocardial Infarction as new ST elevation at the J point in at least 2 contiguous lead >2mm (0.2mV) in men or >1.5mm (0.15mV) in women in lead V2- V3 and or >1mm (0.1mV) in other contiguous chest leads or the limb leads.[6] New or presumably new LBBB has been considered a STEMI equivalent. The main goal of STEMI management is prompt, complete and sustained restoration of ante-grade flow in the infarct related artery is essential to salvage the myocardium at risk improve ventricular function and reduce morbidity and mortality[7] . Currently, there are three main reperfusion strategies: fibrinolytic therapy, primary PCI and pharmaco-invasive PCI. Primary PCI is the preferred treatment modality in patients with ST-Segment Elevation Myocardial Infarction (STEMI) referred to high volume, well-equipped hospitals with PCI capability due to established superior rates of infarct-related artery patency and thrombolysis in Myocardial Infarction TIMI 3 flow compared with thrombolytic therapy. These positive effects on surrogate endpoints are proven to translate into decreased mortality reverse ventricular remodeling and reduced cardiac dysfunction if primary PCI is performed within 12 hours after the onset of STEMI. The 12 hours window period has maximum benefit of revascularization strategy because after this time period benefit of revascularization in STEMI is pretty low [8] . On this background, the most recent US and European PCI guidelines set the first medical contact-to-balloon time goal to 120 minutes for inter hospital transfer of STEMI patients, with emphasis on the need to strive for total ischemia times <90 minutes. However, in a sizable proportion of patients, the effectiveness of STEMI reperfusion is still limited by delays in PCI. In particular, there are environments where delays to primary PCI remain too long for logistic reasons and alternative reperfusion strategies are needed [6].

Pharmaco-invasive therapy means first administering early fibrinolysis and then systematically performing an angiography within 3 to 24 hours after the start of fibrinolytic therapy, regardless of whether fibrinolysis results in successful reperfusion or not. In the event of fibrinolytic failure, a rescue PCI should be immediately performed where one need not wait for the initial 3-hour window. Primary PCI is the preferred reperfusion strategy. However, when this therapy is not available, pharmaco-invasive PCI within 3 to 24 hours appears to be a reasonable. Timely perfusion is the most effective treatment for the STEMI. The risk of 1-year mortality is increased by 7.5% for each 30 min delay in treatment. A delay in undergoing primary PCI greatly reduces the benefit from the invasive procedures[7].

Unavailability of PCI capable hospital and transport delays have restricted primary PCI to only a small proportion of eligible patients. Initial timely fibrinolysis to open the IRA followed by early PCI- that is a pharmaco-invasive strategy to improve the patency rates is an attractive approach particularly in developing countries like Bangladesh where catheterization facilities are limited.

A substantial amount of patients got admitted in coronary care unit of United Hospital with acute coronary syndrome and were diagnosed as a case of acute anterior STEMI depending on ECG. The aim of this study is to compare in-hospital clinical outcome between primary PCI and pharmaco-invasive PCI in acute anterior STEMI patients as we don't have comparative clinical outcome data between these two groups right now.

Objectives

The objective of this study was to evaluate in hospital clinical outcome of patients with acute anterior ST segment elevation myocardial infarction undergoing Primary PCI and Pharmaco-invasive PCI.

Methods

This cross-sectional study was conducted in United Hospital, Dhaka. All the acute anterior ST segment elevation Myocardial Infarction male or female patients admitted in, CCU of United Hospital Ltd were considered as study population. A total of 120 patients were selected by purposive sampling technique. These patients were categorized into two groups. Those with acute anterior ST segment elevation MI who underwent primary PCI was denoted as group A (n= 55) and those with acute anterior ST segment elevation thrombolysed by streptokinase followed by PCI confined to pharmaco-invasive PCI was denoted as group B (n=65).

Inclusion criteria

• Adult patients (aged 18-75yrs) with acute anterior ST segment elevation myocardial infarction diagnosed by standard surface 12 lead ECG admitted in coronary care unit United Hospital Ltd. Dhaka for primary PCI.

• Adult Patients with acute anterior ST segment elevation myocardial infarction were thrombolysed followed by PCI within 24 hours.

• Patients who were thrombolysed from outside and transferred from non PCI capable hospital to United Hospital for PCI within 3-24 hours.

Exclusion criteria

• Old myocardial infarction patients or post PCI or post CABG patients.

• Causes of ST segment elevation in ECG other than MI i.e. pericarditis, Prinzmetal angina, Brugada syndrome.

• ECG evidence of LBBB, WPW syndrome, ventricular arrhythmia, second degree and third degree conduction defect, ventricular electronic pacing of heart.

• Severe co-morbid conditions such as ESRD, cirrhosis of liver, malignancy.

• Unwilling to participate.

Study Procedure

Patients with suspected acute coronary syndrome admitted in United Hospital through emergency department were assessed first by 12 lead standard surface ECG. Detailed history and physical examination were done and required data were recorded in preformed data collection sheet. The diagnosis of acute anterior STEMI was done by identifying the findings of the triad i.e. clinical presentation, characteristic ST segment elevation from V_1-V6 ± I, aVL or V_1-V3, and/or elevation of cardiac biomarker. A total of 120 patients with the diagnosis of acute anterior STEMI were evaluated by the study physician who fulfilled the inclusion and exclusion criteria and were properly loaded with double antiplatelet drugs and were selected for coronary angiography and PCI followed by data collection, and data analysis. These patients were categorized into two groups. Those with acute anterior ST segment elevation MI who underwent primary PCI was denoted as group A (n=55) and those with acute anterior ST segment elevation thrombolysed by streptokinase followed by PCI confined to pharmaco-invasive PCI was denoted as group B (n=65). Informed consent was taken from all the study subjects or from the legal guardians before enrolling them in the study. All the patients selected as study subjects, were evaluated for demographic profile (age, sex) and risk factors of coronary artery disease like diabetes, hypertension, dyslipidemia, smoking, obesity, and family history of premature CAD. Baseline investigations e.g. ECG, high sensitive troponin I, serum creatinine, lipid profile, random blood sugar and echocardiography were done for each patient.

Grouping

Group A: Patients with acute anterior STEMI who underwent Primary PCI (n=55)

Group B Patients with acute anterior STEMI who underwent Pharmaco-invasive PCI (n=65)

Ethical implications

Prior to commencement of this study, the research protocol was approved by the "Research Review Committee" & the "Ethical Committee" of UICVS, Dhaka. All the patients included in this study were informed about the nature, risk and benefit of the study. Then informed consent was taken from all study subjects or from legal guardians.

Statistical analysis

Data were expressed as Mean ± SD for continuous variables and as numbers (percent) for categorical variables. Continuous variables were compared by the

unpaired student t-test. Proportions were compared by Chi-square statistics and Fisher's exact test was used where appropriate. The 95% confidence intervals (CI) were calculated for each technique. P value less than 0.05 was considered significant. All statistical calculations were performed using SPSS-23.

Results

Table 1 showed age and gender of study subjects. The difference between the mean age and gender of two groups were not statistically significant.

Table 1: Baseline characteristics between two groups (N=120)

Variables	Group-A (n=55)		Group-B (n=65)		p value
Age (years)					
Mean ± SD	48.4 ± 8.5		49.7 ± 9.3		0.429
Median	49		51		
Range	34 -71		32-70		
Gender					
	Frequency	Percentage	Frequency	Percentage	
Male	54	98.2	63	96.9	0.659
Female	1	1.8	2	3.1	
Male Female ratio	54:1		63:2		

P value derived from unpaired Student t test for age, chi-square test for gender.

Table 2 showed pre-exposure and post-exposure EF in both groups were nearly similar, tachyarrhythmia and cardiogenic shock was slightly more in group B compared to group A, cardiac arrest and death was nil in group B. Acute LVF was more in group B and was statistically significant. Stent thrombosis and major bleeding was absent in both group.

Table 2: Comparison of in hospital clinical outcome in pharmaco-invasive PCI and primary PCI

Variable	Group A Mean ±SD		Group B Mean± SD		P value
ECG findings					
Pre-exposure EF	48.5 ± 9.3		47.2±8.5		0.425
Post-exposure EF	51.5 ± 10.8		50.4 ±9.5		0.554
Outcome within 7 days					
	Frequency	%	Frequency	%	
Tachyarrhythmia	18	32.7	22	33.8	0.897
Cardiac arrest	2	3.6	0	0	0.207
Acute LVF	3	5.5	12	18.5	0.032
Cardiogenic shock	3	5.5	5	7.7	0.624
Death	2	3.6	0	0	0.207
Procedural complication					
Stent thrombosis	0		0		
Major bleeding	0		0		

Discussion

The present study findings were discussed and compared with the previously published relevant studies. The pre-procedural and post-procedural echocardiographic variable of our study between two groups showed non-significant and which was consistent with a study carried out in Korea[9]. The comparison of in hospital outcome parameters of arrhythmias and heart block were non-significant in both groups (p=0.897). [2] patients (3.6%) died in primary PCI group: one was due to ventricular fibrillation followed by asystole 3 hours after procedure and another died due to cardiac arrest 10 hours after the procedure. This results were similar with studies carried out in Korea [9] and India[10].In our study, acute LVF was more in pharmaco-invasive group than in primary PCI group (21.5% vs 7.3%) and the result was significant (p=0.029). This result was inconsistent with a study carried out in India.[11] Cardiogenic shock was almost similar in both groups and p value was also non-significant (p= 0.624).The result was inconsistent with a study carried out in Korea[9] No major bleeding incidence was found in both groups and the results were similar with other studies. [9,10]. This may be due to the fact that both groups had radial access for catheterization and we excluded patients aged >75 years. In present study, there were no stent thrombosis in both groups.

Conclusion

In this study, acute anterior ST segment elevation myocardial infarction patients receiving pharmaco-invasive strategy had higher incidence of acute LVF than primary PCI group. There was no major bleeding incidence in both groups.

Limitation of study

This is a cross sectional study which has few limitations due to small sample size, single center study, expensive procedure and the precise time interval. Owing to the small sample size of the study, our findings may not provide a precise estimate of outcomes (especially safety end points) and definitive conclusions await larger randomized trials.

References

1. Ahmed, M., Majumder, A.A.S., Rahman, A., et al. 2005. Relationship between baseline white blood cell count and angiographic severity of coronary artery disease in patients with acute coronary syndrome. Bangladesh Heart Journal.2005 Vol. 20, No. 1, pp. 6-10. [Ahmed M, Majumder AA, Rahman A, Baqui MA. Relationship between baseline white blood cell count and angiographic severity of coronary artery disease in patients with acute coronary syndrome. Bangladesh Heart Journal. 2005; 20 (1):6-10.
2. World Heart Federation report, Geneva, 20 May 2023.
3. Peterson S, Peto V, Scarboough P, Rayner M. Coronary Heart Disese Statistics-2005 edition British Heart Foundation Health Promotion Research Group Department of Public Health, University of Oxford, 2006.
4. Rosamond W, Flegal K, Furie K, Go A, Greenlund K, Haase N, et al. Heart Disease and Stroke statistics -2008 Update: A report from the American Heart Association Statistics Committee and Stroke Statistics Subcommittee.
5. Manninen, V., Tenkanen, L., Koskinen, P., Huttunen, J.K., Manttari, M., Heinonen, O.P., 1992. Joint effects of serum triglyceride and LDL cholesterol and HDL cholesterol concentrations on coronary heart disease risk in the Helsinki Heart Study: implications for treatment. Circulation. 1992; 85: 37-45.
6. O Gara,PT., ,Kushner, F.G., Ascheim, D.D., Casey, D.E.,Chung, M. K., de Lemos, J. A., et al ACCF/AHA Guideline for the Management of ST- Elevation Myocardial Infarction. 2013. Practice guideline. A Report of the American College of Cardiology. Foundation/American Heart Association Task Force on Practice Guidelines. Available from Journal of the American College of Cardiology. 2013; 61(4): 78-140.
7. Dalal JJ, Alexander T, Banerjee PS, Dayasagar V, Iyengar SS, Kerkar PG, Mullasari A, Sathe SP, Wander GS; Cardiocare STEMI experts. 2013 consensus statement for early reperfusion and pharmaco-invasive approach in patients presenting with chest pain diagnosed as STEMI (ST elevation myocardial infarction) in an Indian setting. J Assoc Physicians India. 2014; 62(6):470-80.
8. Mishra S, Ramakrishnan S, Babu AS, Roy A, Bahl VK, Singru KV, Chugh S, Sengupta S, Kaul U, Boopathy SN, Nirmit Y, Jadhav UM, Jose J, Gupta V, Chopra HK, Singh A, Sastry BK, Thiyagarajan S. Management algorithms for acute ST elevation myocardial infarction in less industrialized world. Indian Heart J. 2017; 69(1).
9. Kim JH, Chae SC, Oh DJ, Kim HS, Kim YJ, AHN Y, Cho MC, Kim CJ, Yoon , Park HY, Jeong MH; Korea Acute MI National Institutes of Health Registry. PubMed Circ J .2016; 80 (6): 1427-36.
10. Victor SM, Subban V, Alexander T G BC, Srinivas A, S S, Mullasari AS. A prospective, observational, multicentre study comparing tenecteplase facilitated PCI versus primary PCI in Indian patients with STEMI (STEPP-AMI). Indian Heart Journal. 2016; 68 (2): 170-173.
11. Cantor JW, Fitchett D, Borgundvaag B, Ducas J, Heffernan M, Cohen Ea,Morrison Lj, Langer A, Djavik V, Mehta SR, Laam C, Schwartz B, Casanova A, Goodman SG. TRANSFER –AMI Trial Investigatord, Routine early angioplasty after fibrinolysis for acute myocardial infarction. N Engl J M. 2009; 360(26): 2705-18.

Original Article

Prevalence and Determinants of Vitamin D Deficiency during the First Trimester: Evidence from a Major Metropolitan City in Bangladesh

Shirin F[1], Sultana N[2], Chowdhury F[3], Chowdhury FI[4], Sultana M[5], Ferdous J[6], Chawdhury SJ[7], Ali A[8], Deb K[9].

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ABSTRACT:

Background: *Vitamin D deficiency in early trimesters can have detrimental effect on feto-maternal outcomes. This research aimed to determine the prevalence and possible associated factors with vitamin D deficiency during first trimester in Chattogram city, Bangladesh.*

Methods: *This was a cross-sectional study conducted from July to September, 2023 in Chattogram metropolitan city with purposive sampling. After obtaining consent a questionnaire was provided and blood was drawn for biochemical analysis. Statistical inference was done through SPSS V25.*

Results: *Total 398 women participated in this study with mean age of 27 years. More than half (51.8%) were suffering subpar vitamin D level, with 15.1% being deficient and 36.7% having insufficient vitamin D level. Most participants were housewives (78.6%) with over half (57.5%) completing their undergraduate degree. Private service (40.5%) was the most prevalent spouse's profession. Most of the women were primigravid (41.2%). 34.4% and 34.4% of participants had one instance of cesarean section and abortion respectively. High prevalence of anemia was present (49.2%) and was statistically significant with subpar vitamin D level ($p<0.05$). Husband's occupation and covered clothing style was also found to be statistically significant.*

Conclusion: *There is significant prevalence of vitamin D deficiency in early pregnancy in Chattogram metropolitan region. Further research and early intervention should be implemented to prevent and mitigate this deficiency and prevent associated adversities.*

Key Words:
Vitamin D deficiency, First trimester pregnancy, Vitamin D

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1. Dr. Fahmida Shirin, Associate Professor, Department of Obstetrics and Gynecology, Chittagong Medical College Hospital, Chattogram
2. Dr. Nahid Sultana, Senior Consultant, Department of Obstetrics and Gynecology, Chittagong Medical College Hospital, Chattogram
3. Dr. Faisal Chowdhury, MBBS, Chittagong Medical College, Chattogram
4. Dr. Fahmida Islam Chowdhury, Associate Professor, Department of Obstetrics and Gynecology, Chittagong Medical College Hospital, Chattogram
5. Dr. Munawar Sultana, Assistant Professor, Department of Obstetrics and Gynecology, Chittagong Medical College Hospital, Chattogram
6. Dr. Jannatul Ferdous, Junior Consultant, Department of Obstetrics and Gynecology, Chittagong Medical College Hospital, Chattogram
7. Dr. Shahnaj Jahan Chawdhury, Assistant Professor, Department of Obstetrics and Gynecology, Chittagong Medical College Hospital, Chattogram
8. Dr. Asifa Ali, Assistant Professor, Department of Obstetrics and Gynecology, Chittagong Medical College Hospital, Chattogram
9. Dr. Koushik Deb, Medical Officer, Department of Medicine, Mymensingh Medical College Hospital, Mymensingh

Correspondence: Dr. Faisal Chowdhury, MBBS, Chittagong Medical College, Chattogram, Email: faisalchwdhr@gmail.com,
Contact no: +8801857331135

Introduction

Vitamin D is an essential fat-soluble vitamin responsible for human growth and development, including calcium and phosphorus homeostasis, bone formation, resorption and mineralization, and immune system enhancement, among other functions. [1] Despite the importance of its physiological functions, 25-hydroxyvitamin D deficiency affects 15.7% of the world's population [2]. Typically, vitamin D deficiency (VDD) does not manifest itself physically; however, even mild VDD, if it occurs chronically, can contribute to chronic hypocalcemia and hyperparathyroidism, leaving individuals susceptible to osteoporosis, fractures, etc. VDD can also increase the risk of chronic diseases such as obesity, diabetes, hypertension, depression, neurodegenerative diseases, and numerous types of cancer.[3] Women are more susceptible to developing VDD, particularly during pregnancy. [2] Pregnant women have been identified as a high-risk group for VDD, with a prevalence between 20% and 40%. [4] The mother's body adapts to provide the additional calcium required for the fetus's skeletal and bone development, necessitating an increase in vitamin D consumption. [5] Vitamin D is also believed to be responsible for placental development, immune regulation, and infection control, in addition to skeletal growth. [6] This additional need makes pregnant women especially susceptible to VDD and severe complications such as pre-eclampsia and eclampsia, gestational diabetes mellitus, an increased risk of cesarean section, prematurity and preterm birth, and intrauterine growth restriction. [5,7,8] This deficiency was found to be more prevalent among women from low-income nations. [2,9]

VDD continues to be a prevalent health concern in Bangladesh. According to a meta-analysis, Bangladesh had the second highest incidence of VDD, at approximately 67%, which is alarming. [9] Although there are several studies on VDD in non-pregnant women in Bangladesh, few studies have examined the state of VDD in pregnant women. Early detection of VDD allows for faster intervention and may reduce VDD-mediated adverse pregnancy and postnatal outcomes. Our study aims to determine the prevalence of vitamin D deficiency among expectant women in their first trimester as well as the relationship between socioeconomic and pregnancy-related factors and the status of deficiency.

Methods

This was a descriptive cross-sectional study, conducted between July to September, 2023 in Chattogram city, Bangladesh. Purposive sampling method was used and proportional sampling determined the sample size of 357. Inclusion criteria included women 18 years and above in their first trimester of pregnancy (<13 weeks). Women <18 years, who previously had antenatal check-up during current pregnancy, women taking any routine vitamin or mineral supplementations, suffering from any chronic disease or taking any drugs which can alter vitamin D metabolism were excluded from this study. Patients attending private clinics were selected after providing written informed consent and a questionnaire containing socio-demographic information including age, education level, occupation, husband's occupation, para, gravida, previous history of cesarean section (C/S), abortion was given. After providing information the participant's random venous blood sample was collected through a disposable syringe, five mililitres in quantity in a private biochemical lab and was analyzed promptly. Participant's weight was measured to the nearest 100g using a digital weight scale (EB9013, Camry, Hong Kong) .Height was measured using a manual stadiometer with 200cm marking. Serum Vitamin D level was be estimated measuring total 25-hydroxyvitamin D [25(OH)D] using electrochemilumines immunoassay analyzer (Vitros, ECI, , Ortho Clinical Diagnostics, New York, USA). Hemoglobin level was measured through Sysmex XN-1000 hematology analyzer(Sysmex Corporation, Kobe, Japan). After obtaining the results, the data was entered in the specific participant's questionnaire. There is lack of definition regarding the adequate vitamin D status, especially for pregnant women. We used cut-off value for vitamin D level suggested by the Institute of Medicine where (25(OH)D $\geq$ 20 ng/mL was considered sufficient, 25(OH)D = 12–19 ng/mL was considered insufficient and 25(OH)D < 12 ng/mL was deficient. [10] We considered anemia at <11g/dl as defined by WHO during pregnancy. [11] Ethical permission for the research was obtained from ethical review board of Chittagong Medical College, Chattogram, Memo no-59.27.0000.013.19.PG.2023.009/298. Statistical analysis was done using SPSS V25. After providing descriptive statistics, correlation was done through Chi-square test. P value of <0.05 was deemed significant.

Results

Table 1: Socio-demographic information of the patients

Variables	Mean (SD)	Frequency	Percentage
Age	27(±5.18)		
Education			
Primary		5	1.26
SSC		82	20.60
HSC		82	20.60
Undergraduate		105	26.38
Post-graduate		124	31.16
Occupation			
Housewife		313	78.6
Student		26	6.5
Teacher		21	5.3
Private service		16	4
Others		22	5.6
Husband's occupation			
Service		161	40.5
Business		125	31.4
Emigrant		62	15.6
Others		50	12.6

Total 398 women participated in this study. The mean age of the participants was 27 years with SD (± 5.18). Most of the women were educated with more than half of participants, 229 (57.5%) completing their undergraduate degree. Most of the participants 313(78.6%) were housewives, followed by student (26,6.5%) and Teachers (21,5.3%). Other professions included private services, doctors, engineer, bankers etc. 161,40.5% of the husbands were in private service, closely followed by businessman (125,31.4%) and emigrants (62,15.6%). Other occupations included banker, doctor, engineer, teacher etc.

Table 2: Obstetric history of the participants

Variables	Frequency (n=398)	Percentage
Gravida		
1	164	41.2
2	109	27.4
3	76	19.1
≥4	49	12.4
Para		
0	164	41.2
1	107	26.9
2	74	18.6
3	35	8.7
≥4	18	4.5
Previous history of C/S		
0	167	42
1	48	12.1
2	14	3.5
3	3	0.8
≥4	2	0.6
Previous history of abortion		
0	166	41.7
1	57	14.3
2	7	1.8
3	4	1

Table 2 represents the obstetric history of the participants. Most of the women participating in the study were primigravida, 164(41.2%), while 49(12.4%) had 4 gravida or more. Para 0 or nullipara was considered for participants who were conceiving for the first time consisting 164(41.2%). The discrepancies between the para and gravida were due to twin pregnancies being consider as a single para. While calculating previous C/S and abortion history, the primigravida were excluded as it were not applicable. Out of 234 multigravida women out of 398, 68(34.4%) of women had at least one C/S previously, whereas 68 (34.4%) also suffered from at least one instance of abortion.

Table 3: BMI and Anemia level of the participants

	Frequency (n=398)	Percent
BMI		
Underweight	17	4.3
Normal	189	47.5
Overweight	144	36.2
Obese	48	12.1
Presence of anemia		
Anemic	196	49.2
Normal	202	50.8

Table 3 displays the BMI level of the patients and the frequency of anemic patient. Almost half of the participants suffered from being overweight (144,36.5%) and obese (48,12.1%). The hemoglobin level was measured to assess whether the women were anemic. A significant portion of the women, almost half, (196,49.2%) were suffering from different levels of anemia. The mean hemoglobin of the participants was 10.89 gm/dl (±2.46) and mean BMI was 24.81 (±4.3).

Fig 1: Vitamin D level among participants

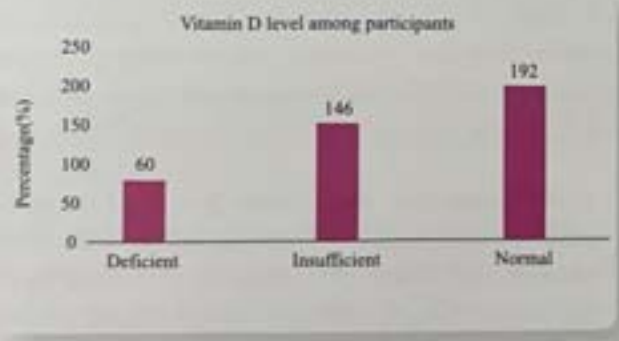

Figure 1 displays the level of Vitamin D among the participants. More than half of the participants, 206 (51.8%) were suffering subpar vitamin D level, with 60 (15.1%) being deficient. The mean vitamin D level of the participants was 20.17ng/dl (±17.14)

Table 4: Vitamin D level and possible associated factors

	Vitamin D level			
	Deficient	Insufficient	Normal	p value
Participants age (in years)				
18-24	19 (4.8%)	49 (12.3%)	68 (17.1%)	NS
25-29	19 (4.8%)	47 (11.8%)	73 (18.3%)	
30-34	16 (4.0%)	37 (9.3%)	35 (8.8%)	
35 and above	6 (1.5%)	13 (3.3%)	16 (4%)	
Participant's occupation				
Housewife	44 (11.1%)	122 (30.7%)	147 (36.9%)	NS
Others	16 (4%)	24 (6%)	45 (11.3%)	
Husband's occupation				
Service	37 (9.3%)	54 (13.6%)	70 (17.6%)	0.001
Business	12 (3%)	50 (12.6%)	63 (15.8%)	
Emigrants	4 (1%)	31 (7.8%)	27 (6.8%)	
Others	7 (1.8%)	11 (2.8%)	32 (8%)	
Parity				
Primipara	42 (10.6%)	101 (25.4%)	134 (33.7%)	NS
Multipara	18 (4.5%)	45 (11.3%)	58 (14.6%)	
Presence of anemia				
Present	22 (5.5%)	67 (16.8%)	107 (26.9%)	0.021
Absent	38 (9.5%)	79 (19.8%)	85 (21.4%)	
Dressing style				
Covered	55 (13.8%)	139 (34.9%)	82 (20.6%)	0.001
Uncovered	5 (1.3%)	7 (1.8%)	110 (27.6%)	
BMI				
Underweight	4 (1%)	5 (1.3%)	8 (2%)	NS
Normal	29 (7.3%)	67 (16.8%)	93 (23.4%)	
Overweight	20 (2%)	55 (13.8%)	69 (17.3%)	
Obese	7 (1.8%)	19 (4.8%)	22 (5.5%)	

NS = Not significant

To further evaluate the relationship between the different variables and VDD, chi-square test through contingency table was conducted and statistically significant association was discovered between type of dressing, husband's occupation level and presence of anemia with sub-normal vitamin D levels. The level of vitamin D was most deficient among husband's who were working in the private services ($p < 0.001$). The level of VDD also significantly correlated with presence of anemia ($p < 0.021$) and women who wore covered dressing ($p < 0.001$).

Discussion

According to the researchers, this study is the first to investigate the occurrence of VDD in first trimester pregnant women in Chattogram. Women in the initial stage of pregnancy are more susceptible to experiencing lack in vitamin D as a result of the hormonal and metabolic alterations. [12] Vitamin D is crucial for the growth and development of the fetus, and if there is a shortfall early on, it can lead to negative outcomes for both the fetus and the mother.[13]

A majority of our subjects (n=206, 51.8%) exhibited varying degrees of vitamin D inadequacy demonstrating a significant prevalence of suboptimal vitamin D levels in this region. This finding is consistent with the possibility that expectant women in Bangladesh have high incidence of VDD, as suggested by other regional studies. A recent review paper conducted in Bangladesh reported a prevalence of VDD ranging from 66% to 94.2% among pregnant women. [14] A study conducted in a rural area by Ahmed et al. [12] discovered that 64.5% of women had below-average levels of vitamin D, with 17.3% being deficient and 47.2% being insufficient. In an urban environment, a study discovered that 31.4% of pregnant women experienced vitamin D insufficiency, while 60.7% had a severe deficiency, and 2.1% had severe deficiency. [15] Despite the variations in the cut-off levels used to define vitamin D deficiency, the studies still indicate an overall inadequate level of vitamin D. Additionally, there is a dearth of national-level surveys on vitamin D levels within this specific population group, which hinders the ability to make broader conclusions based on the findings. The incidence of insufficient levels of vitamin D was higher among younger pregnant women (33.7%) under the age of 30, as compared to other age groups, which aligns with the findings of a previous study. [15] While Ahmed et al.[12] discovered that younger patients had a 2.5 times higher likelihood of experiencing VDD, our study did not see any link between the variables. Our conclusion is consistent with previous research conducted in Malaysia. [16] The disparity could be attributed to various factors, including variations in regional lifestyle and dietary habits. 41.2% of our population consisted of individuals who were primigravid. While a previous study identified a correlation between having parity over 2 and an increased risk of vitamin D deficiency, our investigation did not find any such association. [17] Another longitudinal study yielded results that were consistent with our own findings, since it too did not detect any link between the variables. [18] The majority of our patients, accounting for 78.6%, were housewives. Pregnant housewives were found to be at an elevated risk of vitamin D insufficiency, although our study did not find such association. [19] The occupation of the husband showed a strong correlation with low levels of vitamin D in our study ($p < 0.001$). 40.5% of the husbands in our study were employed in private service jobs. A separate study conducted in Bangladesh identified the occupation of the spouse as a significant risk factor for VDD in pregnant women. [14] In contrast, no correlation of this nature was observed by Ahmed et al. [12] One such cause could be attributed to the socio-economic impact of the husband's profession. Anemia was found to be strongly associated with a low degree of vitamin D insufficiency ($p<0.021$). The results of our study align with the results of a systematic analysis that discovered a 61% higher likelihood of anemia in pregnant women who have a deficient in vitamin D. [20] The precise correlation between anemia and vitamin D deficiency remains poorly understood. However, there is evidence suggesting that the enzyme cytochrome P-450 25-hydroxylase (CYP2R1), which contains heme, may have a significant role in the process of converting cholecalciferol into 25(OH)D3 in the liver and thus hemoglobin deficiency can disrupt the metabolic pathway. [21] Our findings did not discover any significant association between BMI and Vitamin D level , even though higher BMI has been associated with lower level of vitamin D deficiency, [22,23] and our study lacked in depth data to explore this relationship further.

Our study also discovered a significant correlation between vitamin D insufficiency and women who favored a clothing style that covered their whole bodies. Our findings are supported by another research which discovered that concealing garments can potentially lead to vitamin D insufficiency [24] The majority of women in Chattogram adhere to the Islamic faith and choose to wear concealing dress in their daily lives. This cultural practice may be a contributing factor to the elevated prevalence of vitamin D insufficiency among them.

The study's strength rests in its originality, as it explores a specific demography in Chattogram which was not previously studied. Stringent measures were taken to guarantee the collection of blood samples and the analysis of biochemical indicators. Despite the researchers' best efforts, the study was subject to some limitations. The

study employed a cross-sectional design and specifically targeted the urban population residing in the metropolitan area. Furthermore, this study exclusively recruited women who were in the first trimester of their pregnancy. Therefore, the outcome may not be applicable to other distinct populations. Additional potential biochemical markers that could potentially lead to vitamin D insufficiency were not included in this investigation.

Conclusion

The occurrence of vitamin D inadequacy and insufficiency is widespread among pregnant women in Chattogram during the first trimester. The study discovered a strong association between anemia, the husband's work, dressing style, and inadequate vitamin D levels. Interventions should be developed and executed to proactively address vitamin D insufficiency during the early stages of pregnancy and mitigate potential complications. Additional comprehensive and longitudinal research is required to gain a better understanding of the potential causes that may contribute to vitamin D insufficiency in this particular area.

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References

1. Norman AW. From vitamin D to hormone D: fundamentals of the vitamin D endocrine system essential for good health. Am J Clin Nutr. 2008 Aug;88(2):491S-499S.
2. Cui A, Zhang T, Xiao P, Fan Z, Wang H, Zhuang Y. Global and regional prevalence of vitamin D deficiency in population-based studies from 2000 to 2022: A pooled analysis of 7.9 million participants. Front Nutr. 2023 Mar 17;10.
3. Naeem Z. Vitamin d deficiency- an ignored epidemic. Int J Health Sci (Qassim). 2010;4(1):V-Vi.
4. Mithal A, Kalra S. Vitamin D supplementation in pregnancy. Indian J Endocrinol Metab. 2014;18(5):593.
5. Fiscaletti M, Stewart P, Munns C. The importance of vitamin D in maternal and child health: a global perspective. Public Health Rev. 2017 Dec 1;38(1):19.
6. Brannon PM. Vitamin D and adverse pregnancy outcomes: beyond bone health and growth. Proceedings of the Nutrition Society. 2012 May 20;71(2):205–12.
7. Agarwal S, Kovilam O, Agrawal DK. Vitamin D and its impact on maternal-fetal outcomes in pregnancy: A critical review. Crit Rev Food Sci Nutr. 2018 Mar 24;58(5):755–69.
8. Wei SQ, Qi HP, Luo ZC, Fraser WD. Maternal vitamin D status and adverse pregnancy outcomes: a systematic review and meta-analysis. The Journal of Maternal-Fetal & Neonatal Medicine. 2013 Jun 11;26(9):889–99.
9. Siddiqee MH, Bhattacharjee B, Siddiqi UR, MeshbahurRahman M. High prevalence of vitamin D deficiency among the South Asian adults: a systematic review and meta-analysis. BMC Public Health. 2021 Dec 9;21(1):1823.
10. Aji AS, Erwinda E, Yusrawati Y, Malik SG, Lipoeto NI. Vitamin D deficiency status and its related risk factors during early pregnancy: a cross-sectional study of pregnant Minangkabau women, Indonetia. BMC Pregnancy Childbirth. 2019 Dec 22;19(1):183.
11. Wemakor A. Prevalence and determinants of anaemia in pregnant women receiving antenatal care at a tertiary referral hospital in Northern Ghana. BMC Pregnancy Childbirth. 2019 Dec 11;19(1):495.
12. Ahmed F, Khosravi-Boroujeni H, Khan MR, Roy AK, Raqib R. Prevalence and Predictors of Vitamin D Deficiency and Insufficiency among Pregnant Rural Women in Bangladesh. Nutrients. 2021 Jan 29;13(2):449.
13. Lindqvist PG, Silva AT, Gustafsson SA, Gidlöf S. Maternal vitamin D deficiency and fetal distress/birth asphyxia: a population-based nested case–control study. BMJ Open. 2016 Sep 22;6(9):e009733.
14. Islam MZ, Bhuiyan N, Akhtaruzzaman M, Allardt CL, Fogelholm M. Vitamin D deficiency in Bangladesh: A review of prevalence, causes and recommendations for mitigation. Asia Pac J Clin Nutr. 2022;31(2):167–80.
15. Asaduzzaman M, Basak R, Islam MdS, Juliana FM, Ferdous T, Islam MJ, et al. Vitamin D Deficiency and Insufficiency in Healthy Pregnant Women Living In Dhaka, Bangladesh. IOSR Journal of Dental and Medical Sciences. 2018;17(4):66–73.
16. Woon FC, Chin YS, Ismail IH, Batterham M, Abdul Latiff AH, Gan WY, et al. Vitamin D deficiency during pregnancy and its associated factors among third trimester Malaysian pregnant women. PLoS One. 2019 Jun 24;14(6):e0216439.
17. Yang C, Jing W, Ge S, Sun W. Vitamin D status and vitamin D deficiency risk factors among pregnancy of Shanghai in China. BMC Pregnancy Childbirth. 2021 Jun 18;21(1):431.
18. Holmes VA, Barnes MS, Alexander HD, McFaul P, Wallace JMW. Vitamin D deficiency and insufficiency in pregnant women: a longitudinal study. British Journal of Nutrition. 2009 Sep 28;102(6):876–81.
19. Hussain T, Eimal Latif AH, Malik S, Raza S, Saeed T, Salman Zahid A, et al. Vitamin D Deficiency and Associated Risk Factors in Muslim Housewives of Quetta, Pakistan: A Cross-Sectional Study. Cureus. 2021 Sep 1;
20. Lima MS, Pereira M, Castro CT, Santos DB. Vitamin D deficiency and anemia in pregnant women: a systematic review and meta-analysis. Nutr Rev. 2022 Feb 10;80(3):428–38.
21. Toxqui L, Vaquero M. Chronic Iron Deficiency as an Emerging Risk Factor for Osteoporosis: A Hypothesis. Nutrients. 2015 Apr 2;7(4):2324–44.
22. Vimaleswaran KS, Berry DJ, Lu C, Tikkanen E, Pilz S, Hiraki LT, et al. Causal Relationship between Obesity and Vitamin D Status: Bi-Directional Mendelian Randomization Analysis of Multiple Cohorts. PLoS Med. 2013 Feb 5;10(2):e1001383.
23. Alhomaid RM, Mulhern MS, Strain J, Laird E, Healy M, Parker MJ, et al. Maternal obesity and baseline vitamin D insufficiency alter the response to vitamin D supplementation: a double-blind, randomized trial in pregnant women. Am J Clin Nutr. 2021 Sep;114(3):1208–18.
24. G R, Gupta A. Vitamin D Deficiency in India: Prevalence, Causalities and Interventions. Nutrients. 2014 Feb 21;6(2):729–75.

Original Article

Outcome of Transanal suture haemorrhoidopexy and Stapled haemorrhoidopexy -A prospective observational study

Islam MR[1], Bahar MM[2], Pervin MM[3] , Lima IJ[4], Khan RK[5], Das SC[6], Ali M[7], Hasan M[8]

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Hemorrhoids, Stapled and transanal suture hemorrhoid

ABSTRACT:

Background: *Transanal suture haemorrhoidopexy is the preferred treatment due to its low cost, less post operative complication and decreased chance of recurrence in grade II and grade III Hemorrhoids.* ***Objective:*** *To compare the post-operative outcome of transanal suture haemorrhoidopexy and stapled haemorrhoidopexy in patients with grade II and III haemorrhoids.* ***Methods:*** *This study was conducted in the Department of Colorectal Surgery, Shaheed Suhrawardy Medical College hospital over a period of one-year. Sixty-two patients with haemorrhoids were enrolled in this study according to selection criteria. Data were collected, compiled and tabulated according to key variables. Qualitative data were expressed as frequency with percentage and quantitative data as mean with standard deviation. Quantitative data were analyzed by student's t-test and qualitative data by Chi-square test. Data were processed and analyzed by using software SPSS 22.0. For all analyses p-value <0.05 was considered statistically significant.* ***Result:*** *Mean age of the patients was 49.38 ± 7.17 years and 52.45 ± 6.17 years in Stapled hemorrhoidopexy and Trans anal suture hemorrhoidopexy group respectively (p>0.05). Males were predominant in both the two groups. In stapled hemorrhoidopexy group, grade of hemorrhoids was II (51.6%) and III (48.4%) whereas in Transanal suture hemorrhoidopexy group, grade of hemorrhoids was II (38.7%) and III (61.3%) (p>0.05). Operative time was lower in Stapled hemorrhoidopexy (26.93 ± 1.59 min) than Transanal suture hemorrhoidopexy (27.74 ± 1.63 min). Per operative bleeding was found more in stapled group. Most of the patients stayed in the hospital only one day in both the two groups. Only four patients in Stapled hemorrhoidopexy group and one patient in Transanal suture hemorrhoidopexy group stayed more than one day. Post-operative pain according to VAS was lower in Stapled hemorrhoidopexy group (1.90 ± 0.54) than Transanal suture hemorrhoidopexy group (2.09 ± 0.30) after 24 hours of the surgery. But there was no significant difference in pain after 7 days of surgery between the two groups. Post-operative complications were more in stapled hemorrhoidopexy than Trans anal suture hemorrhoidopexy, but not statistically significant. Recurrence (bleeding & prolapse) found more in stapled group than suture hemorrhoidopexy group. Treatment cost was significantly lower in trans anal suture hemorrhoidopexy.* ***Conclusion:*** *Based on this study, transanal suture hemorrhoidopexy showed less intra and post-operative hemorrhage, shorter duration of hospital stay, lower post-operative complications, and lower recurrence rate when compared to stapled hemorrhoidopexy. However, these differences were not statistically significant. The only statistically significant difference was in the operative cost, which was in favor of transanal suture hemorrhoidopexy.*

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1. Dr. Md. Rashidul Islam, Associate Professor and Head of Department of Colorectal Surgery, Shaheed Suhrawardy Medical College Hospital, Dhaka
2. Dr. Mohd. Mejbahul Bahar, Assistant Professor, Department of Colorectal Surgery, Shaheed Suhrawardy Medical College Hospital, Dhaka
3. Dr. Mosammat Mira Pervin, Medical Officer, Department of Surgery (With surgical Oncology) Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka.
4. Dr. Ismat Jahan Lima, Associate Professor, Department of Colorectal Surgery, Shaheed Suhrawardy Medical College Hospital, Dhaka
5. Dr. Rafiul Karim Khan, Associate Professor, Department of Surgery, Shaheed Suhrawardy Medical College Hospital, Dhaka
6. Dr. Shubol Chandra Das, Assistant Professor, Department of Colorectal Surgery, Shaheed Suhrawardy Medical College Hospital, Dhaka
7. Dr. Mohammad Ali, Assistant Professor, Department of Colorectal Surgery, Shaheed Suhrawardy Medical College Hospital, Dhaka
8. Dr. Maniul Hasan, Associate Professor, Department of Colorectal Surgery, Shaheed Suhrawardy Medical College Hospital, Dhaka

Correspondence: Dr. Mohd. Mejbahul Bahar, Assistant Professor, Department of Colorectal Surgery, Shaheed Suhrawardy Medical College Hospital, Dhaka, Phone: 01552-303656; Email: bahar.drmrcs@gmail.com

Conflict of Interest: The authors declare that there is no conflict of interests regarding the publication of this paper.

Discussion

Hemorrhoidal disease is a common pathology with varying incidence[1,2] which affect nearly 4.4% to 36% of the population.[3] The symptoms range from painless bleeding to piles mass prolapse. Hemorrhoids are caused by disruption of the fibroelastic tissue of the anal cushion and increased pressure in the haemorrhoidal plexus of veins.[3,4]

Treatment modalities are conservative treatment (life style modification, oral medications, and topical treatment), Office-based procedures (rubber band ligation, injection sclerotherapy, cryosurgery, Infra-red coagulation), and surgical procedures (Excisional hemorrhoidectomy, Doppler guided hemorrhoidal artery ligation, Stapled hemorrhoidopexy, and Suture hemorrhoidopexy).[5] Conservative and office procedures can help with grade I and II haemorrhoids, but surgical interventions are required for grade III and IV haemorrhoids.[4]

Although there are several surgical techniques for haemorrhoidal disease, debates about the best choice still remain. Postoperative pain and discomfort, mucous discharge, daily activity limitation and recurrence remain the major drawbacks.[6]

The conventional hemorrhoidectomy is associated with a low rate of recurrence, but postoperative pain, discomfort and longer hospital stay are still of major concern. Other postoperative complications that a patient may experience after hemorrhoidectomy are urinary retention, bleeding, incontinence, wound infection, abscess formation, fistula formation, anal fissure, stenosis.[7,8] Therefore, many symptomatic patients often hesitate to receive treatment and are reluctant to undergo surgery.

Dr. Antonio Longo described the stapled hemorrhoidopexy procedure for the first time in 1993.[9] It avoids wounds in sensitive perianal and anal areas, which has the added benefit of significantly reducing postoperative pain. Longo's procedure involves cutting long strip of tissue and repositioning cushions with auto suturing by stapler and also cut off the blood supply of hemorrhoidal cushions above the dentate line.

Stapled hemorrhoidopexy is performed with a circular stapler device, which circumferentially disconnects the mucosa and submucosa above the dentate line. According to a number of studies, stapled hemorrhoidopexy is preferred by patients over standard hemorrhoidectomy because there is less pain, a shorter hospital stay, and an earlier return to work.[10]

Dr. Shantikumar Chivate modified this procedure and termed it as Transanal Suture Mucorectopexy. Suture hemorrhoidopexy (Transanal suture mucorectopexy) is a new invention for managing 2nd and 3rd degree Hemorrhoids. It is based on principles of plication of vessels above dentate line at two different levels by blocking of blood supply and preventing the neo vascularization and anchoring the rectal mucosa and submucosa to parks ligament.[3]

This study was conducted to compare the post-operative outcome of stapled haemorrhoidopexy with transanal suture haemorrhoidopexy in patients with grade II-III haemorrhoids.

Methods and Materials

This study prospective observational study was conducted in the Department of Colorectal Surgery, Shaheed Suhrawardy Medical College hospital, Dhaka from July 2022 to June 2023. A total of 62 patients with grade II to III hemorrhoids were enrolled in this study as study population. Patients with thrombosed piles or ulcerated piles, with grade I & IV hemorrhoids, hemorrhoid with other coexisting anorectal diseases (Anal stricture, Rectal growth, Inflammatory bowel disease, Perianal fistula and fissure) were excluded from this study.

Permission was taken from each participant by using an informed written consent form. The participants were interviewed face to face by the researcher for the purpose of collection of data. Then the patients were examined by the researcher for certain signs. Investigations were done for supporting the diagnosis. All data were compiled and edited meticulously. The data were screened and were checked for any missing values and discrepancy. All omissions and inconsistencies were corrected and were removed methodically. Computer based statistical analysis was carried out with appropriate techniques and systems with the help of professional statistician. Quantitative data were expressed as mean and standard deviation and qualitative data were expressed as frequency

distribution and percentage. Statistical analysis was performed by using window based computer software devised with Statistical Packages for Social Sciences (SPSS-22). A p-value <0.05 was considered statistically significant.

Results

Table 1: Demographic profile of the study subjects (N=62)

	Stapled hemorrhoidopexy	Trans anal suture hemorrhoidopexy	p-value
Age (years)			
≤40	5 (16.1)	2 (6.5)	
41 – 50	14 (45.2)	11 (35.5)	
51 – 60	9 (29.0)	16 (51.6)	
>60	3 (9.7)	2 (6.5)	
Mean ± SD	49.38 ± 7.17	52.45 ± 6.17	[a]0.076
Gender			
Male	19 (61.3)	21 (67.7)	[b]0.596
Female	12 (38.7)	10 (32.3)	

*Unpaired t test and bChi-Square test was done

Mean age of the patients was 49.38 ± 7.17 years and 52.45 ± 6.17 years in Stapled hemorrhoidopexy and Trans anal suture hemorrhoidopexy group respectively. There was no significant difference in age between the two groups. Males were predominant in both the two group.

Table 2: Co-morbidities of the study subjects (N=62)

Co-morbidities	Stapled hemorrhoidopexy	Trans anal suture hemorrhoidopexy	p-value
Hypertension	9 (29.0)	10 (32.3)	[a]0.783
Diabetes mellitus	16 (51.6)	13 (41.9)	[a]0.445
Heart disease	2 (6.5)	3 (9.7)	[b]1.000

*Chi-Square test and bFisher's Exact test was done

There was no significant difference in hypertension, diabetes mellitus and heart disease between the two groups.

Table 3: Grade of the haemorrhoids (N=62)

Grade of the hemorrhoids	Stapled hemorrhoidopexy	Trans anal suture hemorrhoidopexy	p-value
Grade - II	16 (51.6)	12 (38.7)	0.307
Grade - III	15 (48.4)	19 (61.3)	

Chi-Square test was done

In stapled hemorrhoidopexy group, grade of hemorrhoids was II (51.6%) and III (48.4%) whereas in Trans anal suture hemorrhoidopexy group, grade of hemorrhoids was II (38.7%) and III (61.3%) but there was no significant difference.

Table 4: Operative time (N=62)

Operative time (Min)	Stapled hemorrhoidopexy	Trans anal suture hemorrhoidopexy	p-value
Mean ± SD	26.93 ± 1.59	27.74 ± 1.63	0.053

Unpaired t test was done

Mean operative time was little shorter in stapled hemorrhoidopexy (26.93 ± 1.59 min) than Transanal suture hemorrhoidopexy (27.74 ± 1.63 min) but the difference was not statistically significant.

Table 5: Per-operative bleeding (N=62)

	Stapled hemorrhoidopexy	Trans anal suture hemorrhoidopexy	p-value
Bleeding	4 (12.9)	1 (3.2)	0.354

Fisher's Exact test was done

In Stapled hemorrhoidopexy group bleeding was observed in 04 patients during operation from stapled line of which 03 patients were managed by applying mattress suture by 2-0 vicryl and 01 were managed by applying pack and pressure. In Trans anal suture hemorrhoidopexy group bleeding was observed in only one patient from the suture line and was managed conservatively by applying pack and pressure.

Table 6: Post-operative hospital stay (N=62)

Post-operative hospital stay (days)	Stapled hemorrhoidopexy	Trans anal suture hemorrhoidopexy	p-value
01 day	27 (87.1)	30 (96.77)	0.354
>01 days	4 (12.9)	1 (3.2)	

Fisher's Exact test was done

Most of the patients stayed in the hospital only one day in both the two groups. Only 04 patients of Stapled hemorrhoidopexy and one patient of Transanal suture hemorrhoidopexy group stayed more than one day because of post-operative bleeding.

Table 7: Post-operative pain according to VAS (N=62)

Post-operative pain	Stapled hemorrhoidopexy	Trans anal suture hemorrhoidopexy	p-value
At 24 hours	1.90 ± 0.54	2.09 ± 0.30	0.086
At 7 days	0.19 ± 0.40	0.29 ± 0.64	0.480

Unpaired t test was done

Post-operative pain according to VAS was lower in Stapled hemorrhoidopexy group (1.90 ± 0.54) than Trans anal suture hemorrhoidopexy group. In Trans anal suture hemorrhoidopexy group VAS score was (2.09 ± 0.30) after 24 hours of the surgery, but there was no significant difference in pain after 7 days of surgery between the two groups.

Table 8: Post-operative complications (N=62)

	Stapled hemorrhoidopexy	Trans anal suture hemorrhoidopexy	p-value
Bleeding	4 (12.9)	1 (3.2)	0.354
Persistent pain	1 (3.2)	0 (0.0)	1.000
Anal stricture	2 (6.5)	0 (0.0)	0.470

Fisher's Exact test was done

In Stapled hemorrhoidopexy group 02 patient developed reactionary haemorrhage managed by applying mattress suture and 02 patients developed secondary haemorrhage, managed conservatively. In Transanal suture hemorrhoidopexy group only 01 patient developed reactionary bleeding from the suture line and was managed conservatively by applying pack and pressure.

Persistent anal pain was noted in one patient of Stapled hemorrhoidopexy group may be due to the very low stapled line closed to the dentate line and or incorporation sphincter muscle in the doughnut.

Anal stricture developed in 02 cases of Stapled hemorrhoidopexy group of which 01 patients were managed conservatively by anal dilator and one patient was managed with stricturoplasty. None of this patient developed stricture in the suture line in Transanal suture hemorrhoidopexy group. There was difference in post-operative complications between the two groups, but not statistically significant.

Table 9: Recurrence (N=62)

	Stapled hemorrhoidopexy	ransanal suture hemorrhoidopexy	p-value
Bleeding	4 (12.9)	0 (0.0)	0.113
Prolapse	3 (9.7)	1 (3.2)	0.612

Fisher's Exact test was done

In Stapled hemorrhoidopexy group 04 patients developed Recurrent bleeding and 03 patients developed recurrent prolapse. Of which 03 patients were re-operated by excisional procedure due to their severity of symptoms and 04 patients were treated with rubber band ligation. On the other hand, only one patient of Transanal suture hemorrhoidopexy group developed small recurrent prolapse and was managed conservatively.

Table 12: Treatment cost of the two procedure (N=62)

	Stapled hemorrhoidopexy	Trans anal suture hemorrhoidopexy	p-value
Cost	10,600 ± 0.0	800 ± 0.0	<0.001

Unpaired t test was done

Average cost of Stapled hemorrhoidopexy was Tk. 10,600 & of Suture hemorrhoidopexy was Tk. 800. The difference in cost between two groups was statistically significant.

Discussion

The search for a perfect solution to the problem of haemorrhoids is a global effort. Though all the present surgical techniques provide resolution in symptoms to a satisfactory level, post-op complications and recurrence remains a constant problem.

Average age of the patients in this study was almost similar to the study of Jain et al.[4]. In this study males were predominant in both the two group. Similar to this study Jain et al.[4] had similar male predominance. In stapled hemorrhoidopexy group, grade of hemorrhoids was II (51.6%) and III (48.4%) whereas in transanal suture hemorrhoidopexy group, grade of hemorrhoids was II (38.7%) and III (61.3%) but there was no significant difference in this study. Grade II hemorrhoid was prevalent in both the groups.[4]

Operative time was shorter in Stapled hemorrhoidopexy than suture hemorrhoidopexy. Which was similar to the study of Verma et al.[11] and Prasad et al.[5]. Similar to this study intraoperative bleeding was more in stapled hemorrhoidopexy group than Transanal suture hemorrhoidopexy group in the study of Prasad et al.[5]. In contrast to this study, Prasad et al.[5], Verma et al.[11] and Cheetham et al.[12] revealed that post-operative pain was higher in stapled hemorrhoidopexy group than transanal suture hemorrhoidopexy group. Similar to this study, Prasad et al.[5] found higher post-operative bleeding in stapled Hemorrhoidopexy compared to transanal suture hemorrhoidopexy but Manfredelli et al.[13] observed less postoperative bleeding in suture hemorrhoidopexy compared to Stapled Hemorrhoidopexy.

In this study duration of hospital stay was more in stapled hemorrhoidopexy than in suture hemorrhiodopexy because of post-operative bleeding. The same result was found in the study of Prasad et al.[5]. Similar to Tjandra and Chan[14], the recurrence of hemorrhoids after stapled procedure was more.

Stapled hemorrhoidopexy requires a circular stapler costing Tk. 10,000 and a suture material, costing Tk. 600. Transanal suture hemorrhoidopexy only requires two suture material,costing Tk. 800. So, there is significant difference of cost in two groups.

Conclusion

Stapled and suture hemorrhoidopexy reduce postoperative pain, hospital stay, and complications compared to excisional hemorrhoidectomy. In this research, transanal suture hemorrhoidopexy showed lower intra- and postoperative bleeding, hospital stay, complications, and recurrence rates than stapled procedures, although these variances were not statistically significant. Transanal suture hemorrhoidopexy was statistically superior only in terms of operative cost.

References:

1. Haas PA, Haas GP, Schmaltz S, Fox TA. The prevalence of hemorrhoids. Diseases of the Colon & Rectum. 1983;26:435-9.
2. Johanson JF, Sonnenberg A. Temporal changes in the occurrence of hemorrhoids in the United States and England. Diseases of the colon & rectum. 1991;34:585-93.
3. Chivate SD, Ladukar L, Ayyar M, Mahajan V, Kavathe S. Transanal suture rectopexy for haemorrhoids: Chivate's painless cure for piles. Indian Journal of Surgery. 2012;74(5):412-7.
4. Jain A, Khan IH, Poonia K, Jain R. Comparison of Transanal Suture Rectopexy with Stapled Haemorrhoidopexy in Patients of Haemorrhoids: A Randomized Control Trial. IOSR Journal of Dental and Medical Sciences (IOSR-JDMS). 2016;15(9):112-6.
5. Prasad D, Patel S. Suture Hemorrhoidopexy VS Open Hemorrhoidectomy: Comparison of Post-Operative Complications. Inter J Sci Res. 2020;9 :71-6.
6. Crea N, Pata G, Lippa M, Chiesa D, Gregorini ME, Gandolfi P. Hemorrhoidal laser procedure: short-and long-term results from a prospective study. The American Journal of Surgery. 2014 Jul 1;208(1):21-5.
7. Knight JS, Senapati A, Lamparelli MJ. National UK audit of procedure for prolapsing haemorrhoids on behalf of the Association of Coloproctology of Great Britain and Ireland. Colorectal Disease. 2008 Jun;10(5):440-5.
8. Joshi GP, Neugebauer EA. Evidence-based management of pain after haemorrhoidectomy surgery. Journal of British Surgery. 2010 Aug;97(8):1155-68.
9. Longo A. Treatment of hemorrhoid disease by reduction of mucosa and hemorrhoidal prolapse with a circular suturing device: a new procedure. Proceedings of the 6th World Congress of Endoscopic Surgery. Rome, Italy
10. Huang WS, Chin CC, Yeh CH, Lin PY, Wang JY. Randomized comparison between stapled hemorrhoidopexy and Ferguson hemorrhoidectomy for grade III hemorrhoids in Taiwan: a prospective study. International journal of colorectal disease. 2007;22:955-61.
11. Verma R, Yadav BK, Chaube S, Khan R. Comparison of transanal hemorrhoidopexy vs stapler Hemorrhoidopexy, International Journal of Scientific Research. 10(03), pp. 2277-8179
12. Cheetham MJ, Mortensen NJ, Nystrom PO, Kamm MA, Phillips RK. Persistent pain and faecal urgency after stapled haemorrhoidectomy. The Lancet. 2000;356(9231):730-3.
13. Manfredelli S, Montalto G, Leonetti G, Covotta M, Amatucci C, Covotta A, Forte A. Conventional (CH) vs. stapled hemorrhoidectomy (SH) in surgical treatment of hemorrhoids. Ten years' experience. Ann Ital Chir. 2012;83(2):129-34.
14. Tjandra JJ, Chan MK. Systematic review on the procedure for prolapse and hemorrhoids (stapled hemorrhoidopexy). Diseases of the colon & rectum. 2007;50(6):878-92.

Original Article

Metabolic profile of acute ischemic stroke patients in a tertiary care hospital

Haleem MA[1], Morshed T[2], Haque R[3], Begum H[4], Masud I[5], Jahan S[6], Shuvon AAA[7].

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ABSTRACT:

Background: *When the blood supply to a portion of the brain is blocked or diminished, brain tissue cannot get oxygen and nutrients, resulting in an ischemic stroke. This study aimed to investigate the prevalence of hyperglycemia and dyslipidemia among patients with acute stroke in a tertiary healthcare setting in Bangladesh.*

Methods: *This cross-sectional study was conducted from January 2022 to December 2022 at a tertiary healthcare facility in Bangladesh, focusing on patients with acute ischemic stroke. Data was collected through a face-to-face interview, and medical records were reviewed. The study included 40 patients with acute stroke, evidenced by clinical findings and a CT scan of the Brain. Written informed consent was obtained after proper explanation, and participants were free to refuse or withdraw at any point. Confidentiality and privacy were maintained.*

Results: *The majority of participants (37.5%) were aged 60-69, with more males (57.5%) than females (42.5%). Most (70%) lived in urban areas. Among the participants, 82.5% had hypertension, and 52.5% had diabetes mellitus. The mean of HbA1c was 7.6% and of triglyceride was 205.0 mg/dl. Of the participants with acute stroke, 47.5% had extracranial carotid stenosis.*

Conclusion: *Nearly half of those who had an acute stroke also had diabetes, and four out of five had a history of hypertension. Among the patient hyperglycemia and dyslipidemia was common. Nearly half of those who suffered an acute stroke also experienced carotid stenosis. Consideration should be given to managing hypertension, DM, dyslipidemia, and carotid stenosis among patients with acute stroke.*

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1. Dr. Mohammad Aftab Haleem, Associate Professor, Department of Neurology, Ahsania Mission Medical College Hospital.
2. Dr. Tarannum Morshed, Assistant Professor, Radiology and Imaging, Bangladesh Medical College Hospital.
3. Dr. Rushaida Haque, Junior Consultant, Radiology and Imaging, Bangladesh Medical College Hospital
4. Dr. Halima Begum, Associate Professor, Radiology and Imaging, Bangladesh Medical College Hospital
5. Dr. Israt Masud, Medical Officer, Department of Neurology, Bangladesh Medical College Hospital
6. Dr. Sehelly Jahan, Professor & Head, Department of Neurology, Bangladesh Medical College Hospital
7. Dr. Ashfak Al Arif Shuvon, Resident Medical Officer, New life medical services, Nawabganj, Dhaka.

Correspondence: Dr. Mohammad Aftab Haleem, Associate Professor, Department of Neurology, Ahsania Mission Medical College Hospital.
E-Mail: aftab_haleem@yahoo.com

Introduction

Stroke is one of the leading causes of mortality and disability worldwide, accounting for approximately 5% of all disability-adjusted life-years and 10% of all deaths [1]. Important risk factors in stroke patients include age, sex, smoking, hypertension, diabetes mellitus (DM), and hyperlipidemia [2].

Acute ischemic stroke risk is exacerbated by DM and related chronic hyperglycemia, which also results in a worsening clinical outcome and higher mortality [3]. Type 2 DM greatly raises the risk of first ischemic stroke and approximately doubles the risk of stroke; DM may be to blame for more than 8% of first ischemic strokes [4].

Dyslipidemia is linked to increased risk of vascular events like stroke and monitoring triglyceride (TG) levels is crucial for patients at high risk of atherosclerotic cardiovascular disease [5]. TG is also a marker of increased residual cholesterol particles that trigger atherosclerosis and atherothrombosis [6]. One of the most frequent causes of stroke worldwide is atherosclerosis in major intracranial arteries, which results in alterations ranging from mild wall thickening to hemodynamically substantial luminal stenosis [7].

Stroke was the leading cause of death in Bangladesh in the year 2019 [8]. A nationwide survey revealed that the prevalence of stroke in Bangladesh was 11.39 per 1000 population [9].

However, there is limited data on metabolic profile in acute stroke patients in the context of Bangladesh. This study is aimed to explore the metabolic profile in patients with acute stroke in a tertiary healthcare facility in Bangladesh.

Methodology

This is a descriptive cross-sectional study conducted in a tertiary healthcare facility in Bangladesh. This study purposively selected all the patients with confirmed clinical and radiological features of acute ischemic stroke attending the healthcare facility from January 2022 to December 2022. Data was collected through a face-to-face interview using a pre-tested, semi-structured, interviewer-administered questionnaire. Medical records were reviewed for confirmation of the stroke.

Initially, 46 patients of the adult age group presenting with clinical features of stroke were selected. After imaging, three patients were excluded from the study due to high carotid bifurcation, which limited proper evaluation of the internal carotid artery, and due to extensive calcification of plaque, which interfered with imaging. Three more patients were excluded as their CT reports could not be collected. Ultimately a total of 40 patients with acute stroke were included in the study. Written informed consent was taken after a proper explanation of the purpose, procedure, and use of the study. The participants had the freedom to refuse to participate or withdraw at any point from the study. Confidentiality and privacy were maintained, giving maximum priority.

Statistical analysis

Variables were descriptively expressed by frequency, percentage, mean±standard deviation where applicable. For the variable of age in years, the closest integer value was used. Body mass index (BMI) was calculated as weight in kilograms divided by height in meters squared and then categorized into four groups: for an adult of ≥20 years of age, underweight (<18.5 kg/m^2), normal (18.5-24.9 kg/m^2), overweight (25-29.9 kg/m^2), obese (≥30 kg/m^2) [10]. The 25th version of the Statistical Package for Social Science for Windows was used for analysis.

Results

The descriptive cross-sectional study was conducted from January 2022 to December 2022 in a tertiary healthcare facility in Bangladesh among 40 participants with clinically and radiologically confirmed acute stroke.

Table 1: Socio-demographic characteristics of the participants (N=40)

Variables	Frequency	Percentage
Age		
40-49	4	10.0
50-59	12	30.0
60-69	15	37.5
70-79	7	17.5
80-89	2	5.0
Sex		
Male	23	57.5
Female	17	42.5
Occupation		
Housewife	17	42.5
Employed	11	27.5
Retired	12	30.0
Residence		
Rural	12	30.0
Urban	28	70.0

Table 1 reveals that the highest proportion (37.5%) of participants belonged to the 60-69 years of age group. More were male (57.5%) than female (42.5%). The majority (70%) were living in the urban area.

Table 2: Distribution of co-morbidities among the participants (N=40)

Variables	Frequency	Percentage (%)
History of Diabetes mellitus (DM)	21	52.5
History of Ischemic heart disease	8	20.0
History of Hypertension (HTN)	33	82.5
History of thyroid disorder	2	5.0
History of dyslipidemia	5	12.5
History of both DM and HTN	22	55

Table 2 shows different co-morbidities related to stroke among the participants, which revealed that 82.5% of the participants had a history of hypertension, 52.5% had a history of DM, and 20.0% had a history of ischemic heart disease.

Table 3: Pulse, body mass index and other laboratory parameters of the participants (N=40)

Variables	Minimum	Maximum	Mean	p-value
Pulse (b/min)	60.0	105.0	80.2	0.29
Body mass index (Kg/m^2)	16.79	28.3	22.1	0.25
Random blood sugar (mmol)	4.0	17.8	8.7	0.33
HbA1c (%)	5.0	13.7	7.6	0.27
High density lipoprotein (mg/dl)	21.0	59.0	35.9	0.24
Low density lipoprotein (mg/dl)	55	230	115.3	0.25
Triglyceride (mg/dl)	16.4	708.0	205.0	0.24
Total cholesterol (mg/dl)	97.6	338.0	185.9	0.24
S. Creatinine (mg/dl)	0.52	5.1	1.1	0.25
Sodium (mmol/l)	125.0	141.0	136.3	0.33
Potassium (mmol/l)	3.0	353.0	12.8	0.25
Bicarbonate (mmol/l)	22.0	26.0	24.6	0.39

Table 3 describes that among the participants, the mean of random blood sugar was 8.9 mmol, and HbA1c was 7.6%, both of which indicate DM. The mean of triglyceride was 205.0 mg/dl, and potassium was 12.8 mmol/l.

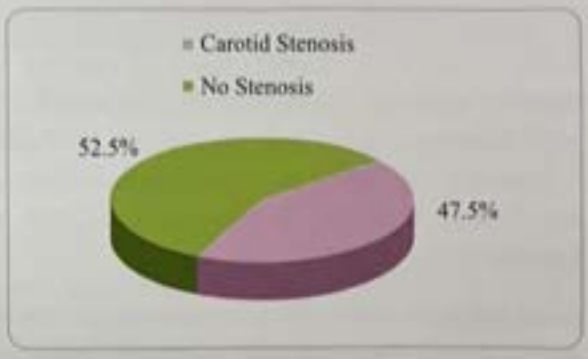

Figure 1: Proportion of carotid stenosis among participants with acute stroke (N=40)

Figure 1 depicts that 47.5% of the participants with acute stroke had developed carotid stenosis of any type.

Discussion

This cross-sectional study was performed in a tertiary healthcare facility among 40 participants with acute stroke attending the facility from January 2022 to December 2022. This study found that most (37.5%) of the participants were of the 60-69 years of age group. Most of the strokes occur in persons aged ≥65 years [11]. It is evident that after age 55, the risk of having a stroke doubles approximately every decade[12]. Prevention strategies and policies in Bangladesh should be formulated, giving attention to this age group as a similar finding was observed in this current study.

This study observed that 52.5% of patient with ischemic stroke had a history of DM and the mean of random blood sugar was 8.9 mmol, HbA1c was 7.6%. A study in Qatar reported a similar finding among patients with acute ischemic stroke, which found that 57.2% had DM where the recorded mean random blood sugar during admission was 9.7 mmol, and HbA1c was 7.4% [13]. Another study in Pakistan reported 48.1% of the participants as having DM [14]. The DM percentages are higher than that reported in European heart journal which stated that 30% of people with ischemic stroke have DM [15]. This discrepancy between Asian and European patient may be due to difference in their diet, physical activity and other lifestyle behaviors [16].

This study explored the history of hypertension among the participants and observed that the majority (82.5%) had a history of hypertension. Such higher rates were also observed in other studies, such as in the USA (87.1%) [17], in China (83.1%) [18], and in Paraguay (78%) [19].

The current study found that 20.0% of the acute ischemic stroke patient had a history of ischemic heart disease. A similar finding was reported in a study in India which found the overall 17.7% of the stroke patient had a history of ischemic heart disease [20]. A lower rate was observed in Qatar which reported that 9.5% of patient with ischemic stroke was previously diagnosed with ischemic heart disease [13]. In this study more than fifty percent (55%) patients of ischemic stroke had both DM and HTN. One epidemiological study in Japan showed that approximately 50% of diabetic patients had hypertension, and approximately 20% of hypertensive patients had diabetes mellitus [21]. Adequate control of blood pressure in patients with diabetes improves the cardiovascular disease risk, particularly for stroke. In the UKPDS, for combined fatal and nonfatal stroke, tight BP control (mean BP achieved 144/82 mm Hg) resulted in 44% RR reduction compared with less aggressive control (mean BP achieved 154/87 mm Hg) [22].

This study investigated the triglyceride level of the participants and found that the mean triglyceride level was a bit higher than that of the normal value. The normal value of the triglyceride in healthy individuals was <150 mg/dl [23]. This finding is supported by the American heart association, which states that high triglycerides might expose individuals to an increased risk for stroke [24].

One of the most important findings of this study was that among the participants with acute stroke, 47.5% had carotid stenosis. Similar results were observed in India in 2019, where they found 46% of the participants with acute stroke had carotid stenosis [25], and in the Netherlands which was 52.3% [26]. But a lower rate was observed in another study in the Netherlands, where the proportion was 18.7% [27], and the United Kingdom was 19.0% [28]. The differences could be due to the fact that this current study was cross-sectional, where the studies with dissimilarity were cohort studies. Also, individual, lifestyle and other health risk factors might have contributed to it. It's important to note that one of the recruited patients had an underweight body mass index of 16.79 kg/m^2. whose ischemic stroke was preceded by a history of IHD.

This study had some limitations. As this was conducted in a tertiary healthcare facility, the results were not generalized. This study did not explore other risk factors like smoking, physical inactivity and dietary habits. As sedentary lifestyle including lack of physical activities and unhealthy dietary habit has long been evidenced to be associated with DM, HTN, dyslipidemia which influence the incidence and outcome of ischemic stroke. This study also found a higher percentage of stroke among the patients with DM and HTN. It is recommended to counsel on lifestyle modification along with clinical management.

Conclusion

This study on acute ischemic stroke showed that more than 80% of patients exhibited medical record of hypertension, either with or without comorbid diabetes mellitus (DM), with close to 50% presenting with DM. Approximately 50% of those diagnosed with acute stroke had varying forms of carotid stenosis. Patients with acute stroke should receive particular emphasis on the treatment of conditions such as diabetes mellitus (DM), dyslipidemia, hypertension, and carotid stenosis. A well-maintained blood pressure and appropriate glycemic control might have the potential to provide enhanced preventive measures against stroke and other associated problems.

Conflict of Interest: None

References

1. Khedr E, Tony AA, Habeel M, Nasreldein A. Frequency and risk factors of carotid artery disease among ischemic stroke patients in the south Egypt: hospital-based study. Egypt J Neurol Psychiatry Neurosurg [Internet]. 2021 Dec 1 [cited 2023 Jun 23];57(1):1–6. Available from: https://ejnpn.springeropen.com/articles/10.1186/s41983-021-00382-5
2. Gyawali M, Sharma P, Karki D. Study of Carotid doppler in Patients with ischemic stroke. J Brain Spine Found Nepal [Internet]. 2021 Aug 10 [cited 2023 Jun 23];2(1):24–30. Available from: https://www.nepjol.info/index.php/jbsfn/article/view/39014
3. Ferrari F, Moretti A, Villa R. Hyperglycemia in acute ischemic stroke: physiopathological and therapeutic complexity. Neural Regen Res [Internet]. 2022 Feb 1 [cited 2023 Jul 1];17(2):292. Available from: /pmc/articles/PMC8463990/
4. Altemimi MT, Hashim AR. Acute Stroke in Diabetes Mellitus: A Prospective Observational Study Evaluating the Course and Short-Term Outcome in Basrah, Southern Iraq. Cureus [Internet]. 2019 Oct 29 [cited 2023 Jul 1];11(10). Available from: /pmc/articles/PMC6886642/
5. Kim Y-J, Kim E-G. Impact of Dyslipidemia on Ischemic Stroke. 2021 [cited 2023 Jul 1];23–41. Available from: https://link.springer.com/chapter/10.1007/978-981-16-3923-4_3
6. Chang Y, Eom S, Kim M, Song TJ. Medical Management of Dyslipidemia for Secondary Stroke Prevention: Narrative Review. Med 2023, Vol 59, Page 776 [Internet]. 2023 Apr 17 [cited 2023 Jul 1];59(4):776. Available from: https://www.mdpi.com/1648-9144/59/4/776/htm

7. Banerjee C, Chimowitz MI. Stroke Caused by Atherosclerosis of the Major Intracranial Arteries. Circ Res [Internet]. 2017 Feb 3 [cited 2023 Jul 1];120(3):502–13. Available from: https://www.ahajournals.org/doi/abs/10.1161/CIRCRESAHA.116.308441

8. Bangladesh | Institute for Health Metrics and Evaluation [Internet]. [cited 2023 Jun 23]. Available from: https://www.healthdata.org/bangladesh

9. Mondal MBA, Hasan ATMH, Khan N, Mohammad QD. Prevalence and risk factors of stroke in Bangladesh: A nationwide population-based survey. eNeurologicalSci [Internet]. 2022 Sep 1 [cited 2023 Jun 23];28. Available from: https://pubmed.ncbi.nlm.nih.gov/35769921/

10. Related Division and Health Promotion. About Adult BMI | Healthy Weight, Nutrition, and Physical Activity | CDC [Internet]. Centers for Disease Control and Prevention. 2021 [cited 2021 Aug 20]. Available from: https://www.cdc.gov/healthyweight/assessing/bmi/adult_bmi/index.html

11. Yousufuddin M, Young N. Aging and ischemic stroke. Aging (Albany NY) [Internet]. 2019 May 5 [cited 2023 Jun 23];11(9):2542. Available from: /pmc/articles/PMC6535078/

12. Know Your Risk for Stroke | cdc.gov [Internet]. [cited 2023 Jun 23]. Available from: https://www.cdc.gov/stroke/risk_factors.htm

13. Akhtar N, Kamran S, Singh R, Malik RA, Deleu D, Bourke PJ, et al. The Impact of Diabetes on Outcomes After Acute Ischemic Stroke: A Prospective Observational Study. J Stroke Cerebrovasc Dis. 2019 Mar 1;28(3):619–26.

14. Khan RSU, Nawaz M, Khan S, Raza HA, Nazir T, Anwar MS, et al. Prevalence of Dyslipidemia in Ischemic Stroke Patients: A Single-Center Prospective Study From Pakistan. Cureus [Internet]. 2022 Jun 13 [cited 2023 Jul 1];14(6). Available from: /pmc/articles/PMC9276871/

15. Fadini GP, Cosentino F. Diabetes and ischaemic stroke: a deadly association. 2018; Available from: https://academic.oup.com/eurheartj/article/39/25/2387/4846897

16. Gujral UP, Pradeepa R, Weber MB, Narayan KMV, Mohan V. Type 2 diabetes in South Asians: similarities and differences with white Caucasian and other populations. Ann N Y Acad Sci [Internet]. 2013 [cited 2023 Sep 29];1281(1):51. Available from: /pmc/articles/PMC3715105/

17. Qureshi AI, Ezzeddine MA, Nasar A, Suri MFK, Kirmani JF, Hussein HM, et al. Prevalence of Elevated Blood Pressure in 563,704 Adult Patients Presenting to the Emergency Department with Stroke in the United States. Am J Emerg Med [Internet]. 2007 Jan [cited 2023 Jun 23];25(1):32. Available from: /pmc/articles/PMC2443694/

18. Jing L, Tian Y, Ren G, Zhang L, Shi L, Dai D, et al. Epidemiological features of hypertension among ischemic survivors in Northeast China: insights from a population-based study, 2017–2019. BMC Public Health [Internet]. 2021 Dec 1 [cited 2023 Jun 23];21(1):1–10. Available from: https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-021-11692-x

19. Díaz-Escobar L, Flores A, Seró-Ballesteros L, Otto C, Mernes R, Podrozo F, et al. Frequency of hypertension, age, and gender in cerebrovascular disease in Paraguay. Rev Mex Neurocienc [Internet]. 2019 Jul 5 [cited 2023 Jun 23];20(3):130–5. Available from: http://www.scielo.org.mx/scielo.php?script=sci_arttext&pid=S1665-50442019000300130&lng=es&nrm=iso&tlng=en

20. Bhatia R, Sharma G, Patel C, Garg A, Roy A, Bali P, et al. Coronary Artery Disease in Patients with Ischemic Stroke and TIA. J Stroke Cerebrovasc Dis [Internet]. 2019 Dec 1 [cited 2023 Aug 15];28(12). Available from: http://www.strokejournal.org/article/S1052305719304616/fulltext

21. Tatsumi Y, Ohkubo T. Hypertension with diabetes mellitus: significance from an epidemiological perspective for Japanese. Hypertens Res 2017 409 [Internet]. 2017 Jul 13 [cited 2023 Sep 29];40(9):795–806. Available from: https://www.nature.com/articles/hr201767

22. Orchard T. Diabetes: A time for excitementand concern—and concern: Hopeful signs exist that the ravages of diabetes can be tamed. BMJ. 1998 Sep 12;317(7160):691–2.

23. High Blood Triglycerides - High Blood Triglycerides | NHLBI, NIH [Internet]. [cited 2023 Jun 23]. Available from: https://www.nhlbi.nih.gov/health/high-blood-triglycerides

24. High Blood Triglycerides Are Independent Risk Factor For Stroke -- ScienceDaily [Internet]. [cited 2023 Jun 23]. Available from: https://www.sciencedaily.com/releases/2001/12/011210163853.htm

25. Bharathi BM, Gullapalli R. A study on prevalence of carotid artery stenosis in acute ischaemic stroke patients in Amalapuram, Andhra Pradesh, India. Int J Res Med Sci [Internet]. 2019 May 29 [cited 2023 Jun 23];7(6):2146–50. Available from: https://www.msjonline.org/index.php/ijrms/article/view/6395

26. den Brok MGHE, Kuhrij LS, Roozenbeek B, van der Lugt A, Hilkens PHE, Dippel DWJ, et al. Prevalence and risk factors of symptomatic carotid stenosis in patients with recent transient ischaemic attack or ischaemic stroke in the Netherlands. Eur Stroke J [Internet]. 2020 Sep 1 [cited 2023 Jun 23];5(3):271–7. Available from: https://journals.sagepub.com/doi/10.1177/2396987320932065

27. van Velzen TJ, Kuhrij LS, Westendorp WF, van de Beek D, Nederkoorn PJ. Prevalence, predictors and outcome of carotid stenosis: a sub study in the Preventive Antibiotics in Stroke Study (PASS). BMC Neurol [Internet]. 2021 Dec 1 [cited 2023 Jun 23];21(1). Available from: /pmc/articles/PMC7802330/

28. Cheng SF, Brown MM, Simister RJ, Richards T. Contemporary prevalence of carotid stenosis in patients presenting with ischaemic stroke. Br J Surg [Internet]. 2019 Jun 4 [cited 2023 Jun 23];106(7):872–8. Available from: https://dx.doi.org/10.1002/bjs.11136

Original Article

Socio-economic profile and prevalence of hypertension among type 2 newly diagnosed diabetes mellitus patients attending a tertiary hospital in Dhaka

Wahiduzzaman M[1], Hossain MM[2], Haque KMM[3], Zishan MSH[4], Yasmin A[5], Shuvon AAA[6]

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ABSTRACT:

Introduction: *Untreated coexistence of hypertension and diabetes mellitus (DM) may result in more severe complications. The implementation of earlier intervention to prevent these complications can be facilitated by earlier identification of the conditions and their associated factors.*

Methods: *This cross-sectional research was conducted at Sir Salimullah Medical College, Dhaka, between June 2020 and July 2021. Following the diagnosis of DM in the symptomatic patients, SPSS V 25 was utilized to collect socioeconomic history and blood pressure data for further analysis.*

Results : *271 (40 %) of the 542 diabetic patients were between 33 to 47 years of age. Most (332, 60.9%) were females. A majority of the patients (302.55.7%) belonged to lower socioeconomic classes, with incomes ranging from 1 thousand to 14 thousand taka. 253 patients (46.7%) had a familial predisposition to diabetes. Concurrent hypertension was observed in 193 (35.6%) diabetic patients; this was substantially correlated with advancing age, lower socioeconomic status, and higher body mass index ($p< 0.05$).*

Conclusion: *Diabetic hypertensive patients were more prevalent among those with lower socioeconomic status, a demographic that is least likely to pursue and adhere to treatment. Therefore, it is necessary to develop and execute policies that guarantee their appropriate treatment and avert subsequent complications.*

Key Words:
Retinoid, Pilosebaceous, Propionibacterium, Hyperinsulinemia, Glycemic Indexe

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1. Dr. Miah Wahiduzzaman, Assistant Professor, Department of Medicine, Holy Family Red Crescent Medical College Hospital, Dhaka.
2. Prof. Dr. Mir Mosarraf Hossain, Professor and Head, Department of Endocrinology, Holy Family Red Crescent Medical College Hospital, Dhaka.
3. Prof. Dr. K M Muzibul Haque. Professor and Head, Department of Anaesthesia, analgesia & ICU, Holy Family Red Crescent Medical College Hospital, Dhaka.
4. Dr. MD. Shahriar Hossain Zishan, Intern doctor, Holy Family Red Crescent Medical College Hospital, Dhaka.
5. Abida Yasmin, MBBS student (Final year, Session 2018-19), Sher E Bangla Medical College, Barisal
6. Dr. Ashfak Al Arif Shuvon, RMO, New Life Medical Services, Nawabganj, Dhaka.

Correspondence: Dr. Miah Wahiduzzaman, Assistant Professor, Department of Medicine, Holy Family Red Crescent Medical College Hospital, Dhaka.
Email:www.miahwahiduzzaman@yahoo.com, Mobile Number: 01682728964

Introduction

Diabetes mellitus (DM) is an exceedingly common noncommunicable disease that impacts an estimated 537 million people worldwide [1]. Diabetic DM manifests as a chronic metabolic disorder because of either inadequate insulin secretion or impaired insulin functionality, leading to sustained hyperglycemia. Regardless, diabetes mellitus (DM) is associated with substantial morbidity and mortality, encompassing a wide spectrum of complications that have emerged in recent years, including cancer, infections, functional and cognitive impairment, and traditional neuropathy, retinopathy, nephropathy, and vascular [2] .In the majority of cases, earlier detection of DM and appropriate intervention can effectively halt the progression of the disease and avert complications.

Socioeconomic status of the patient is also a significant factor in the development and management of DM. Access to healthcare, available treatment options, and control recommendations are all significant determinants in the management of DM. Socioeconomically disadvantaged individuals have a diminished likelihood of obtaining adequate resources and an increased susceptibility to complications associated with diabetes mellitus [3].

Hypertension is one of the most likely conditions to coexist with DM. The concurrent existence of both conditions substantially elevates the patient's susceptibility to cardiovascular and other systemic complications [4]. The management of a hypertensive diabetic patient differs substantially and necessitates more stringent monitoring and interventions, such as the use of polypharmacy [5].

Likewise, DM is an increasing concern in Bangladesh.[6] The prevalence of DM in the general population increased from 4.0% in 1995 to 10.4% in 2019, representing a substantial national disease burden. Furthermore, the management of diabetes mellitus, including treatment adherence and self-awareness, was found to be significantly influenced by socioeconomic status [7]. Additionally, hypertension is on the rise in Bangladesh; however, there is a scarcity of data regarding the mutual coexistence of these two conditions. The objective of this research is to examine the socioeconomic status of diabetic patients who also have hypertension at a tertiary medical center located in one of the world's major metropolitan areas.

Materials and methods

A cross-sectional investigation was carried out at Sir Salimullah Medical College Hospital in Dhaka, outpatient setting, from June 2020 to July 2021. Patients with DM-like symptoms initially provided informed consent. Following this, their sociodemographic and clinical information was collected. Following this, venous blood was drawn in order to conduct an oral glucose tolerance test during fasting and two hours after a meal. This investigation recruited participants with fasting glucose levels of 7 mmol/L or higher and postprandial glucose levels of 11.1 mmol/L or higher two hours later on Automatic biochemistry analyzer (AS-12, Bioelab, China). Blood pressure was measured through manual sphygmomanometer (ALPK2, Japan) and stethoscope (ALPK2, Japan). Patients were deemed hypertensive if their systolic and diastolic blood pressure were above 139 mmHg & 89 mmHg respectively in 2 settings one day apart on both arms. Participants in this study were those who met the following criteria: a minimum age of 18 years, exhibit symptoms of diabetes mellitus (DM) such as polyphagia, polydipsia, polyuria, recurrent infections, and compromised wound healing, not taking any medications which can alter blood sugar, not-pregnant. Following the process of data cleansing and sorting, descriptive presentation and analysis were conducted utilizing SPSS V 25.

Results

Table 1: Socio-economic status of the participants

	Frequency	Percentage
Age group		
18-32 years	81	14.9
33-47 years	217	40
48-62 years	198	36.5
63-77 years	39	7.2
78-92 years	7	1.3
Gender		
Male	212	39.1
Female	330	60.9
Monthly income (in thousand taka)		
1-14	302	55.7
15-29	159	29.3
30-44	54	10
45-59	24	4.4
60-74	3	0.6
Family history of DM		
Yes	253	46.7
No	287	53.0

In total, 542 participants were enrolled in this study. 217 (40%) of the patients fell within the age range of 33 to 47 years, while the age group of 48 to 62 years comprised 198 (36.5%). Females comprised the majority of the participants (332,60.9%). As shown in Table 1, a majority of the patients (302.55.7%) had monthly income from 1 to 14 thousand taka. Almost half of the patients (253,46.7%) had family history of DM.

Table 2: Associated factors with Hypertension in DM patients

	Hypertension		
	Absent	Present	P value
Age group (in years)			
18-32 years	66(18.9%)	15(7.38%)	0.000
33-47 years	148(42.4%)	69(35.8%)	
48-62 years	109(31.2%)	89(46.1%)	
63-77 years	22(6.3%)	17(8.8%)	
78-92 years	4(1.1%)	3(1.6%)	
Monthly income (in taka)			
1-14	210 (60.20%)	92(47.70%)	0.003
15-29	88(25.20%)	71(36.80%)	
30-44	39(11.20%)	15(7.80%)	
45-59	10(2.90%)	14(7.30%)	
60-74	2(0.60%)	1(0.50%)	
BMI			
Underweight	15(4.30%)	9(4.70%)	0.019
Normal	146(41.80%)	57(29.50%)	
Overweight	151(43.30%)	94(48.70%)	
Obese	37(10.60%)	33(17.10%)	
Duration of symptoms (in months)			
<12	323(92.60%)	177(91.70%)	0.200
12-24	3(0.90%)	16(8.30%)	
>24	3(0.90%)	0	

The potential factors associated with patients who have hypertension and diabetes are detailed in Table 2. 193 patients with diabetes (35.6 %) also had hypertension. The majority of patients were aged 30 years or older, with the highest prevalence (89, 46.1%) among those aged 48-69. A significant majority of hypertensive patients (163, 84.5%) had an income below 30,000 taka. The majority of hypertensive patients (127,65.8%) were classified as overweight or obese. Statistically, these variables were significant ($p< 0.05$).

Table 3: Hyperglycemic profile of the participants

	Mean	SD
Average fasting glucose (mmol/L)	12.1	8.4
Average 2 hours postprandial glucose (mmol/L)	17.4	5.2

The average fasting glucose of the participants was 12.1 ± 12.1 and 2 hours post prandial glucose was 17.4 mmol/L.

Discussion

The purpose of this research was to identify the sociodemographic characteristics of hypertensive diabetic patients. The age of the most of our patients exceeded 30 years, with (415,76.5%) falling within the 33–62 years age range. Age is a well-established and immutable risk factor for the onset of both hypertension and diabetes, with the occurrence of these conditions escalating substantially as age increases. After the age of 30, fasting plasma glucose levels are estimated to increase by 1-2 mg/dL per decade, while postprandial glucose levels rise by approximately 15 mg/dL per decade[8]. This accounts for the increased prevalence of hyperglycemia and consequent diabetes mellitus among the elderly [8]. This result is comparable to that of another Bangladeshi study [9], which discovered an increase in the prevalence of DM at a younger age, with the maximum incidence occurring between the ages of 35 and 44. Females comprised 330 (60.9%) of the respondents. Similar research conducted in Bangladesh, where female participants had a disproportionately higher prevalence of DM than their male counterparts, provides further support for the female preponderance [9,10]. Additionally, there was a higher prevalence of undiagnosed and inadequately treated DM among females [10]. Although there are multiple contributing factors to the female predominance of DM, obesity is a pivotal element in its pathogenesis. As indicated by prior research [11], 219 out of 330 female participants in our study (66.3%) were overweight or obese [data not presented]. The greater frequency of DM in the lower socioeconomic category is consistent with the findings of Kim et al. [12], who identified psychosocial stress among the lower working class as a significant risk factor for the development of DM, as supported by prior research. Nevertheless, this discovery contradicts the results of Ahsan et al. [7], who observed that DM was more prevalent among individuals from superior socioeconomic backgrounds compared to those with lower social status. Almost half of the patients had a history of DM in their family which is a major risk factor for developing DM. A familial history of DM was associated with a 76.3% increased risk of developing the disease, according to one study [13]. Our study identified several factors that were substantially associated with patients who had hypertension and diabetes. Hypertension was more prevalent in the elderly, with the majority of cases occurring around the age of 50. The increased prevalence of hypertension

among the elderly has been linked to arterial and arteriolar rigidity, which is primarily caused by structural changes induced by atherosclerosis and subsequent calcification [14]. Concomitant hypertension and diabetes mellitus in the elderly increases the risk of systemic complications and necessitates more aggressive treatment strategies and more frequent monitoring. According to our findings, diabetic patients from lower socioeconomic classes had a higher prevalence of hypertension. This result is consistent with the findings of Blok et al. [15], who observed a greater prevalence of hypertension among members of the lower working class. This may be indicative of the challenges faced by individuals from lower socioeconomic backgrounds in accessing healthcare facilities, which can lead to inadequate diagnosis and treatment of the disease. The majority of patients with hypertension in our study were obese or overweight. Obesity is a significant risk factor in the development of hypertension, potentially attributable to an increased prevalence of dyslipidemia and premature atherosclerotic change [16].

Limitations

There were some limitations to the investigation. The accumulation of data occurred amidst the COVID-19 pandemic. The accessibility of laboratory facilities and other extensive variables, including patient access, was restricted. Furthermore, it should be noted that the research was carried out exclusively in an urban environment, which may limit its applicability to the broader populace.

Conclusion

A significant percentage of the participants simultaneously presented with diabetes mellitus and hypertension, both of which are life-threatening conditions if left untreated. The majority of patients belonged to the lower socioeconomic class, which increases the likelihood of inadequate diagnosis and treatment. It is imperative to develop policies that facilitate their convenient access to healthcare services, thereby enabling them to obtain appropriate treatment and prevent any subsequent complications.

Reference

1. Kumar A, Gangwar R, Ahmad Zargar A, Kumar R, Sharma A. Prevalence of Diabetes in India: A Review of IDF Diabetes Atlas 10th Edition. Curr Diabetes Rev. 2024 Jan;20(1).
2. Tomic D, Shaw JE, Magliano DJ. The burden and risks of emerging complications of diabetes mellitus. Nat Rev Endocrinol. 2022 Sep 6;18(9):525–39.
3. Darvishi A, Nikkhah A, Mahmudimanesh M, Balajam NZ, Shafiee G, Heshmat R. Socioeconomic inequalities in type 2 diabetes mellitus: a study based on a population-based survey in Iran. BMC Public Health. 2024 Mar 30;24(1):926.
4. Al-Azzam N, Al-Azzam S, Elsalem L, Karasneh R. Hypertension prevalence and associated factors among patients with diabetes: A retrospective cross-sectional study from Jordan. Annals of Medicine and Surgery. 2021 Jan;61:126–31.
5. Ganesh J, Viswanathan V. Management of diabetic hypertensives. Indian J Endocrinol Metab. 2011;15(8):374.
6. Akhtar S, Nasir JA, Sarwar A, Nasr N, Javed A, Majeed R, et al. Prevalence of diabetes and pre-diabetes in Bangladesh: a systematic review and meta-analysis. BMJ Open. 2020 Sep 9;10(9):e036086.
7. Ahsan KZ, Iqbal A, Jamil K, Haider MM, Khan SH, Chakraborty N, et al. Socioeconomic disparities in diabetes prevalence and management among the adult population in Bangladesh. PLoS One. 2022 Dec 20;17(12):e0279228.
8. Gambert SR, Pinkstaff S. Emerging Epidemic: Diabetes in Older Adults: Demography, Economic Impact, and Pathophysiology. Diabetes Spectrum. 2006 Oct 1;19(4):221–8.
9. Chowdhury MAB, Islam M, Rahman J, Uddin MJ, Haque MdR. Diabetes among adults in Bangladesh: changes in prevalence and risk factors between two cross-sectional surveys. BMJ Open. 2022 Aug 5;12(8):e055044.
10. Khatun MM, Rahman M, Islam MJ, Haque SE, Adam IF, Chau Duc NH, et al. Socio-economic inequalities in undiagnosed, untreated, and uncontrolled diabetes mellitus in Bangladesh: is there a gender difference? Public Health. 2023 May;218:1–11.
11. Kautzky-Willer A, Leutner M, Harreiter J. Sex differences in type 2 diabetes. Diabetologia. 2023 Jun 10;66(6):986–1002.
12. Kim YJ, Jeon JY, Han SJ, Kim HJ, Lee KW, Kim DJ. Effect of Socio-Economic Status on the Prevalence of Diabetes. Yonsei Med J. 2015;56(3):641.
13. Abdulaziz Alrashed F, Ahmad T, Almuzdi MM, Alqahtani AS, Alamam DM, Alsubiheen AM. Investigating the relationship between lifestyle factors, family history, and diabetes mellitus in non-diabetic visitors to primary care centers. Saudi J Biol Sci. 2023 Sep;30(9):103777.
14. Pinto E. Blood pressure and ageing. Postgrad Med J. 2007 Feb;83(976):109–14.
15. Blok S, Haggenburg S, Collard D, Van Der Linden EL, Galenkamp H, Moll van Charante EP, et al. The association between socioeconomic status and prevalence, awareness, treatment and control of hypertension in different ethnic groups: the Healthy Life in an Urban Setting study. J Hypertens. 2022 May;40(5):897–907.
16. Jiang SZ, Lu W, Zong XF, Ruan HY, Liu Y. Obesity and hypertension. Exp Ther Med. 2016 Oct;12(4):2395–9.

Original Article

Prognostic Significance of Angiogenesis in invasive ductal carcinoma

Mehjabin M,[1] Talukder AS,[2] Ferdousi NJ[3] Sultana S,[4] Munmun UK,[5] Kamal M [6]

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ABSTRACT:

Background: *Angiogenesis is essential for tumor growth and metastasis. Axillary lymphnode status has been the most important prognostic factor in operable breast carcinoma, but it does not fully account for the varied disease outcome. More accurate prognostic indicators would help in selection of patients at high risk for disease recurrence and death who are candidates for systemic adjuvant therapy. Microvessel density in invasive ductal carcinoma (measures of tumor angiogenesis) is associated with metastasis and thus may be a prognostic indicator.*

Objective: *To correlate intratumoral and peritumoral angiogenic microvessel density with lymphnode metastasis in invasive ductal carcinoma.*

Material and Methods: *It is a cross sectional observational study, carried out at the department of Pathology, BSMMU from January 2016 to December 2017. A total 48 mastectomy samples with axillary nodes from histologically confirmed invasive ductal carcinoma were included in this study. Weidner method was used for calculating micro vessels density. Sections examined to evaluate the density of angiogenic vessels by immuohistological stain with vWF expression in invasive breast cancer. Correlation between angiogenic vessels density with or without lymph-node metastasis was taken.*

Results: *In this study angiogenic vessel count is more in the intratumoral area than peritumoural area. There was a positive significant correlation between lymphnode metastasis with micro vessel density in both peritumoral and intratumoral areas in Weidner method in vWF stain.*

Key Words:
Angiogenesis, invasive breast carcinoma, vWF, Weidner method.

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1. Dr. Monika Mehjabin, Lecturer, Department of Pathology, Shaheed Suhrawardy Medical College, Dhaka.
2. Dr. Abdus Sabur Talukder, Assistant Professor, Department of Medicine, Colonel Maleque Medical College, Manikganj.
3. Dr. Sabera Sultana, Junior consultant, Department of Pathology, Rajshahi Medical College, Rajshahi.
4. Dr. Nure Jannat Ferdousi, Assistant Professor, Department of Pathology, M Abdur Rahim Medical College, Dinajpur.
5. Dr. Umme Kulsum Munmun, Lecturer, Department of Pathology, Dhaka Medical College, Dhaka.
6. Dr. Mohammed Kamal, Ex Professor of Pathology, Bangabandhu Sheikh Mujib Medical University, Shahbag, Dhaka

Correspondence: Dr. Monika Mehjabin, Lecturer, Department of Pathology, Shaheed Suhrawardy Medical College, Dhaka.
Email: mehjabin11@gmail.com

Introduction

Angiogenesis is critical process for tumour growth, invasion, and metastasis.[1] Thus, measurement of vascular growth may be clinically important in breast cancer specimens. Breast cancer is the most common cancer in women, comprising almost one third of all malignancies in female. It is the most frequently diagnosed cancer among women in 140 of 184 countries worldwide.[2] Breast cancer is one of the major malignant disease burdens in Bangladesh, with an estimated incidence of about 22.5 per 1, 00,000 in females.[3] Breast cancers are notorious for their invasive and metastasizing potential. The axillary lymph node involvement, tumor size, nuclear grade, hormone receptor status, patient's age are well recognized prognostic factors for patients with operable invasive breast cancer. The lymph node involvement predicts the choice of adjuvant chemotherapy and radiotherapy after surgery for primary breast cancer.[4] The markers used to detect blood vessel invasion include elastic van Gieson stain, factor VIII-related antigen (vWF), CD34, CD31. vWF is useful marker of vascular endothelium. vWF is a trasmembrane glycoprotein in platelet edothelial adhesion molecule-1in the immunoglobin superfamily. It is expressed on monocyte, platelet, selected T cell subsets and endothelial cell and is found more commonly on blood vascular endothelial cell than lymphatic endothelial cell [5].

vWF is useful markers for vascular density (VD). It can be used in routinely preserved breast cancer tissue. Thus vascular density can be assessed and correlated with lymph node metastasis to find out the relationship and its role as potential indicators in breast cancer cases. The common pathologic approach to assess angiogenesis involves microscopic estimation of vascular density or microvessel density using endothelial markers by immunohistochemistry [6].

Studies of various tumors have shown the potential clinical significance of angiogenesis, suggesting that vascular microvessel density correlate with tumor growth and metastasis.[7] The two principal approaches in this regard are direct microscopic immunohistochemistry and semiautomated image cytometry. Direct immunohistochemical analysis of microvessel density is relatively inexpensive and widely available in diagnostic pathology departments [8].

Therefore, this study was aimed to assess intratumoral and peritumoral angiogenic microvessel density and to find out the possible relationships between intratumoral and peritumoral microvessel density and lymphnode metastasis in invasive breast cancer.

Materials and Methods

A total of 48 histologically diagnosed cases of invasive ductal carcinoma samples were included in this cross sectional observational study which was carried out in the Department of Pathology, BSMMU from January 2016 to December 2017. After the approval of the Institutional Review Board (IRB) of BSMMU, Dhaka, the specimens were selected following the inclusion and exclusion criteria. Surgically resected formalin fixed total mastectomy specimen including axillary dissection were collected from BSMMU and all the relevant information were recorded. In this study, sections of normal vermiform appendix were taken as positive control.

Statistical analysis: Statistical analyses of the results were obtained by using Microsoft Office Excel version 2007. The results were calculated using relevant statistical formula (Pearson's correlation)and were presented in tables, figures and diagrams.

Histopathological study: 5 mm thick consecutive tissue sections were cut from each blocks including intratumoural and peritumoural areas and two slides were made. Tissues were processed according to routine histopathological processing protocol of BSMMU. The slides were routinely stained with H&E method from the cases histologically diagnosed as invasive ductul carcinoma. All samples were selected for vWF stain on the basis of suspicion of vascular invasion in H&E slides. Histopathological categorization of tumor and grading (Nottingham modification of the Bloom– Richardson Grading System) of all the cases were done. Vascular invasions were recorded. Each lymph node was histologically examined to determine metastasis.

Immunohistochemistry study

Immunohistochemistry of all cases were performed using Dako Autostainer Plus at the immunohistochemistry laboratory of the department of Pathology, BSMMU. Polyclonal Rabbit Anti-Human Von Willebrand factor, Ready to use (link) (code, IR527) was used for endothelial cells. From paraffin-embedded, 5-micrometer thick sections were cut, deparaffinized with xylene and rehydrated through a graded series of alcohol. Antigen

retrieval was done by water bath. The sections were stained with vWF according to protocol followed at the department of Pathology, BSMMU. The numbers of blood vessels were counted by Weidner's method in peritumoral and intratumoral areas. .[9-10]

Microvessel quantification: Microvessel densities were calculated according to Weidner's method by Olympus microscope model BH51. At first the sections were scanned at low power (X100) looking for hot spots. Three hot spots were selected in both intratumoral and peritumoral areas. When the hot spots were detected, microvessel count was performed by counting the individual stained microvessels (at power X20) representing a field size of 0.74mm2(20X objective, 10X ocular; equivalent to 0.7386 mm2 per 200X field.[10] First three hot spots were chosen in intratumoral and peritumoral area. In each hot spot, microvessel count was performed at power X20 and finally microvessel density was calculated as the mean of the total number of microvessels in those three hot spots.

Result and Observation

Ages of the 48 study subjects ranged form 22 to 85 years and subjects were grouped on the basis of decades (table-I). It was observed that one third (41.7%) sample belonged to age ≤40 years.

Table I: Distribution of the study sample by age (n=48)

Age (in years)	Number of the sample	Percentage
≤40	20	41.7
41-50	14	29.1
51-60	13	27.1
>60	1	2.1
Mean±SEM	45.38±1.6	

Tumor sizes of the study sample ranged from 1-9 cm and were grouped on the basis of tumor size (table-II). It was observed that (60.4%) sample belonged to tumor size of 2-5 cm.

Table **II:** Distribution of the study sample by tumor size (n=48)

Tumor size (cm)	Number of the sample	Percentage
0-2	11	22.9
2-5	29	60.4
>5	8	16.7
Mean±SEM	3.63±0.3	

Table III shows histological grading of the ductal carcinoma. it was observed that 21(43.8%) sample had invasive ductal carcinoma, grade-II followed by 19(39.6%) grade-III and 8(16.6%) grade-I.

Table III: Distribution of the study sample by histological grade (n=48)

Histological Grade	Number of the sample	Percentage
Grade 1	8	16.6
Grade 2	21	43.8
Grade 3	19	39.6

Total 25 cases had lymphode metastasis.The number of lymph node involved ranged from 0-17 in the case. The cases were grouped according to the numbers of lymph node metastases as N0, N1, N2, N3 (table-IV) and observed that almost half (47.9%) of the sample had no lymph node metastases N0.

Table IV: Distribution of the study sample by number of lymph node metastases (n=48)

Number of Lymphnode metastases	Number of the sample	Percentage
N0	23	47.9
N1	5	10.4
N2	17	35.4
N3	3	6.3
Mean±SEM	3.2±0.6	

N0=0, N1=(1-3) lymphnode, N2=(4-9) lymphnode
N3=(≥10) lymphnode

The blood vascular invasion was observed in vWF stain in study sample in (table-V). It was observed that 15(31.3%) was positive and 33(68.7%) negative.

Table V: Distribution of the study sample by blood vascular invasions (BVI) in (VWF stain) (n=48)

BVI	Number of the sample	Percentage
Positive	15	31.3
Negative	33	68.7

Micro vessel density in peritumoral area (PT) and intertumoral area (IT) in Weidner method in vWF stain ranged from 1-92 and intratumoral area was ranged from 0-95. Table VI shows the Mean±SEM MVD in PT was 36.81±2.90 and Mean±SEM MVD in IT was 42.68±2.88.

Table VI: Distribution of the study sample by micro vessel density in peritumoral area (PT) and intertumoral area (IT) in Weidner method (vWF stain) (n=48)

Micro vessel density	Mean±SEM	Range (min-max)
MVD in PT	36.81±2.90	1-92
MVD in IT	42.68±2.88	0-95

The table-X shows the Mean±SEM MVD in PT was 25.80±1.87 and Mean±SEM MVD in IT was 24.75±1.99.

Vascular invasions in H&E stain was detected in 15(31.3%) cases, 10(20.8%) cases were indeterminate and 23(47.9%) cases were negative (Figure-I).

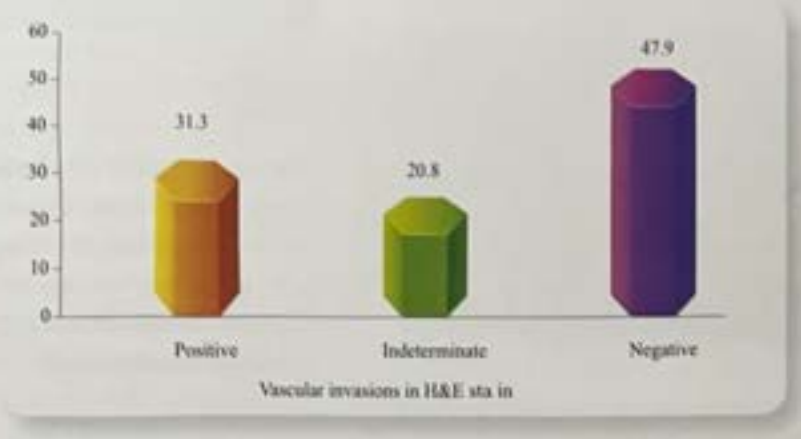

Figure I: Bar diagram showing vascular invasions in H&E stain of the study samples

.Lymphnode metastases of 48 cases were expressed the number and micro vessel density in peritumoral area (PT) in Weidner method in vWFstain was expressed in number/mm2. A positive correlation was found between microvessel density in PT and lymphnode metastases (Figure-II).

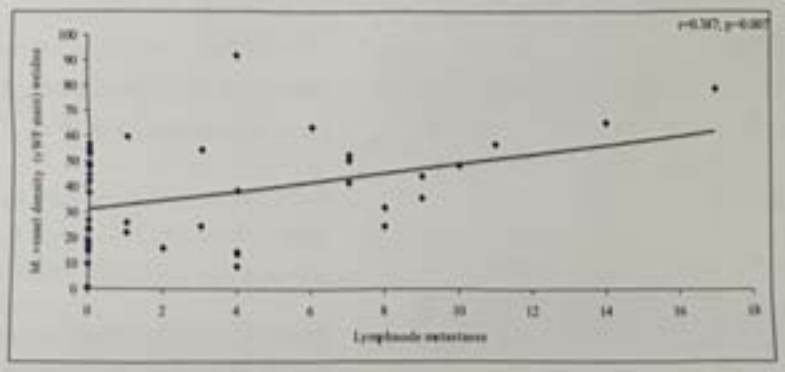

Figure II: Scatter diagram showing Pearson's positive significant correlation (r=0.387; p=0.007) between micro vessel density in peritumoral area in Weidner method in vWF stain and lymph node metastases.

The lymph node metastases of 48 cases were expressed in number and micro vessel density in intratumoral area (IT) in Weidner method in vWF stain was expressed in number/mm2. A positive correlation was found between MVD in IT and lymphnode metastases (Figure-III).

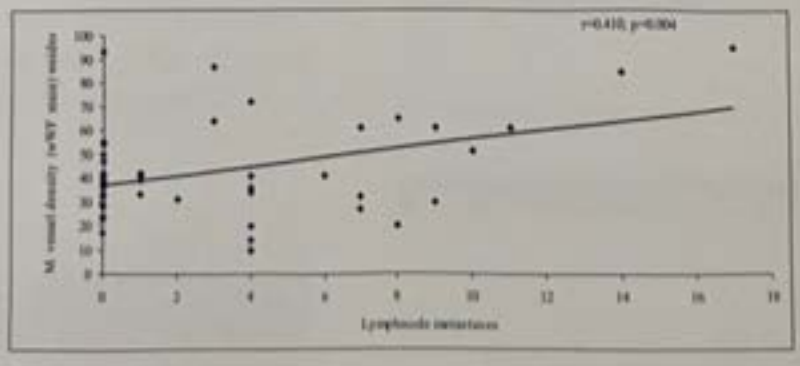

Figure-III: Scatter diagram showing Pearson's positive significant correlation (r=0.410; p=0.004) between micro vessel density in intratumoral area in Weidner method in vWFstain and lymphnode metastases.

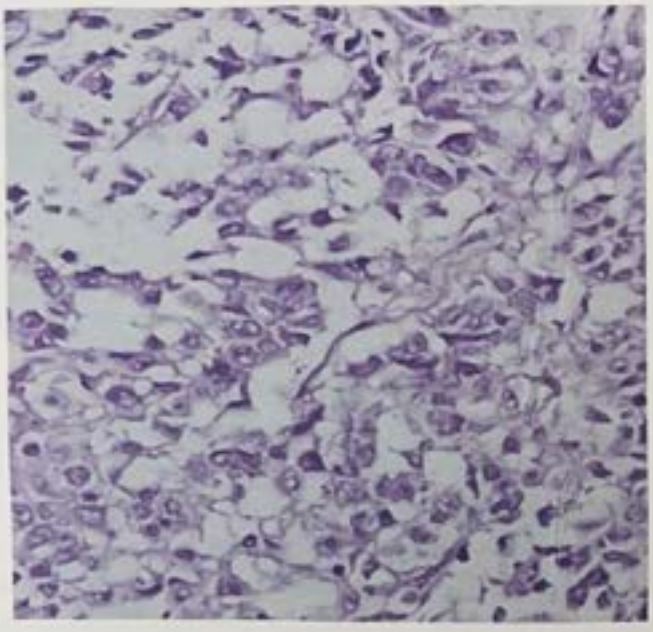

Fig.IV: photo micrograph shows invasive ductal carcinoma grade II (H&E stain x200)

Fig.V: Photo micro graph shows lymph vascular invasion (H&E x200)

Fig.VI: Photo micrograph shows blood vessel proliferation in intratumoral area (vWFstain x200)

Fig.VII: Photo micrograph shows blood vessel proliferation in peritumoral area (vWF stain x200)

Discussion

Angiogenesis plays a key role in tumour growth invasion and metastasis. Tumour angiogenesis has long been claimed as an important factor for tumour spread. To see this, blood vessels proliferation was estimated in intratumoral and peritumoral areas. There were correlation with lymphnode metastasis. Immunohistochemically using vWF were empioyed to identify blood vessels. This study also estimated the density of expression of Von willebrand factor in angiogenic vessel in invasive breast cancer with or without lymphnode metastasis.

In the present study, 41.7% sample belonged to age ≤40 years and the mean±SEM age was 45.38±1.6 years ranged from 22 to 85 years. Similarly in Italy Raica et al.[11] found that women having invasive breast carcinoma age varied from 26 – 81 years. Almost similar age ranged

also observed by Zhao et al.[5] in China, where they found age varied from 29 – 75 years.

In the current study, tumour size ranged from 1-9cm. 60.4% sample belonged to tumor Size 2-5 cm and only 16.6% had >5 cm tumor size. The mean±SEM of tumor size was 3.63±0.3 cm.. Lee et al.3 found 51.2% had 1cm, 41.3% 2cm, 5.0% 3cm and 2.5% 4cm, which is comparable with the current study.

In this present study, it was observed that 43.8% sample had ivasive ductal carcioma grade-II followed by 39.6% grade

-III. Lee et al.[3] showed 44.9 LVI positive tumors were histological grade-III. Valencak et al.[12] and Braun et al.[13] also demonstrated similar findings and which can be explained by the speculation that aggressive tumors are more capable of invading lymphatic vessels.

In this study, it was observed that 47.9% sample belonged to LN metastases stage 0, followed by 35.4% stage II. Schoppmann et al.[14] demonstrated that LVI assessed by anti-podoplanin immunostaining has been strongly associated with the presence of lymph-node metastases and unfavorable for overall survival in human breast cancer.

In the current study, regarding the vascular invasions (VI) in H&E stain, it was observed that 31.3% were VI positive, 47.9% negative and 20.8% indeterminate. Previous reports have suggested that vascular invasion (blood vessel invasion and lymphatic vessel invasion) are significant prognostic factors.[15-16]

In our study, it was observed that 50.0% had LVI positive and 50.0% negative. Kato et al.[17] observed that LVI positive had 32.4% in Japanese and 37.0% in British. LVI negative had 67.6% in Japanese and 63.02% British. However, Kato et al.[17] study showed that LVI was not contribute to the Japanese-British disparity in breast cancer and LVI vari¬ability which could not explain the survival differences between Japanese and British patients. In another study, Lee et al.[3] demonstrated that LVI was detected by D2-40, podoplanin and H&E stain in 10.0%, 8.8%, and 5.2% tumors respectively.

In the current study, regarding the blood vessel invasions (BVI) it was observed that 31.3% was BVI positive and 68.7% negative. BVI positive had 20.2% in Japanese and 26.1% in British. BVI was negative in 79.8% of Japanese and 73.9% of British, which indicated that the preva¬lence of BVI in British patients was particularly high as reported by Kato et al.[17] They also evaluated BVI by H&E staining alone and found a rate of 6.5%. By H&E staining alone, it was difficult to detect blood vessels filled with tumor cell emboli, to distinguish between small blood vessel invasion and lymphatic vessel invasion. In another study Lee et al.[3] mentioned that BVI was detected by CD31 stain in 22.5% tumors, which is slightly lower our present study.

In the present study, regarding Micro vessel density in peritumoral area (PT) and intertumoral area (IT) in Weidner method in vWF stain ranged from 1-92 and intratumoral area was ranged from 0-95.So microvessel density was greater in intratumoral area in vWF stain. Weidner et al.[9] showed that the intensity of tumor neovascularization is highly predictive for overall and relapse free survivals in patients with early stage (I or II) invasive breast carcinoma.

It is well known that blood vessel density, an indicator of tumor angiogenesis, is closely associated with the clinicopathological outcomes of breast cancer.[17] The methods used for assessing angiogenesis are usually used to measure the lymphangiogenesis of breast cancer as well.[18-19] El-Gohary et al.[5] and Choi et al.[18] reported that the associations between peritumoral LVD and tumor grade, tumor stage, lymphatic invasion, LNM, and overall survival in breast cancer. However, the relationship between intratumoral LVD and clinicopathological behavior is still uncertain.

In this study, there was a positive significant Pearson's correlation (r=0.387; p=0.007) was found between LN Metastases with micro vessel density in peritumoral area (PT) in Weidner method (vWF stain). Similarly, there was also a positive significant Pearson's correlation (r=0.410; p=0.004) between LN metastases with micro vessel density in intratumoral area (IT) in Weidner method (vWF stain). El-Gohary et al.[5] reported that CD31-detected MD correlated significantly (r=0.378; P=0.008) with vascular invasion and vascular invasion was detected in 23% by CD31.Peritumoral LMD was statistically significantly higher than intratumoral LMD. Both correlated significantly with CD31-detected MD, and all correlated significantly with lymph node metastasis, nuclear grade, histologic grade, clinical stage, and vascular inva-sion detected by CD 31. [20]

Present study was done to observe the microvessel density using Weidner method. In Weidner method it was observed that there was significant positive correlation between micro vessel (blood vessel) density and lymph-node metastasis. Therefore, further analysis is needed for evaluation.

Conclusion

It can be said that both peritumoral and intratumoral angiogenic vessel count (density) stained by anti vWF antibody correlated with lymph node metastasis. angiogenic vessel count is more in the intratumoral area. Weidner method was used for calculating microvessel(blood vessel) density. In this study Weidner method was found simple and gave significant result . The specific blood vessel marker vWF proved to be a valuable tool in highlighting vascular density and vascular invasion, and therefore a reliable predictor of lymph node metastasis.

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References

1. Nathanson SD. Insights into the mechanisms of lymph node metastasis. Cancer. 2003;98(2):413-23.
2. Siegel R. NaiShadham d, Jemal a. Cancer statistics, 2012. CA Cancer journal Clin. 2013;63(1):11-30.
3. Uddin AK, Khan ZJ, Islam J, Mahmud AM. Cancer care scenario in Bangladesh. South Asian journal of cancer. 2013;2(2):102.
4. Lee JA, Bae JW, Woo SU, Kim H, Kim CH. D2-40, podoplanin, and CD31 as a prognostic predictor in invasive ductal carcinomas of the breast. Journal of breast cancer. 2011;14(2):104-11.
5. El-Gohary YM, Metwally G, Saad RS, Robinson MJ, Mesko T, Poppiti RJ. Prognostic significance of intratumoral and peritumoral lymphatic density and blood vessel density in invasive breast carcinomas. American journal of clinical pathology. 2008;129(4):578-86.
6. Uzzan B, Nicolas P, Cucherat M, Perret GY. Microvessel density as a prognostic factor in women with breast cancer: a systematic review of the literature and meta-analysis. Cancer research. 2004;64(9):2941-55.
7. Zhao YC, Ni XJ, Li Y, Dai M, Yuan ZX, Zhu YY, Luo CY. Peritumoral lymphangiogenesis induced by vascular endothelial growth factor C and D promotes lymph node metastasis in breast cancer patients. World journal of surgical oncology. 2012;10(1):165.
8. Tille J, Nisato R, Pepper MS. Lymphangiogenesis and tumour metastasis. InNovartis Foundation symposium 2004 Mar 5 (Vol. 256, p. 112). Chichester; New York; John Wiley; 1999.
9. Park JS, Kim HK, Hong SW, Kim JK, Yoon DS. Prognostic significance of angiogenesis by Chalkley counting in node negative cancer of the ampulla of Vater. Journal of Korean Medical Science. 2012 May 1;27(5):495-9.
10. Weidner N, Folkman J, Pozza F, Bevilacqua P, Allred EN, Moore DH, Meli S, Gasparini G. Tumor angiogenesis: a new significant and independent prognostic indicator in early-stage breast carcinoma. JNCI: Journal of the National Cancer Institute. 1992;84(24):1875-87.
11. Raica M, Cimpean AM, Ceauşu R, Ribatti D, Gaje P. Interplay between mast cells and lymphatic vessels in different molecular types of breast cancer. Anticancer research. 2013 Mar 1;33(3):957-63.
12. Valencak J, Heere-Ress E, Kopp T, Schoppmann SF, Kittler H, Pehamberger H. Selective immunohistochemical staining shows significant prognostic influence of lymphatic and blood vessels in patients with malignant melanoma. European Journal of Cancer. 2004;40(3):358-64.
13. Braun M, Flucke U, Debald M, Walgenbach-Bruenagel G, Walgenbach KJ, Höller T, Pölcher M, Wolfgarten M, Sauerwald A, Keyver-Paik M, Kühr M. Detection of lymphovascular invasion in early breast cancer by D2-40 (podoplanin): a clinically useful predictor for axillary lymph node metastases. Breast Cancer Research and Treatment. 2008;112(3):503-11.
14. Schoppmann SF, Birner P, Studer P, Breiteneder-Geleff S. Lymphatic microvessel density and lymphovascular invasion assessed by anti-podoplanin immunostaining in human breast cancer. Anticancer Research. 2001;21(4A):2351-5.
15. Colleoni M, Rotmensz N, Maisonneuve P, Sonzogni A, Pruneri G, Casadio C, Luini A, Veronesi P, Intra M, Galimberti V, Torrisi R. Prognostic role of the extent of peritumoral vascular invasion in operable breast cancer. Annals of Oncology. 2007 Oct 1;18(10):1632-40.
16. Fujii T, Sutoh T, Morita H, Yajima R, Yamaguchi S, Tsutsumi S, Asao T, Kuwano H. Vascular invasion, but not lymphatic invasion, of the primary tumor is a strong prognostic factor in patients with colorectal cancer. Anticancer Research. 2014 Jun 1;34(6):3147-51.
17. Kato T, Pezzella F, Steers G, Campo L, Leek RD, Turley H, Kameoka S, Nishikawa T, Harris AL, Gatter KC, Fox S. Blood vessel invasion and other variables as predictors of long-term survival in Japanese and British patients with primary invasive breast cancer. International Journal of Clinical and Experimental Pathology. 2014;7(11):7967.
18. Choi WW, Lewis MM, Lawson D, Yin-Goen Q, Birdsong GG, Cotsonis GA, Cohen C, Young AN. Angiogenic and lymphangiogenic microvessel density in breast carcinoma: correlation with clinicopathologic parameters and VEGF-family gene expression. Modern Pathology. 2005 Jan;18(1):143-52.
19. Mohammed RA, Ellis IO, Elsheikh S, Paish EC, Martin SG. Lymphatic and angiogenic characteristics in breast cancer: morphometric analysis and prognostic implications. Breast Cancer Research and Treatment. 2009 Jan 1;113(2):261-73.
20. Van der Auwera I, Cao Y, Tille JC, Pepper MS, Jackson DG, Fox SB, Harris AL, Dirix LY, Vermeulen PB. First international consensus on the methodology of lymphangiogenesis quantification in solid human tumours. British Journal of Cancer. 2006 Dec;95(12):1611-25.

Original Article

Pancreaticogastrostomy: A Safe and Effective Reconstruction Method After Pancreaticoduodenectomy: A Short Observational Study

Islam MJ[1], Suma SA[2], Farhad-Ul-Hassan ASM[3] Khan MS[4], Ullah MM[5]

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ABSTRACT:

Background: *Pancreaticoduodenal resection is usually performed in patients with a localised small carcinoma in the head of the pancreas, at the lower end of the common bile duct or at the ampulla and occasionally for chronic pancreatitis.The mortality following pancreaticoduodenal resection has fallen and is now below 5% 1-6 .However, leakage from the anastomosis between pancreas and the jejunum has been and remains, one of the most worrying complications of the operation. The data from papers published in the last 8 years show that the incidence of pancreatic leak is 14% and the mortality of this complication 24%3,4,6-16 .Pancreaticogastrostomy is a potentially safer alternative to pancreaticojejunostomy in the reconstruction following Whipple's operation.* ***Aim:*** *The aim of the study was to observe pancreaticogastrostomy is a potentially safer alternative to pancreaticojejunostomy after pancreaticoduodenectomy.* ***Methods:*** *This prospective observational study was conducted at the Department of Surgery in Shaheed Suhrawardy Medical College Hospital, for One year (August 2021 to July 2022). Patients with a localised small carcinoma in the head of the pancreas, at the lower end of the common bile duct or at the ampulla, and occasionally for chronic pancreatitis admitted in the department of surgery were approached for inclusion in the study. Total 41 patients were selected according to inclusion and exclusion criteria. Informed written consent was taken from each patient. All patients underwent pancreaticogastrostomy. Detail clinical and demographic history was taken along with thorough physical examination relevant investigations. All patients were evaluated preoperatively and post operatively at discharge, 1 month and 3 months. Outcome was assessed post operatively. Collected data were checked and analysed in SPSS 23.* ***Results:*** *Two patients died within 30 days of the operation (mortality 4.9%), one from perioperative haemorrhage and another from septicaemia due to a biliary infection, which may have resulted from preoperative transhepatic biliary drainage. Both operations were carried out for carcinoma of the head of the pancreas. One patient developed a biliary leak which closed in 6 days. A postoperative pancreatic leak occurred in one patient with carcinoma of the ampulla; the fistula closed after 5 mdays, and did not delay his discharge from hospital. This patient remains well 36 months after operation, although he has now developed mild diabetes.One other patient developed diabetes mellitus postoperatively. This woman had evidence of obstructive pancreatitis at operation. She died 6 months later of recurrent carcinoma of the head of the pancreas. One patient with chronic pancreatitis has uncontrolled steatorrhoea, with up to four bowel movements a day. Four other patients take regular pancreatic supplements together with H2 receptor antagonists in order to maintain normal defaecation. There has been no case of stomal ulceration. None of the patients were lost to follow-up. The median survival for patients operated on for carcinoma of the head of the pancreas was 13 months, and for patients with carcinoma of the bile duct, 14 months. Median survival of patients with ampullary carcinoma was 38 months.* ***Conclusion:*** *Seventy two percent of patients had good outcome after Pancreaticogastrostomy(PG). Significant relief in symptoms of pain were noted after PG. Further larger study is recommended to validate this findings.*

Key Words:
Pancreaticoduodenectomy, Pancreaticogastrostomy

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1. Dr. Mohammad Jayedul Islam, Junior Consultant, Department of Surgery, Shaheed Suhrawardy Medical College Hospital, Dhaka
2. Dr. Sharmin Akter Suma, Lecturer, Department of Anatomy, Shaheed Suhrawardy Medical College, Dhaka
3. Dr. A.S.M Farhad-Ul-Hassan, Junior Consultant, Department of Surgery, Shaheed Suhrawardy Medical College Hospital, Dhaka
4. Dr.Mohammad Saifuddin Khan,Resident, Hepatobiliary surgery, Shaheed Suhrawardy Medical College Hospital, Dhaka
5. Dr. Muhammad Mizan Ullah, Anesthesiologist, Department of Anaesthesia, pain and intensive care medicine, Shaheed Suhrawardy Medical College Hospital, Dhaka

Correspondence: Dr. Md. Jayedul Islam, Junior Consultant, Shaheed Suhrawardy Medical College Hospital, Sher-e- Bangla Nagar, Dhaka-1207. Email: jayedulislam95@gmail.com, Mobile: +880-1741-029-805

Introduction

Pancreaticoduodenectomy has become increasingly accepted as a safe and appropriate operation for selected patients with malignant and benign diseases of the pancreas and periampullary region. The operative mortality rate after pancreaticoduodenectomy is 4% or less at major surgical centers [1-5] Postoperative sepsis, hemorrhage and cardiovascular events are responsible for the majority of deaths after pancreaticoduodenectomy. Although the mortality rate after pancreaticoduodenectomy has decreased in recent years, the incidence of postoperative morbidity occasionally approaches 50% [1-8] .In most series, the three leading causes of morbidity after pancreaticoduodenectomy are delayed gastric emptying, wound infection and pancreatic fistula resulting from a pancreatic anastomotic leak[1,2,1-18] .Failure of a pancreatic-enteric anastomosis to heal after pancreaticoduodenectomy can be a source of considerable morbidity and can contribute to mortality. The incidence of pancreatic anastomotic leak ranges from 5% to 25% in most series. Because pancreatic fistula has been such a common problem after pancreaticoduodenectomy, various techniques of managing the pancreatic remnant (body and tail of the pancreas) have been studied [12] .Simple suture ligation of the pancreatic duct without enteric anastomosis was popular in past decades [13] but has been largely abandoned due to an external fistula rate of more than 50% [14] .Pancreatic ductal occlusion with such substances as neoprene or prolamine has been proposed as a means of reducing fistula rates, with some reported success [15-16] . Various modifications of a pancreaticojejunal anastomosis have been tested, including site of jejunum used (end vs. side), type of anastomosis (invagination vs.duct-to-mucosa), use of an isolated Roux-en-Y limb, and use of fibrin glue and pancreatic duct stenting[17-22] .No universal agreement has been reached regarding one particular variation of pancreaticojejunostomy being safer and less prone to fistula formation. A recently repopularized option for enteric drainage of the pancreatic remnant is pancreaticogastrostomy, a technique first reported on experiments in dogs in 193423 and used clinically for 50 years [24-25] . Reported results of pancreaticogastrostomy have been favorable, with very low rates of pancreatic fistula and mortality [26-29]

Materials and Method

This is a cross sectional study done at Suhrawardy Medical College and Hospital over a period of one year (August 2021 to July 2022) amongst the admitted patient in Department of Surgery. A total of 41 subjects (n=41) were chosen for purposive sampling. After inclusion and assessment, all patients were interviewed by the research team for base line data like age, sex, socioeconomic status, BMI and co-morbid disease. Subjects were investigated for anesthetic fitness as well as to identify comorbidities. All patients underwent pancreaticogastrostomy. Detail clinical and demographic history was taken along with thorough physical examination relevant investigations. All patients were evaluated preoperatively and post operatively at discharge, 1 month and 3 months. Outcome was assessed post operatively . All information were recorded in separate case record form.

Results

There were 30 females and 11 males included in this study,with a median age of 60 years (range 26 to77 years)(Table 1). The histopathological diagnoses were as follows:20 pancreatic adenocarcinomas, five ampullary adenocarcinomas,three cholangiocarcinomas, two chronic pancreatitis, two neoplastic pancreatic cysts, two pancreatic cystic lesions, two neuroendocrine tumors, two duodenal gastrointestinal stromal tumor, one ampullary tubulovillous adenoma with high grade dysplasia, one intraductal tubular carcinoma, and one adenocarcinoma of the distal, extrahepatic common bile duct (Table 1). The median size of the tumors was 30 mm (range, 8e130 mm).Positive resection margins (R1) were observed in three(6.8%) of the specimens whereas 44 (93.6%) were of negative resection margins (R0).The classic Whipple's resection was performed in 41(80.85%) patients, and two (4.25%) patients underwent PPPD (Table 2). In another three (12.76%) cases, classic Whipple's resection was combined with other procedures such as wedge segmentectomy for neuroendocrine liver metastasis, left hepatectomy, and total abdominal hysterectomy. One (2.12%) patient underwent PPPD with salpingo-oophorectomy. The median operative time was 351 minutes (range, 243e553 minutes). The median bloodloss was 563.8 mL (range, 200e5000 mL); 20 (42.55%) out of 41 patients received perioperative blood transfusion, withthe median amount transfused being 2 units of packed red blood cells.

Figure 1: Schematic drawing shows the technique of pancreaticogastrostomy. The pancreatic stent was secured with a 4/ 0 polydioxanone (PDS) suture. A series of 4/0 Prolene sutures was passed through the pancreatic parenchyma, away from the cutting edge, to anchor the pancreatic stump to the posterior wall of the stomach. An incision was made at the posterior gas- trostomy, next to the pancreatic stump.

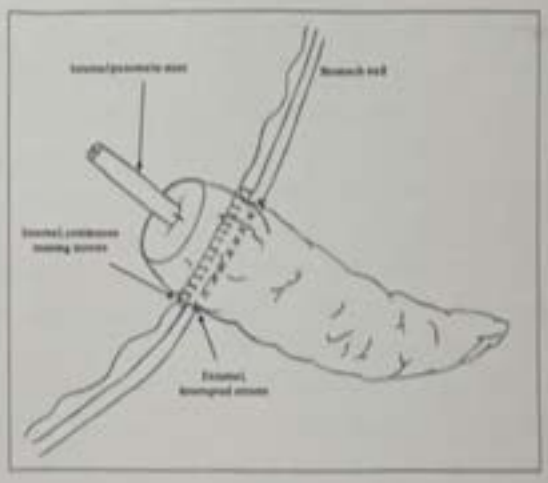
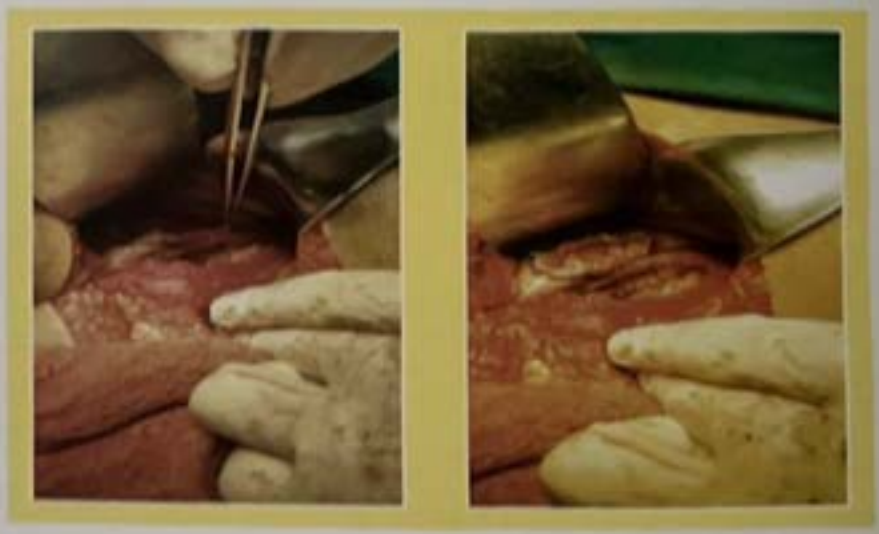


Figure 2 Schematic drawing shows the pancreatic stump protruding the stomach lumen. The pancreatic stump was sutured to the seromuscular layer of the stomach with 4/0 polydioxanone (PDS) sutures, in a continuous running fashion. The external part of the pancreas was sutured to the posterior wall of the stomach with 4/0 Prolene sutures, in an interrupted, full-thickness fashion



The median fluid amylase concentrations were 578 U/L from the left abdominal drain near the hep- aticojejunostomy anastomosis (range, 3e54,879 U/L) and 232.5 U/L (range, 3e7617 U/L) from the right abdominal drain near the PG anastomosis on POD 3. On POD 5, the median amylase concentration for the left abdominal drain was 116 U/L (range, 5e24,043 U/L), and for the right abdominal drain it was 68 U/L (range, 6e1672 U/L). Meanwhile, the median fluid volumes were 140 mL (range, 3e1200 mL) for the left abdominal drain and 79.5 mL (range, 1e1400 mL) for the right abdominal drain on POD 3. On POD 5, the median drain volumes were 102.5 mL (range, 2e1280 mL; left abdomen) and 110 mL (range, 5e1002 mL; right abdomen).

The overall postoperative morbidity was 44.68%. According to the Clavien Dindo classification of surgical complications, nine were Grade I, one was Grade II, nine were Grade IIIa, two were Grade IIIb, and two were Grade IIIb, two were Grade V.

There were two (4.25%) postoperative mortalities. Surgical complications (Table 3) included bile leak , delayed gastric emptying , chylous ascites , intra-abdominal fluid collection , gastric outlet obstruction and dehiscence of gastrostomy, liver abscess, liver abscess and narrowed hepatico jejunal anastomosis , PG ulcer , upper gastrointestinal bleeding , and wound infection . According to the ISGPF clas sification system, there were 24 patients with Grade A POPF (nonclinical significant) and none of the patients had Grade B/C POPF (clinically significant). All patients with POPF recovered uneventfully. The median length of stay was 12 days (range, 6-35 days). The most frequent complication was chylous ascites, which was treated with laparotomy or conservatively with total parenteral nutrition (Table 3). One patient with bile leak was treated with exploratory laparotomy and hepaticojejunostomy was redone. Two patients with DGE were treated with the insertion of nasojejunal feeding tube and were conservatively managed. Intra-abdominal fluid collection, which occurred in four cases, were successfully treated with ultrasound-guided drainage and antibiotics. Two cases with gastric outlet obstruction and dehiscence of gastrostomy were treated with relaparotomy. A case with liver abscess was treated with percutaneous drainage and antibiotics. One case that was complicated with liver abscess and narrowed hepaticojejunal anastomosis was treated with abscess drainage, percutaneous transhepatic biliary stenting. Two patients with upper gastrointestinal bleeding from gastrojejunal stromal ulcers were treated with adrenaline injection and hemoclip application. Lastly, one case with wound infection was treated with wound dressing. All patients with complications recovered uneventfully.

The two cases of postoperative mortalities in this series involved portal vein injury and had no correlation with the PG reconstructive technique. The first case involved portal vein tear close to the hepatic bifurcation and was injured during hilar lymphadenectomy. The injury was repaired, but the patient subsequently succumbed to postoperative liver failure and ensuing multiple-organ failure on POD 6. The second case involved resection of a large tumor with elective portal vein resection and reconstruction using saphenous vein graft. Postoperative ischemic hepatitis was observed with poor portal flow and hepatic artery thrombosis. The patient gradually deteriorated with sepsis and multiorgan failure and died on POD 8.

Table 1: Patients' demographic data and histopathological diagnoses.

Variable	Patients (*n*=47)
Sex *(M/F)*	17/30
Age (y)	60 (20-77)
Histopathological diagnoses	
Pancreatic adenocarcinoma	18
Ampullary adenocarcinoma	8
Cholangiocarcinoma	6
Chronic Pancreatitis	3
Neoplastic Pancrearic Cysts	3
Pancrearic Cystic lesions	2
Neuroendocrine tumor	2
Duodenal gastrointestinal stromal tumor	2
Ampullary tubulovillous adenoma with high grade dysplasia	1
Intraductal tubular carcinoma	1
Adenocarcinoma of the distal, extrahepatic common bile duct	1
Tumor Size (mm)	30 (8-130)
Surgical resections	
Positive resection margin(R1)	3 (6.8%)
Negative resection margin (R0)	4 (93.6%)

Table 2: Operative Details.

	Patients (*n=41*)
Type of Surgery	
Classic Wihipple's	41
Classic Wihipple's + wedge segmentectomy	1
Classic Wihipple's + left hepatectomy	1
Classic Wihipple's + TAHBSO	1
PPPD	2
PPPD + salpingo-oophorectomy	1
Operative Time (min)	351 (243-553)
Blood Loss (mL)	563.8 (200-500)
Perioperative blood transfusion	20/47 (42.55%)
No. of packed red blood cell units	2

PPPD = pylorus-preserving pancreaticoduodenectomy; TAHBSO = total abdominal hysterectomy bilateral salpingo-oophorectomy;

Table 3: Postoperative outcome and interventions.

Postoperative morbidity	44.68%
Calvien-Dindo	
Grade I	9
Grade II	1
Grade IIIa	9
Grade IIIb	2
Grade IV	0
Grade V	2
Postoperative mortality	2 (4.25%)
Surgical complication	
Bile leak	1
Delayed gastric emptying	2
Chylous ascites	7
Intra-abdominal fluid collection	4
Gastric outlet obstruction and dehiscence of gastrostomy	2
Liver abscess	1
Liver abscess and narrowed hepaticojejunal anastomosis	1
Upper gastrointestinal bleeding from gastrojejunal stromal ulcers	2
Wound infection	1
POPF	
Gread A	24 (51.06%)
Gread B/C	0
Interventions	
Laparotomy	1
Conservatively with total parenteral nutrition	6
Exploratory laparotomy repair of bile leak and redo hepaticojejunostomy	1
Insertion of nasojejunal feeding tube and conservatively managed	2
Ultrasound-guided drainage and antibiotics	4
Relaparotomy	2
Percutaneous drainage and antibiotics	1
Abscess drainage, PTBD and stenting	1
OGDS	2
Wound Dressing	1
Length of stay (d)	10 (6-35)

OGDS = esophagogastricduodenoscopy; POPF =post-operative pancreatic fistula; PTBD = percutaneous transhepatic biliary drainage

Discussion

As PD becomes a more standardized surgical procedure, controversy regarding the reconstructive method for pancreaticeenteric anastomosis continues to persist. Although PG was first reported by Waugh and Clagett30 in 1946, PJ is still the most commonly performed procedure in comparison to PG. PG has been reestablished as an alternative secure reconstructive method in the past decade. It is favored by several surgeons lately because of its many theoretical advantages compared to PJ. First, pancreatic enzymatic secretions are deactivated by the acidic gastric fluid and the deficiency of enterokinase, which is necessitated for converting trypsinogen to trypsin and consequently activating other proteolytic enzymes, may help in preventing the autodigestion of the pancreatic anastomosis. Moreover, the alkaline pancreatic secretions may assist in preventing marginal ulceration. The close proximity between the posterior gastric wall and the pancreatic remnant permits for the possibility of less tension on the pancreatic anastomosis. The nasogastric decompression also allows for the continuous stomach emptying, thus reducing the tension on the anastomosis. Lastly, PG decreases the anatomoses amount in a single loop of retained jejunum and averts the creation of a long jejunal limb between the biliary and pancreatic anastomoses, wherein an accumulation of both pancreatic and biliary secretions could induce more pressure, which could potentially lead to tension at both anastomoses.[31,32] Even so, pancreatic sur- geons continue to be challenged in managing the pancreatic remnant after PD, thus, many modified techniques have been used in order to further decrease the occurrence rate of POPF.

In this study, PG is the reconstructive method of choice after PD. Many authors endorsed this practice. Guerrini et al16 presented a lower fistula rate (15.1%) after PG compared to after PJ (22.1%). We reported a newly modi- fied PG technique utilizing two-layer anastomoses (internal continuous and external interrupted), which were per- formed using 4/0 PDS sutures, with a short internal stenting of the pancreatic duct. In comparison to other modified PG techniques, this method of reconstruction was beneficial because the full-thickness bites of sutures on the stomach wall and the pancreatic parenchy-

ma were more secure irrespective of the thickness and consistency of the pancreatic parenchyma. In other words, cheese-wire or cut-through of the sutures were less likely to occur. Furthermore, the internal, short pancreatic stent diverted the pancreatic juice away from the PG anastomosis, thus lessening the risk of autodigestion and dehiscence on the anastomosis.

POPF refers to a drain output of any measurable volume of fluid on or after POD 3 with an amylase content greater than three times the serum amylase activity based on ISPGF.[13] POPF was identified based on both drainage amylase concentration and volume on POD 3 and POD 5. Out of 41 patients, only 24 patients were diagnosed with Grade A, but none of the patients were unwell clinically and no patient required any specific intervention. None of the patients were diagnosed with Grade B/C POPF. Grade A POPF is also known as a "transient fistula" or "chemical leakage," which has no clinical impact. Various reports have analyzed the utilization of particular concentrations of drain amylase during the postoperative period as a predictor of POPF with diverging results, in spite of the international consensus.[13] For instance, drain amylase greater than 5000 U/L on POD 1 or more than 200 mL/d output with amylase greater than five times the serum amylase concentration on POD 5 have been proposed as clinically useful predictors of POPF.[33,34] Although the data in our study aligned with these proposed predictors, no clinical evidence for clinical POPF (Grade B/C) was observed. Accordingly, there are limitations in using the fistula classification.[35,36] This is because amylase-rich drainage cannot be solely used in identifying clinical POPF.[37] From the results obtained, both left and right abdominal drainage concentrations and volumes decreased on POD 5 from POD.

Additionally, in some cases, the surgical drainage volume increased owing to the resumption of normal diet, which in turn induced exocrine stimulation causing more pancreatic juice to move through the leaking pancreatic anastomosis. Thus, measurement of surgical drainage volume alone might be useful, but it was insufficient to identify clinical POPF. Therefore, the severity of POPF was further determined and graded by the clinical outcomes of patients.[34] Because there are differences in the description of POPF, it is conceived that the well-defined Claviene Dindo classification of surgical complications[25,26] has more merit in scoring postoperative complications. The rate of severe postoperative complication was 27.7% in this study, which was similar to the rates (16.7-27.1%) in other studies.[38-40] Patient-related risk factors such as age,41 sex,42 duration of jaundice, clearance of creatinine, and intraoperative blood loss[43] were not taken into account because they have been shown equivocally to have no association with POPF.

Limitations

This work has several limitations. Unavailability of important data44 and the small sample size. Future prospective, large-volume trials are crucial to corroborate these preliminary results and elucidate the advantages of this modified technique.

Conclusion

In conclusion, the acceptable morbidity and low mortality rates in this series demonstrated that this modified PG anastomotic technique was safe and reliable in comparison with other PG or PJ methods.

Conflicts of interest

Not reported

References

1. Winter JM, Cameron JL, Campbell KA, et al. 1423 Pan- creaticoduodenectomies for pancreatic cancer: a single- institution experience. J Gastrointest Surg. 2006;10:1199e1211.
2. Osada S, Imai H, Sasaki Y, Tanaka Y, Nonaka K, Yoshida K. Reconstruction method after pancreaticoduodenectomy. Idea to prevent serious complications. JOP. 2012;13:1e6.
3. Callery MP, Pratt WB, Kent TS, Chaikof EL, Vollmer Jr CM. A prospectively validated clinical risk score accurately predicts pancreatic fistula after pancreatoduodenectomy. J Am Coll Surg. 2013;216:1e14.
4. Callery MP, Pratt WB, Vollmer Jr CM. Prevention and management of pancreatic fistula. J Gastrointest Surg. 2008;13:163e173.
5. Lai EC, Lau SH, Lau WY. Measures to prevent pancreatic fistula after pancreatoduodenectomy: a comprehensive review. Arch Surg. 2009;144:1074e1080.
6. Aranha GV, Aaron JM, Shoup M, Pickleman J. Current man- agement of pancreatic fistula after pancreaticoduodenectomy. Surgery. 2006;140:561e569.
7. Schmidt CM, Choi J, Powell ES, et al. Pancreatic fistula following pancreaticoduodenectomy: clinical predictors and patient outcomes. HPB Surg. 2009:1e8.
8. Kazanjian KK, Hines OJ, Eibl G, Reber HA. Management of pancreatic fistulas after pancreaticoduodenectomy: results in 437 consecutive patients. Arch Surg. 2005;140:849e856.
9. Veillette G, Dominguez I, Ferrone C, et al. Implications and management of pancreatic fistulas following pan- creaticoduodenectomy. Arch Surg. 2008;143:476e481.

10. Muscari F, Suc B, Kirzin S, et al. Risk factors for mortality and intra-abdominal complications after pancreatoduodenectomy: multivariate analysis in 300 patients. Surgery. 2006;139: 591e598.

11. Rosso E, Bachellier P, Oussoultzoglou E, et al. Toward zero pancreatic fistula after pancreaticoduodenectomy with pan- creaticogastrostomy. Am J Surg. 2006;191:726e732.

12. Tewari M, Hazrah P, Kumar V, Shukla HS. Options of restorative pancreaticoenteric anastomosis following pan- creaticoduodenectomy: a review. Surg Oncol. 2010;19:17e26.

13. Bassi C, Dervenis C, Butturini G, et al. Postoperative pancre- atic fistula: an international study group (ISGPF) definition. Surgery. 2005;138:8e13.

14. Bassi C, Falconi M, Molinari E, et al. Reconstruction by pan- creatico-jejunostomy versus pancreaticogastrostomy following pancreatectomy. Ann Surg. 2005;242:767e773.

15. McKay A, Mackenzie S, Sutherland FR, et al. Meta-analysis of pancreaticojejunostomy versus pancreaticogastrostomy reconstruction after pancreaticoduodenectomy. Br J Surg. 2006;93:929e936.

16. Guerrini GP, Soliani P, D'Amico G, et al. Pancreatico-jejunos- tomy versus pancreaticogastrostomy after pan- creaticoduodenectomy: an up-to-date meta-analysis. J Investig Surg. 2016;29:175e184.

17. Hallet J, Zih FS, Deobald RG, et al. The impact of pan- creaticojejunos-tomy versus pancreaticogastrostomy recon- struction on pancreatic fistula after pancreatico- duodenectomy: meta-analysis of randomized controlled trials. HPB. 2015;17:113e122.

18. Zhang X, Ma L, Gao X, et al. Pancreaticogastrostomy versus pancreati-cojejunostomy reconstruction after pan- creaticoduodenectomy: a meta-analysis of randoenized controlled trials. Surg Today. 2014;45:585e594.

19. Shen YF, Jin WY. Reconstruction by pancreaticogastrostomy versus pancreaticojejunostomy following pancreaticoduo- denectomy: a meta-analysis of randoenized controlled trials. Gastroenterol Res Pract. 2011;91(42):2990e2994.

20. Wente MN, Shrikhande SV, Mu¨ller MW, et al. Pan- creatico-jejunostomy versus pancreaticogastrostomy: sys- tematic review and meta-analysis. Am J Surg. 2007;193: 171e183.

21. Maemura K, Mataki Y, Kurahara H, et al. Pancreaticogas- trostomy after pancreaticoduodenectomy using twin square wrapping with duct-to-mucosa anastomosis. Eur Surg Res. 2015;55:109e118.

22. Wang XA, Wu XS, Cai Y, et al. Single purse-string duct to mu- cosa pancreaticogastrostomy: a safe, easy, and useful tech- nique after pancreaticoduodenectomy. J Am Coll Surg. 2015; 220:e41ee48.

23. Fatih O, Adil B, Cengiz A, et al. No mortality or pancreatic fistula after full-thickness suture pancreaticogastrostomy in 39 patients who underwent pancreaticoduodenectomy. Int Surg. 2015;100:275e280.

24. Zhu F, Wang M, Wang X, et al. Modified technique of pan- creatico-gastrostomy for soft pancreas with two continuous hemstitch sutures: a single-center prospective study. J Gas- trointest Surg. 2013;17:1306e1311.

25. Clavien PA, Barkun J, de Oliveira ML, et al. The ClavieneDindo classification of surgical complications: five-year experience. Ann Surg. 2009;250:187e196.

26. Dindo D, Demartines N, Clavien PA. Classification of surgical compli-cations: a new proposal with evaluation in a cohort of 6336 patients and results of a survey. Ann Surg. 2004;240: 205e213.

27. Wente MN, Bassi C, Dervenis C, et al. Delayed gastric emptying (DGE) after pancreatic surgery: a suggested definition by the Interna-tional Study Group of Pancreatic Surgery (ISGPS). Surgery. 2007;142:761e768.

28. Brooke-Smith M, Figueras J, Ullah S, et al. Prospective evalu- ation of the International Study Group for Liver Surgery defi- nition of bile leak after a liver resection and the role of routine operative drainage: an international multicentre study. HPB. 2015;17:46e51.

29. Al-Busafi SA, Ghali P, Desche'nes M, Wong P. Chylous ascites: evaluation and management. ISRN Hepatol. 2014:1e10.

30. Waugh JM, Clagett OT. Resection of the duodenum and head of the pancreas for carcinoma. Surgery. 1946;20:224e232.

31. Fragulidis GP, Arkadopoulos N, Vassiliou I, et al. Pancreatic leakage after pancreaticoduodenectomy: the impact of the isolated jejunal loop length and anastomotic technique of the pancreatic stump. Pancreas. 2009;38:e177ee182.

32. Shrikhande SV, Qureshi SV, Rajneesh N, Shukla PJ. Pancreatic anastomoses after pancreaticoduodenectomy: do we need further studies? World J Surg. 2005;29:1642e1649.

33. Molinari E, Bassi C, Salvia R, et al. Amylase value in drains after pancreatic resection as predictive factor of postoperative pancreatic fistula. Ann Surg. 2007;246:281e287.

34. Shinchi H, Wada K, Traverso LW. The usefulness of drain data to identify a clinically relevant pancreatic anastomotic leak after pancrea-ticoduodenectomy? J Gastrointest Surg. 2006;10: 490e498.

35. Gebauer F, Kloth K, Tachezy M, et al. Options and limitations in applying the fistula classification by the International Study Group for Pancreatic Fistula. Ann Surg. 2012;256:130e138.

36. Tan WJ, Kow AW, Liau KH. Moving towards the New Interna- tional Study Group for Pancreatic Surgery (ISGPS) definitions in pancreati-coduodenectomy: a comparison between the old and new. HPB. 2011;13:566e572.

37. Shyr YM, Su CH, Wu CW, Lui WY. Does drainage fluid amylase reflect pancreatic leakage after pancreaticoduodenectomy? World J Surg. 2003;27:606e610.

38. Braga M, Capretti G, Pecorelli N, et al. A prognostic score to predict major complications after pancreaticoduodenectomy. Ann Surg. 2011;254:702e708.

39. Greenblatt DY, Kelly KJ, Rajamanickam V, et al. Preoperative factors predict perioperative morbidity and mortality after pan- creaticoduo-denectomy. Ann Surg Oncol. 2011;18:2126e2135.

40. McAuliffe JC, Parks K, Kumar P, McNeal SF, Morgan DE, Christein JD. Computed tomography attenuation and patient characteristics as predictors of complications after pan- creaticoduodenectomy. HPB. 2013;15:709e715.

41. Matsusue S, Takeda H, Nakamura Y, Nishimura S, Koizumi S. A prospective analysis of the factors influencing pan- creaticojejunosto-my performed using a single method, in 100 consecutive pancreati-coduodenectomies. Surg Today. 1998;28: 719e726.

42. Suzuki Y, Kuroda Y, Morita A, Pujino Y, Ykawamura T, Saitoh Y. Fibrin glue sealing for the prevention of pancreatic fistulas following distal pancreatectomy. Arch Surg. 1995;130:952e955.

43. Yeh TS, Jan YY, Jeng LB, et al. Pancreaticojejunal anastomotic leak after pancreaticoduodenectomydmultivariate analysis of perioperative risk factors. J Surg Res. 1997;67:119e125.

44. Hess DR. Retrospective studies and chart reviews. Respir Care. 2004;49:1171e1174.

Original Article

Growth Status of Bangladeshi Children in Functional Constipation: Experience From A Tertiary Care Hospital

Reza R[1], Mazumder MW[2], Poly FH[3], Rifah TJ[4], Noor MA[5], Sharmin ZS[6], Islam MS[7], Haque MM[8]

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ABSTRACT:

Background: *Constipation is one of the common complaints of children with long-term hazardous consequences. It is a frequent cause of hospital visit in both primary and specialized care which needs proper evaluation and management. Recently in few studies, impairment of growth status has been reported as a result of functional constipation. But the relation is not well evaluated, especially in the pediatric population of our country.*

Aim: *To assess the growth status of Bangladeshi children in functional constipation.*

Methods: *This analytical study was conducted at the department of Pediatric Gastroenterology and Nutrition, BSMMU, Dhaka. A total 150 children aged 2-18 years were enrolled in this study. Children were divided into two groups, 75 having functional constipation (FC) and 75 healthy children with no constipation. Samples were collected randomly from pediatric out-patient department of BSMMU with consent of parents and child's approval. Diagnosis of functional constipation was made by Rome IV criteria. Children with any red flag sign, chronic disease and on treatment of constipation were excluded from the study. Growth status (weight, height & BMI) was evaluated by using growth charts. Data collected in semi-structured questionnaire and analyzed by SPSS 23.0.*

Results: *We evaluated 75 constipated children with the mean age of 7.61±3.50 years and 75 healthy children with the mean age of 7.40±3.88 years. The mean weight of children with functional constipation was 22.8±10.01 kg, mean height 117.7 ±18.4 cm and BMI 15.6±2.3 kg/m2. The mean weight of children with no constipation was 28.6± 13.72 kg, mean height 124.49±23.3 cm and BMI 18.11±2.9 kg/m2,demonstrated significant difference between two sets. In functional constipation group, on weight for age and height for age chart, 28% and 24% children were below the 3rd centile respectively and 18.6% children had BMI below 5th centile. All these parameters (weight, height, BMI) were statistically significant in compare to children without constipation and p value is <.05. Presenting features of functional constipation were anorexia (64%), abdominal pain (73.3%), hard stool (84%), blood mixed hard stool (13.3%) and nausea (34%).*

Conclusion: *Growth impairment occurs in children with functional constipation in comparison to children without constipation. Children aged 2 to 18 years with functional constipation may have decelerated weight, height and BMI growth. And this observation needs further large-scale multicenter study for ensuring optimal growth of children with constipation.*

Key Words:
Children, Functional constipation (FC), Growth status, Growth chart.

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1. Dr. Renesa Reza, Consultant, Department of Pediatrics, National Center for Control of Rheumatic Fever and Heart Disease, Sher e Bangla Nagar, Dhaka.
2. Dr. Md. Wahiduzzaman Mazumder, Associate Professor, Department of Pediatric, Gastroenterology and Nutrition, Bangabandhu Sheikh Mujib Medical University, Dhaka
3. Dr. Ferdousi Hossain Poly, Consultant, Department of Pediatrics, Shaheed Suhrawardy Medical College and Hospital, Dhaka
4. Dr. Tasfia Jannat Rifah, Pediatric Gastroenterologist, Bangabandhu Sheikh Mujib Medical University, Dhaka.
5. Dr. Morium Alam Noor, Pediatric Gastroenterologist, Director General of Health Services (DGHS).
6. Dr. Zinat Sultana Sharmin, Pediatric Gastroenterologist, DGHS, Upazila Health Complex, Banskhali, Chattogram
7. Dr. Mohammed Shahidul Islam, Pediatric Gastroenterologist (Medical Officer) DGHS, Upazila Health Complex, Senbag, Noakhali.
8. Dr. Mohammad Mominul Haque, Consultant, Department of Anesthesia, Analgesia & Intensive Care Medicine, Bangabandhu Sheikh Mujib Medical University, Dhaka

Correspondence: Dr. Renesa Reza, Consultant, Department of Pediatrics, National Center for Control of Rheumatic Fever and Heart Disease, Sher e Bangla Nagar, Dhaka. E-mail: rezarenesa78@gmail.com; Mobile: 01713000884.

Introduction

Constipation is a common pediatric problem which is frequently overlooked. 17% to 40% children experience their first episode of constipation during infancy[1]. This disorder is accompanied with painful bowel movement, abdominal pain and sometimes fecal incontinence[2]. It affects the child and family's quality of life by making them uncomfortable[2]. Constipation is generally defined as infrequent stool, passage of hard stool or both[3].North American Society for Pediatric Gastroenterology, Hepatology and Nutrition (NASPGHAN) defines constipation as delay or difficulty in defecation, present for 2 or more weeks and sufficient to cause significant distress to the patient4.Regarding etiology of constipation, 95% functional and 5% are organic5.Among organic causes, Hirschsprung disease is the most common[6].

Constipation may be acute or chronic. Acute constipation is due to changes in diet, place, drugs, anal fissure, perianal inflammation etc. Chronic constipation is functional in more than 90% cases[6].As functional constipation is the most frequent one, it should be taken into consideration when organic diseases are excluded[7,8]

Functional constipation is diagnosed by Rome IV criteria. For children ≥4 years, at least two features of ROME IV criteria must be present with duration of minimum one month: 1) Two or fewer defecations in the toilet per week. 2) At least one episode of fecal incontinence per week. 3) History of retentive posturing or excessive volitional stool retention. 4) History of painful or hard bowel movements. 5) Presence of a large fecal mass in the rectum. 6) History of large-diameter stools that may obstruct the toilet. These symptoms cannot be fully explained by another medical condition and symptoms are insufficient to fulfill the diagnostic criteria of irritable bowel syndrome.

Among general population and even in physicians, common belief is FC has no remarkable impact on child's growth. Recently in few studies impairment of growth status has been reported as a consequence of functional constipation. Several studies showed significant negative impacts of constipation on the children's weight and height. Adequate treatment of constipation and elimination of risk factor improve constipated children's growth9.But the relation is not well evaluated in the pediatric population of Bangladesh.

Objective

To assess the effect of functional constipation on physical growth of children and compare this growth status with children having no constipation.

Methodology

It was a cross sectional analytical study, conducted at the department of Pediatric Gastroenterology and Nutrition, Bangabandhu Sheikh Mujib Medical University (BSMMU) from January 2021 to June 2022 (18 months). A total of 150 children aged 2 to 18 years, 75 with FC and 75 having no constipation were enrolled in this study. Children were assembled from outdoor visit. Proper history, clinical examination, relevant investigation, Rome IV criteria were done and samples were selected accordingly. Children having constipation but did not fulfill Rome IV criteria, having organic or chronic disease and already on treatment for constipation were excluded from the study. Details clinical history, examination findings and investigation reports were recorded in a predesigned structured data sheet. Height, weight and Body Mass Index (BMI) were recorded. Weight of every child was measured by same bath room scale, preferably at early morning with minimum clothing after evacuation of bowel and bladder. Height measurement done by stadiometer. BMI was calculated by using formula of weight in kg divided by height in meter square. CDC recommended percentile growth chart were used to determine age-specific growth of children.

Operational Definition

Diagnosis of functional constipation was made by Rome IV criteria. Presence of chronic disease or any red flag sign were considered as organic cause. Weight for age less than 3rd centile termed as underweight & Height for age less than 3rd centile stunted. BMI more than 85th centile overweight, between 5th to 85th percentiles normal weight and less than 5th centile was considered as underweight.

Results

A total 150 participants between 2-18 years were taken as study sample and divided into two groups, one group of children with functional constipation (FC) and another group without constipation.

Table-1: Weight for age on centile chart of growth, one group with FC and another without constipation (N=150)

Weight for age centile	With FC n=75 n (%)	Without FC n=75 n (%)	p value
<3rd centile	21(28)	2(2.8)	<0.001
3rd-97thcentile	53(70.6)	70 (93.3)	
97th centile	01 (1.4)	3 (4.0)	

p value was determined by chi-square test. Results were expressed as percentage

Table 4.1 analyze weight for age in children with FC and without constipation. Among children with FC, 28% had weight <3rd centile and 70% had weight between 3rd-97thcentile and 1.4% had weight over 97thcentile. On the other hand, 93.3% children without constipation had weight between 3rd-97thcentile.Weight for age < 3rd centile was found higher in children with FC group and p value was significant (p<.05).

Table 4.2: Height for age on centile chart of growth, one group with FC and another without constipation (N=150)

Height for age centile	With FC n=75 n (%)	Without FC n=75 n (%)	p value
<3rd centile	18(24)	0	<0.001
3rd-97thcentile	53(73.3)	71 (94.66)	
97th centile	2 (2.6)	4 (5.34)	

p value was determined by chi-square test

In Table 4.2 24% children with FC had height <3rd centile and 73.3% children had height between 3rd-97th centile. In healthy children group, 94.4% children had normal height between 3rd-97th. Height for age < 3rd centile was statistically significant in children with FC group (p<.05).

Table 4.3: BMI for age with FC group and without constipation (N=150)

BMI for age	With FC n=75 n (%)	Without FC n=75 n (%)	p value
<5th centile	14(18.6.)	0	<0.001
5th-85th centile	56(74.6)	55(73.3)	
85th- 95th centile	04 (5.3)	13(17.3)	
>95thcentile	01(1.3)	07(9.3)	

p value was determined by chi-square test. Results were expressed as percentage

Table 4.3 showing analysis of body mass index (BMI) of the studied population.18.6% children with FC had BMI <5th centile according to age and p value was statistically significant (p<.05)

Table 4.4: Mean of Anthropometric variables of children with functional constipation and without constipation (N=150)

Variables	With FC n=75	Without FC n=75	p value
Weight in kg (Mean± SD)	22.8±10.01	28.6± 13.72	<.05
Height in cm (Mean± SD)	117.7 ±18.4	124.49±23.3	<.05
BMI in kg/m2 (Mean± SD)	15.6±2.3	18.11±2.9	<.001

p value was determined by unpaired t test and p value <0.05 is considered significant. Results were expressed as mean.

Table 4.4 showing analysis of mean of anthropometric variables (weight, height and BMI) of studied population. Mean weight, mean height and BMI in children with FC group were less in comparison to healthy children group and p value were statistically significant.

Table 4.5: Symptom analysis of children with functional constipation and without constipation

Variables	Functional Constipation n=75 n (%)	Without FC n=75 n (%)	p value
Anorexia	48 (64.0)	6 (21.6)	<.001
Nausea	26 (34.6)	3(8)	<.001
Abdominal Pain	55 (73.3)	12(21.3)	<.001
Hard stool	63 (84)	4(5.6%)	<.001
Blood with hard stool	10 (13.3)	0(0.0)	<.05
Abdominal distension	15(20)	7 (1.2%)	.064
Fecal mass in LIF	04 (5.4)	0 (0%)	0.12

* p value was determined by Chi-square test, P-value <0.05 considered significant.

Results were expressed as percentage

Table 4.5 showing Children with functional constipation had higher frequency of anorexia, nausea, abdominal pain, hard stool, blood with hard stool than children without constipation and these parameters were statistically significant (P-value <0.05).

Discussion

Physical and psychological effect of constipation on children is an inevitable fact. Various evidence showed the susceptible effects of functional constipation on the development of children, especially in the early years of life.

Our study revealed children with FC had less weight and height than healthy children. Constipated children were found wasted and stunted in comparison to healthy children and p value was significant. BMI for age also found low in functional constipation group. Chao et al. demonstrated that chronic constipation may retard growth and a long-term medication for constipation appears beneficial to their growth status[9]. Yousefi A et al. observed mean weight and height were lower in children with constipation and difference of weight-for-age Z score (WAZ) and height-for-age Z score (HAZ) were statistically significant between constipated and healthy children[10].

In contrast, some research papers showed a high prevalence of obesity in children with functional constipation. In a study by Ilan et al. revealed most children with constipation were obese or overweight. Dehghani et al conducted a study on 100 Iranian children with functional constipation (younger than 18 years) and found higher obesity and higher BMI in constipated children [11]. But we had no such finding regarding overweight and obesity. Benzamin et al. observed children with functional constipation have impaired growth[12] (weight for age and BMI). They reported - poor intake of food due to anorexia, nausea and abdominal pain may play contributory role in growth retardation[12]. Pawlowska et al. demonstrated children with FC were slightly shorter for age and sex compared with the reference population. They observed high prevalence of short stature (almost 11%) with FC[13].This study result of growth impairment are consistent with our study outcome.

Conclusion

In this study we found nearly one third children with functional constipation had weight, height and body mass index below 3rdcentile. Our remark - growth impairment occurs in children with functional constipation in comparison to children without constipation. So early diagnosis and treatment of functional constipation will be beneficial in achieving adequate growth.

Limitations of The Study

Times and resources were limited. Sample size was also small and this study was carried out in a specific center of Dhaka city which is not the true representation of all Bangladeshi children who have functional constipation.

Recommendation

Larger sample size and multicenter study.

Conflict of Interest

The authors declare no conflict of interest.

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References

1. Tabbers, M.M., Dilorenzo, C., Berger, M.Y., Faure, C., Langendam, M.W., Nurko, S., et al., 2014. Evaluation and treatment of functional constipation in infants and children: Evidence-based recommendations from ESPGHAN and NASPGHAN. Journal of Pediatric Gastroenterology and Nutrition, 58(2),pp. 258–274.

2. Liem, O., Harman, J., Benninga, M., Kelleher, K., Mousa, H. & Di Lorenzo, C., 2009. Health Utilization and Cost Impact of Childhood Constipation in the United States. The Journal of Pediatrics, 154(2), pp.258–262.

3. Brandt LJ, Prather CM, Quigley EM, Schiller LR, Schoenfeld P, Talley NJ, 2005. Systematic review on the management of chronic constipation in North America. The American Journal of Gastroenterology, vol.100, pp.5-21.

4. North American Society for Pediatric Gastroenterology Hepatology and Nutrition, 2006. Evaluation and Treatment of Constipation in Children: Summary of Updated Recommendations of the North American Society for Pediatric Gastroenterology, Hepatology and Nutrition. Journal of Pediatric Gastroenterology and Nutrition, 2006;43(3):pp.405-7.

5. Loening-Baucke, V., 1993. Chronic constipation in children. Gastroenterology, 105(5), pp.1557–1564.

6. Khanna V., Poddar U., Y.S., 2010. Etiology and spectrum of constipation in Indian children. Indian Pediatr, 1(47), pp.1025–30.

7. Tabbers, M.M., Boluyt, N., Berger, M.Y. & Benninga, M.A., 2011. Clinical practice: Diagnosis and treatment of functional constipation. European Journal of Pediatrics, 170(8),pp. 955–963.

8. Felt, B., Wise, C.G., Olson, A., Kochhar, P., Marcus, S. & Coran, A., 1999. Guideline for the management of pediatric idiopathic constipation and soiling. Archives of Pediatrics and Adolescent Medicine, 153(4), pp.380–385.

9. Chao HC, Chen SY, Chen CC, Chang KW, Kong MS, L.M., 2008. The impact of constipation on growth in children. Pediatr Res., 64(3), pp.308–11.

10. Yousefi, A., Mohamadian, S., Sharifabadi, P.M., Nakhaei, S. & Norouzi, E., 2019. How does functional constipation affect growth status in children? Iranian Journal of Pediatrics, 29(2),e85700.

11. Dehghani SM, Moravej H, Rajaei E, J.H., 2015. Evaluation of familial aggregation, vegetable consumption, legumes consumption, and physical activity on functional constipation in families of children with functional constipation versus children without constipation. Prz Gastroenterol, (10), pp.89–93.

12. Benzamin, M., Karim, A.B., Rukunuzzaman, M., Mazumder, M.W., Rana, M., Alam, R., et al., 2022. Functional constipation in Bangladeshi school aged children: A hidden misty at community. World Journal of Clinical Pediatrics, 11(2), pp.160–172.

13. Pawłowska, K., Umławska, W. & Iwańczak, B., 2018. A Link between Nutritional and Growth States in Pediatric Patients with Functional Gastrointestinal Disorders. The Journal of Pediatrics, 199, pp.171–177.

Case Report

Lumbar Spinal Meningioma- A common tumor in an uncommon location: A case report

Saha S[1], Sarker SH[2], Sarkar S[3], Rashid MH[4], Sarkar S[5]

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ABSTRACT:

Meningioma in the spinal canal commonly appears as intradural extramedullary spinal tumors at the dorsal and cervical region but is rare in the lumbar area. A 36-year-old man presented to us with complaints of left sciatica, weakness, and difficulty in movements of his left toes for a couple of months. Magnetic Resonance Imaging revealed an enhancing oval-shaped lesion at the level of L4, and histopathology revealed a meningioma. The complete removal has been done with hemilaminectomy for this common tumor in an uncommon location.

Key Words:
Meningioma, Spinal tumors, Hemilaminectomy.

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1. Dr. Shuvro Saha, MBBS, Indoor Medical Officer, Department of Neurosurgery, Dhaka Medical College Hospital, Dhaka
2. Dr. Md. Shahadat Hossain Sarker, MBBS, Medical Officer, Upazilla Health Complex, Debidwar, Cumilla
3. Saumik Sarkar, MBBS Student, Sylhet MAG Osmani Medical College, Sylhet
4. Dr. Md. Harun-Ur-Rashid, Associate Professor, Department of Anaesthesia and Intensive Care, Mymensingh Medical College, Mymensingh
5. Professor Saumitra Sarkar, Professor & Head, Department of Neurosurgery, Shaheed Suhrawardy Medical College, Dhaka

Correspondence: Dr. Shuvro Saha, Indoor Medical Officer, Department of Neurosurgery, Dhaka Medical College Hospital, Dhaka
Email: shuvro.neurosurgery@gmail.com

Introduction

The meninges originate from meninx, a Greek term meaning membrane, which Erasistratus first introduced in the third century.[1] Meninges is known as the covering of the central nervous system, which consists of the brain and the spinal cord. The outer meningeal covering of the brain and spinal cord is dura mater, a Latin word that means 'tough mother.'[1] Spinal meningioma is the second most common intradural extramedullary tumor after schwannoma, and it originates from the meningothelial arachnoid membranes within the dura mater.[2] This lesion has a more muscular female sex predisposition in adults than intracranial meningiomas.[3] Spinal meningiomas are slow-growing benign intradural tumors exclusively rare in the lumbar areas but primarily observed in the thoracic and cervical regions at an incidence rate of 2-14%.[4] We present a case of lumbar spinal meningioma in a male with unprecedented surgical management.

Case presentation

A 36-year-old man presented to us with gradually progressive left-sided sciatica and difficulty in moving his left toes over several months. Upon examination of

the lower limbs, the patient exhibited left-sided distal muscle wasting. The straight leg raise test on the left side was positive at 50 degrees. Muscle strength in the left extensor hallucis longus (EHL) and ankle plantar flexion was graded 3/5 on the MRC scale. Additionally, knee and ankle reflexes were diminished on the left side, and there was reduced sensation in the L4 to S1 dermatomes on the left lower limb. Magnetic Resonance Imaging (MRI) revealed a well-defined, oval-shaped, regular margined, enhancing lesion attached to the anterior lateral surface of the dura at the level of L4 vertebrae (Figure 1,2). Left-sided L4 hemilaminectomy under general anesthesia (GA) was planned. The patient was in the prone position with adequate padding. A 5 cm posterior midline incision was made. Following a left-sided subperiosteal dissection (Figure 3), a left-sided L4 laminectomy was performed without injuring the facet joint (Figure 4). Left-sided 2 cm durotomy was done with an 11-blade after tilting the operative table on the right side. With meticulous dissection, the total tumor had been removed. Watertight dural closure was done with 5-0 R/B prolene. Layered closure was done. The patient was discharged on the 3rd POD as the post-operative period was uneventful with the histopathology of Meningothelial Meningioma, NOS, WHO grade I (Figure 5). The patient walked into us independently on his one-month follow-up visit (Figure 6).

Discussion

Spinal meningioma is a slow-growing, benign tumor primarily affecting the dorsal spine and the cervical spine in an intradural extramedullary lesion. Cushing and Eisenhardt's 1938 surgical removal of a spinal meningioma was a groundbreaking achievement in neurosurgery. [3] However, the lumbar spinal meningioma in male patients is an infrequent presentation. [4] Various techniques exist for the removal of lumbar intradural extramedullary tumors, with less invasive methods such as hemilaminectomy gaining popularity due to their preservation of spinal biomechanics and early return to work. Less operative time with minimal blood loss has made these techniques more lucrative. However, the selection of surgical approach depends upon the size, location, radiological type of the lesion, and some patient factors. [6] Turel MK et al. (2015) recommended hemilaminectomy as a quick, safe, minimally invasive procedure with minimal morbidity and no mortality for the removal of intradural extramedullary tumors. Liao D et al. (2023) suggested hemilaminectomy as a rapid and safe procedure to remove intradural and extradural tumors. In summary, hemilaminectomy at most weight-bearing zones, lumbar vertebrae, is an excellent technique to remove intradural tumors like meningioma successfully. Well-preserved spinal biomechanics is ensured, along with minimal tissue damage, which encourages early functional recovery. However, well-equipped instruments and skilled surgical expertise are mandatory.

Conclusion

Meningioma is expected in the dorsal and cervical spine but rare in the lumbar spine. In this case, single-side subperiosteal dissection and one-level hemilaminectomy for tumor removal resulted in an excellent functional recovery. Lumbar spinal meningioma is an uncommon condition, but the single-level hemilaminectomy for tumor removal has made it unique.

Reference

1. Adeeb N, Mortazavi MM, Tubbs RS, Cohen-Gadol AA. The cranial dura mater: a review of its history, embryology, and anatomy. Child's Nervous System. 2012 Jun;28:827-37.

2. Osborn AG. Diagnostic neuroradiology. Mosby Inc. (1994) ISBN:0801674867. Read it at Google Books - Find it at Amazon

3. Koeller KK, Shih RY. Intradural Extramedullary Spinal Neoplasms: Radiologic-Pathologic Correlation. (2019) Radiographics: a review publication of the Radiological Society of North America, Inc. 39 (2): 468-490. doi:10.1148/rg.2019180200 - Pubmed

4. Gottfried ON, Gluf W, Quinones-Hinojosa A, Kan P, Schmidt MH.. Spinal meningiomas: surgical management and outcome. Neurosurg Focus. 2003;14:1e2–1e7. http://www.ncbi.nlm.nih.gov/pubmed/15669787.Accessed April 5, 2019. [PubMed] [Google Scholar]

5. Hohenberger C, Hau P, Schebesch KM, Kölbl O, Riemenschneider MJ, Pohl F, Proescholdt M, Schmidt NO. Spinal meningiomas. Neuro-oncology advances. 2023 May 1;5(Supplement_1):i112-21.

6. Goodarzi A, Clouse J, Capizzano T, Kim KD, Panchal R. The optimal surgical approach to intradural spinal tumors: laminectomy or hemilaminectomy?. Cureus. 2020 Feb;12(2).

Conflicts of interest

There were no conflicts of interest, according to the authors, during the planning and writing of this paper.

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Figure 1 Preoperative sagittal MRI of the Lumbosacral spine (T1WI, T2WI)

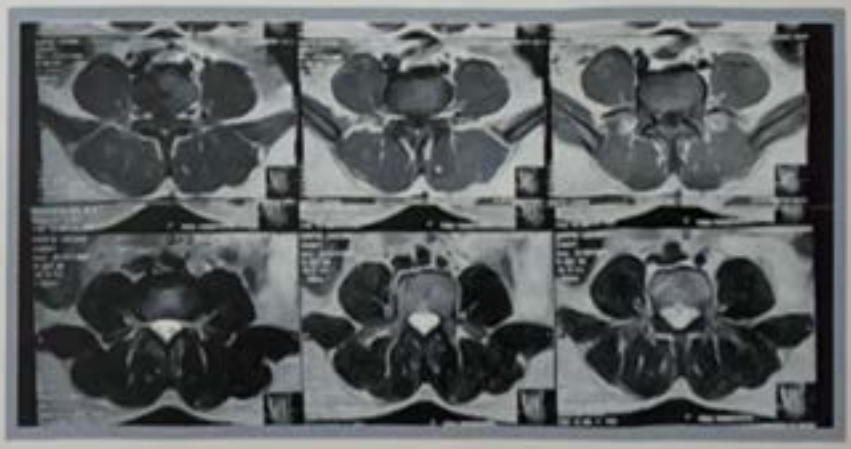

Figure 2 Preoperative axial MRI of the Lumbosacral spine (T1WI, T2WI)

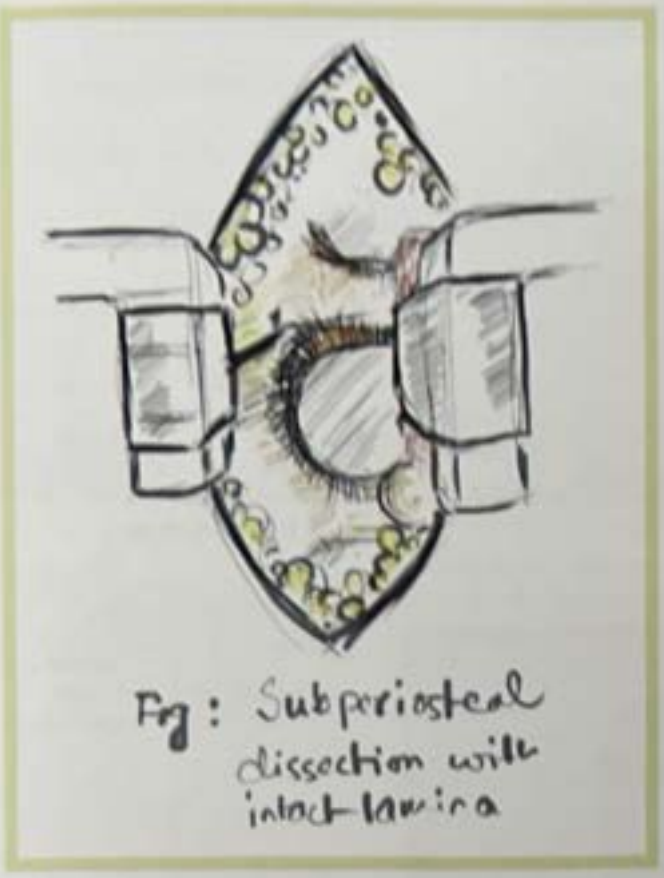

Figure 3 Per operative drawing of subperiosteal dissection

Figure 4 Per operative drawing of hemilaminectomy

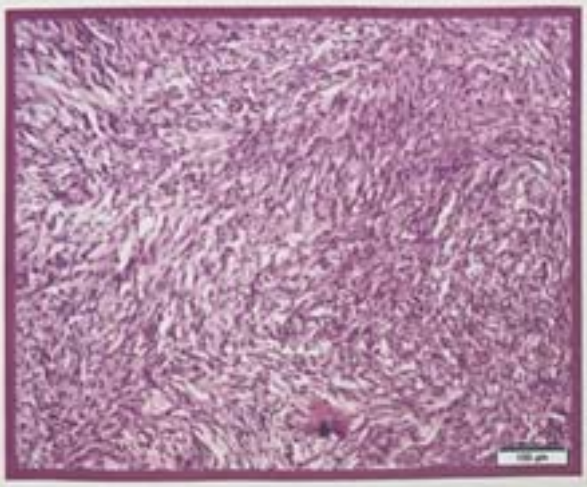

Figure 5a Histopathology

Figure 5b Histopathology

Figure 6 Postoperative follow up

Case Report

A Symptomatic Calcified Chronic Subdural Hematoma in an Elderly Patient: A Case Report

Dasgupta A[1], Saha S[2], Arifin MS[3], Halder R[4], Roy M[5], Dey A[6]

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ABSTRACT:

Calcified chronic subdural hematomas are rare forms of chronic subdural hematoma, accounting for 0.3-2.7%. Surgery is adequate for most chronic subdural hematomas, but its effectiveness is uncertain for calcified chronic subdural hematomas.

In this case report, we illustrate a case of a 70-year-old male presenting with a motor function deficit in his left limbs over two months and neurological deterioration. A substantial calcified subdural collection was seen on computed tomography in the right parietal hemisphere. This was surgically removed with success and completeness.

A chronic subdural hematoma has minimal possibility of becoming calcified. Because of the patient's condition's severity, surgery was the only remaining choice.

Key Words:
Calcified chronic subdural hematomas, armoured brain, Matrioska head

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1. Dr. Anindya Dasgupta, Indoor Medical Officer, Department of Neurosurgery, National Institute of Neurosciences & Hospital, Dhaka
2. Dr. Shuvro Saha, Indoor Medical Officer, Department of Neurosurgery, Dhaka Medical College Hospital, Dhaka,
3. Dr. Md. Samsul Arifin, Indoor Medical Officer, Department of Neurosurgery, National Institute of Neurosciences & Hospital, Dhaka
4. Dr. Rathin Halder, Indoor Medical Officer, Department of Neurosurgery, Dhaka Medical College Hospital, Dhaka,
5. Dr. Madhuree Roy, Assistant Surgeon, Thana Health Complex, Tejgaon, Dhaka
6. Dr. Ankhi Dey, Lecturer, Department of Anatomy, Sir Salimullah Medical College, Dhaka

Correspondence: Dr. Anindya Dasgupta, Indoor Medical Officer, Department of Neurosurgery, National Institute of Neurosciences & Hospital, Dhaka. Email: anindya.ns.12317@gmail.com, Mobile: +8801714370995

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Introduction

Chronic subdural hematoma is a common phenomenon in elderly patients, but calcified chronic subdural hematoma is an infrequent diagnosis, accounting for about 0.3-2.7%. [1,2] Calcified chronic subdural hematoma was first documented in 1884 (3,4,5); since then, about 100 cases have been reported. [2,6]

Surgical treatment for chronic subdural hematomas is familiar, but there is cynicism about the management of calcified chronic subdural hematomas.[1,2,3] The ideal surgical approach for this specific type of lesion, commonly known as "armored brain or Matrioska head" [7], has not yet been determined due to the brain's limited ability to expand after surgery. [6] The thick calcified inner membrane often sticks to the cortical surface of the brain tissue, making dissection challenging and potentially leading to brain discolouration, bleeding, or the onset of new neurological issues. [7]

Multiple authors state that surgery does not lead to improvement in long-standing symptoms. Consequently,

they advise not ruling out surgery for patients who are newborns or very young but advised surgery for those who have an intracerebral hematoma, elevated intracranial pressure, or progressive neurological impairments. [3,7]

Case report

We report a case of a 70-year-old male, exhibiting declining motor function in his left lower extremities for the last two months, referred from a primary care hospital. This patient had a history of anterior cervical fusion and fixation with titanium screws and anterior plate, along with a right-sided burr hole craniotomy about three months ago due to trauma [Figure 1]. The patient presented in our emergency room, in Glasgow coma score (GCS) E3V4M5, left hemiparesis with motor strength grade 3. The computed tomography (CT) scans documented an extensive subdural collection of the right parietal region with a calcified inner membrane [Figure 2]. Right parietal craniotomy was performed under LA with deep sedation [Figure 3], exposing an "armored dura" with the mold of the underlying hematoma. An arcuate fashion was maintained during the dural opening, exposing the calcified capsule of the chronic subdural hematoma, which has a gummy appearance concerning the inner surface of the dura. A scrupulous dissection made the path for incising the capsule, exposing various stages of subacute hematoma. After removing these partly calcified grayed mud-like components, the thick inner membrane covering the parenchymal surface became visible. Luckily, the arachnoid membrane could be removed entirely without harming the brain beneath since it was unbroken and had not attached itself to the hematoma.

The postoperative period was uneventful, with 15 GCS. At his 2-month follow-up, he could stand with the support of a clutch, only with slight mono paresis of the left lower limb (grade 4 of 5) [Figure 4]. His postoperative CT scan showed clearance of subdural collection and gradual brain re-expansion. [Figure 5].

Discussion

A subdural hematoma is a medical condition where blood accumulates between the dura mater and the arachnoid layer of the brain when there is a tear in the bridging veins near the sagittal sinus. [8] The condition is often caused by trivial trauma, which can be insignificant that the patient may not remember [9].

Calcified chronic subdural hematoma (CCSDH) is a type of subdural hematoma characterised by the formation of calcium over more than six months, which von Rokitansky first reported during an autopsy. It is common in children and young adults but also elderly patients. Calcification in calcified chronic subdural hematoma can result from "regressive" changes, such as poor absorption in the subdural space, calcium deposition, and hyalinisation of connective tissue rather than an "active" process. Still, this process's exact mechanism remains undefined [10]. The formation of these lesions appears to be influenced by coagulopathy and alcoholism, and neurological illnesses, such as dementia in older people, should be taken into account when making a differential diagnosis of hematoma.

There are different utterances regarding the treatment for calcified chronic subdural hematoma. Observation is recommended for asymptomatic ones, along with those without acute or progressive neurological disorders in the elderly. [1,4] Furthermore, due to the increased risk of bleeding as demonstrated by the vascular proliferation in the capsule of calcified chronic subdural hematoma, patients with intracerebral hematomas or acute or progressive neurological disorders should also be considered for surgery to prevent further brain damage.

After surgery, patients' neurological conditions can improve because removing the calcified chronic subdural hematoma decreases the mass effect of cerebral irritation and enhances cerebral blood flow. [2]

As per previous publications, we confirm that our patient's postoperative neurological recovery confirms the effectiveness of surgical treatment for symptomatic calcified chronic subdural hematoma, especially for those with clinical deterioration. Based on the analysis of the reports available in the literature, we believe that a thicker inner layer compressing the brain may make fluid drainage insufficient to alleviate symptoms and facilitate brain re-expansion. Prolonged compression in recurrent bleeding is considered to be the primary factor that discourages brain expansion. Insufficient information exists in the literature regarding the recurrence rate of calcified subdural haemorrhages, as they are rare.

Conclusion

The successful and careful piecemeal removal of the calcified portion with a craniotomy is the key to better

surgical outcomes. Based on our expertise, we advocate for surgical intervention in symptomatic patients with chronic calcified subdural hematoma whenever feasible, as it often results in neurological enhancement. Nevertheless, it's crucial to exercise caution during the procedure to prevent the accidental formation of a new subdural hematoma, which could arise from damage to the bridging veins.

Figure 1 Fusion and fixation

Figure 2 Preoperative CT scan of brain

Figure 3.1 Per operative image

Figure 3.2 Per operative image

Figure 3.3 Per operative image

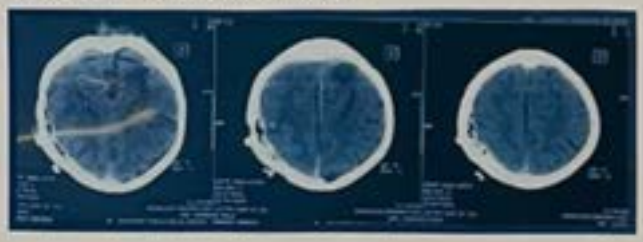

Figure 4.1 Postoperative CT scan

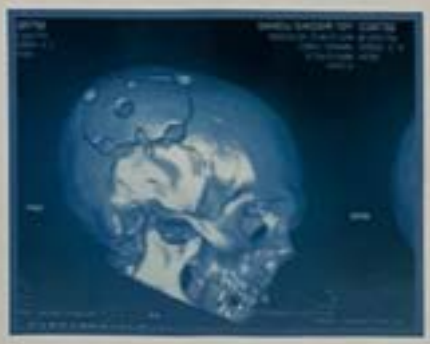

Figure 4.2 Postoperative CT scan 3D reconstruction view

Figure 5 Follow-up image

References

1. Pruna V, Bucur N, Neacsu A, Voina A, Andrei G, Sandu A, et al. Calcified chronic subdural haematoma – A case report. Roman Neurosurg 2010;15:225.
2. Yang HZ, Tseng SH, Chen Y, Lin SM, Chen CJ. Calcified chronic subdural haematoma – A case report. Tzu Chi Med J 2004;16:2615
3. Kaplan M, Akgun B, Seçer HI. Ossified Chronic Subdural Haematoma with Armored Brain. Turk Neurosurg 2008;4:4204.
4. Park JS, Son EI, Kim DW, Kim SP. Calcified Chronic Subdural HaematomaAssociated with intracerebral haematoma. J Korean Neurosurg 2003;34:1778.
5. Yan HJ, Lin KE, Lee ST, Tzaan EC. Calcified chronic subdural haematoma: Case report. Changgeng Yi Xue Za Xhi 1998;21:5215.
6. Niwa J, Nakamura T, Fujishige M, Hashi K. Removal of a large asymptomatic calcified chronic subdural haematoma. Surg Neurol 1988;30:1359.
7. Oda S, Shimoda M, Hoshikawa K, Shiramizu H, Matsumae M. Organized Chronic Subdural Haematoma with a thick calcified inner membrane successfully treated by surgery: A case report. Tokai J Exp Clin Med 2010;3:858.
8. Turgut M, Akhaddar A, Turgut AT. Calcified or ossified chronic subdural hematoma: a systematic review of 114 cases reported during last century with a demonstrative case report. World Neurosurg. 2020;1(134):240–63.
9. Snopko P, Kolarovszki B, Opsenak R, Hanko M, Benco M. Chronic calcified subdural hematoma—case report of a rare diagnosis. Biomed Pap. 2020;164(2):209–12
10. Turgut M, Samancoğlu H, Özsunar Y, Erkuş M. Ossified chronic subdural hematoma. Cent Eur Neurosurg-Zentralblatt Für Neurochir. 2010;71(03):146–8

Conflicts of interest

There were no conflicts of interest, according to the authors, during the planning and writing of this paper.

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Case Report

Conservative Management of mild symptomatic descending thoracic aneurysm – A case report with 1 year follow-up

Rabbani GM[1], Khan MMR[2]

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Key Words:
Thoracic aortic aneurysm, asymptomatic, Thoracic endovascular aortic repair

ABSTRACT:

Background: *The thoracic aorta is made up of the ascending, descending, aortic arch, and aortic root. An aneurysm forms when the artery's usual diameter increases by fifty percent. Thoracic aneurysms affect 10 of every 100,000 elderly adults and are less common than their abdominal counterparts. Patients with thoracic aortic aneurysms (TAAs) rarely experience symptoms, and 95% of TAA patients are asymptomatic.*

Case history: *A 47-year-old male patient who had a medical history of hypertension, dyslipidemia, and smoking. During the first visit, the patient presented with two months of dull back pain. The patient's blood pressure was 180/110 mm of Hg. Our initial assessment involved taking an X-ray and an echocardiography of the patient's chest. The data from his echocardiography and chest reveals that he has a thoracic aneurysm. After a confirmatory CT scan, the diagnosis of thoracic aortic aneurysm was made.*

Conclusion: *In our case report, conservative method was successful in the management of a mild symptomatic descending thoracic aorta aneurysm. However, the size, growth pace, and underlying cause of an aortic aneurysm might all affect whether doctors recommend surgery to repair it. If an aneurysm ruptures or dissects, immediate surgery may be required.*

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1. Dr. Golam Mahfuz Rabbani, Assistant Professor, Department of Cardiology, Jashore Medical College Hospital, Jashore.
2. Dr. Md. Moshfequre Rahman Khan, Associate Professor, Department of Cardiology, Shaheed Suhrawardy Medical College, Dhaka

Correspondence: Dr. Golam Mahfuz Rabbani, Assistant Professor, Departmental of Cardiology, Jashore Medical College, Jashore
Email : mahfuz123098@gmail.com

Introduction

The thoracic aorta is made up of the ascending, descending, aortic arch, and aortic root.[1] An aneurysm forms when the artery's usual diameter increases by fifty percent.[2] Widening that is more than 10 cm in diameter is regarded as giant TAA. [3] Thoracic aneurysms affect 10 of every 100,000 elderly adults and are less common than their abdominal counterparts. [4,5]

It occurs due to the intrinsic fragility of the aortic wall. Patients with thoracic aortic aneurysms (TAAs) rarely experience symptoms, and 95% of TAA patients are asymptomatic.[6,7]The reason these aneurysms are referred to as "silent killers" is that they can result in severe consequences like aortic dissection or rupture.[8] Twenty-two percent of patients who have an aneurysm complication die before reaching the hospital.[9] Most thoracic aortic aneurysms affect the ascending or root aorta, which is followed by the descending and occasionally the arch aorta.[1]

There are multiple possible etiologies for thoracic aortic aneurysms (TAA). Patients who develop symptoms or experience aneurysm-related problems (such as acute

aortic regurgitation, dissection, or aortic rupture) should have their TAA repaired, even though the majority of these patients do not show any symptoms.[10] Reducing aortic stress and preventing additional aortic enlargement are the goals of conservative therapy of asymptomatic TAA. [10] Patients with no symptoms who don't fit the repair criteria also need to have their aneurysms monitored continuously. Endovascular repair has been increasingly utilized as a first-line treatment. [11] The endovascular technique has several advantages such as avoiding the need for an incision during a thoracotomy or sternotomy, preventing aortic cross-clamping, reducing blood loss, and lessening end-organ ischemia. [12]

In this study, we are reporting a case of a mild symptomatic descending thoracic aneurysm.

Case History

A 47-year-old male patient who had a medical history of hypertension, dyslipidemia, and descending thoracic aortic aneurysm arrived. He had never smoked. During the first visit, the patient presented with two months of back and chest pain complaints. The patient's blood pressure increased to 180/110. Our initial assessment involved taking an X-ray and an echocardiography of the patient's chest. [Fig.1] The data from his echocardiography and chest reveals that he has a thoracic aneurysm. After a confirmatory CT scan, the diagnosis of thoracic aortic aneurysm was made.

In the CT aortogram report, there was evidence of a left-sided aortic arch with the aorta emerging from the left ventricle. Aneurysmal dilatation of the descending thoracic aorta was seen with a length of the aneurysm which was about 23 cm with fusiform dilatation and eccentric circumferential thrombus inside (maximum diameter 9.2 x 8.5 cm, contrast filed lumen measures about (6.8 x 6.2) cm. [Fig.2]

Other than back and chest pain, the patient did not exhibit any mass-effect symptoms such as dyspnea or cough. He got a full cardiac evaluation at that time, showing no abnormalities in heart function and 0.9 mg/dl of blood creatinine. Consequently, we advised the patient to undergo the surgical procedure. However, the patient chose TAA's conservative management because of his unstable financial situation. Based on our assessment, we decided to start the patient on conservative treatment and monitor him for a year.

At a follow-up after four months, the CT angiography showed no problems. The patient was doing well and we got no complaints from the patient regarding his health at the 12-month follow-up.

Figure 1: A) Chest x-ray, B) Echocardiography of the patient

Figure 2: A) & B) CT angiogram of the patient

Discussion

Thoracic aortic aneurysms are thought to be underreported in frequency since they often show no symptoms. Six to ten cases are estimated to occur for every 100,000 patient-years.[13] Patients with TAA greater than 6.0 cm had an estimated 15.6% likelihood of rupture, dissection, or mortality from all causes before surgical surgery. The same study found that only 54% of patients with large TAAs survived for five years without surgery. [14]

The pathophysiology of TAA development includes focal

degeneration of the elastic and muscle tissue within the tunica media of the aorta wall, which is caused by the process of cystic medial necrosis. As a consequence of the high pressure of intraluminal blood flow, the aortic wall weakens and dilates.[15] This definition distinguishes between an aneurysm and a fake aneurysm, the latter being a perivascular pulsatile hematoma resulting from a vessel injury that is frequently observed during endovascular operations. The presence of two or more of the following characteristics—sepsis, positive blood culture, positive culture from the aneurysmal wall, or a distinctive radiological appearance—defines the mycotic counterpart, a third form of aneurysm.[16] Another kind of aneurysm develops after an acute episode of aortic dissection.

Since hypertension is a contributing factor in 50–60% of deaths from TAAs (aortic dissection and rupture), the patient in this case was diagnosed with the illness before receiving treatment. 15% of patients with aneurysms greater than 10 cm survive for five years.[17] A triple abnormality may be manifested by diastolic murmurs and, less frequently, congestive heart failure signs and symptoms. However, massive TAAs can also result in a local mass effect, such as compression of the trachea or mainstem bronchus, which can induce dyspnea, coughing, fatigue, wheezing, chest pain, or recurrent pneumonitis. [15,17,18] Another common symptom of an aortic rupture is sudden, severe pain in the neck, back, chest, and/or abdomen. [15]

Primary or secondary aortoesophageal fistulae (AEsFs) are categorized as complications in large thoracic aortic aneurysms (TAAs). It is well recognized that the majority of TAA patients have no symptoms, and the diagnosis is often obtained by accident when doing imaging examinations for other purposes.[15,17,18] As the gold standard for diagnosis, contrast-enhanced CT scans and MR angiography are the recommended imaging techniques to evaluate aneurysms. [15,17,18]

Unless they exhibit symptoms or comorbidities, patients with aneurysms smaller than 6 cm are typically not candidates for surgery and may instead get medicinal treatment. For individuals with proven aneurysm growth of more than 1 cm annually, repair is also advised. Elective surgery can be performed at a size of 5.5 cm for ascending and 6.5 cm for descending aortic aneurysms. Comparing propranolol to non-blocker therapy, studies have demonstrated a noticeably slower rate of aortic dilatation, fewer aortic events, and decreased mortality. [15,17,18]

Conclusion and recommendations

In our case report, conservative method was successful in the management of a mild symptomatic descending thoracic aorta aneurysm. We found our patient was experiencing no problems at his last follow-up. However, the size, growth pace, and underlying cause of an aortic aneurysm might all affect whether doctors recommend surgery to repair it. If an aneurysm ruptures or dissects, immediate surgery may be required. Open surgical repair and thoracic endovascular aortic repair (TEVAR) are the most common types of surgery performed. Intervention may not be beneficial for survival in DTAA <55 mm. To defend surgery in the small aneurysm group, operative outcomes need to be remarkable. It is necessary to obtain additional data from case series and case-control studies to elucidate the late complications and re-intervention rate after a 5-year follow-up.

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Ethical approval: The study was approved by the Institutional Ethics Committee

References

1. Salameh MJ, Black JH, Ratchford EV. Thoracic aortic aneurysm. Vasc Med. 2018 Dec;23(6):573-578.
2. Faiza Z, Sharman T. Thoracic Aorta Aneurysm. In: StatPearls. Treasure Island (FL): StatPearls Publishing; 2024 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK554567/
3. T. Okura, Giant Unruptured Aneurysm of the Thoracic Aorta, Angiology 50 (10) (1999) 865–869.
4. M.S. Makaroun, E.D. Dillavou, S.T. Kee, G. Sicard, J. Bavaria, D. Williams, R.P. Cambria, R. Scott, From the Society for Vascular Surgery Endovascular Treatment of Thoracic Aortic Aneurysms: Results of the Phase II Multicenter Trial of the GORE TAG Thoracic Endoprosthesis, 2001, pp. 1–9, http://dx.doi. org/10.1016/j.jvs.2004.10.046.
5. W.D. Clouse, J.W. Hallett Jr., H.V. Schaff, M.M. Gayari, D.M. Ilstrup, L.J. Melton III, Improved prognosis of thoracic aortic aneurysms, JAMA 280 (1998) 1926, http://dx.doi.org/10.1001/jama.280.22.1926.
6. Elefteriades JA, Habel N, Sun W, Sang AX, Kuzmik GA. The aortic wall: four questions and insights. J Thorac Cardiovasc Surg. 2013 Mar;145(3 Suppl):S130-4. [PubMed]
7. Ziganshin BA, Elefteriades JA. Treatment of Thoracic Aortic Aneurysm: Role of Earlier Intervention. Semin Thorac Cardiovasc Surg. 2015 Summer;27(2):135-43. [PubMed]

8. Saeyeldin AA, Velasquez CA, Mahmood SUB, Brownstein AJ, Zafar MA, Ziganshin BA, Elefteriades JA. Thoracic aortic aneurysm: unlocking the "silent killer" secrets. Gen Thorac Cardiovasc Surg. 2019 Jan;67(1):1-11.

9. Cheung K, Boodhwani M, Chan KL, Beauchesne L, Dick A, Coutinho T. Thoracic Aortic Aneurysm Growth: Role of Sex and Aneurysm Etiology. J Am Heart Assoc. 2017 Feb 03;6(2)

10. UpToDate. Emerg Med News [Internet]. 2024 [cited 2024 Feb 28];46(2):20–20. Available from: https://www.uptodate.com/contents/management-of-thoracic-aortic-aneurysm-in-adults

11. Nodeau AE, Pomposelli FB, Hamdan AD, et al. Endovascular vs open repair for ruptured abdominal aortic aneurysm. J Vasc Surg. 2012;56(1):15-20.

12. Walsh SR, Tang TY, Sadat U, et al. Endovascular stenting versus open surgery for thoracic aortic disease: systematic review and meta-analysis of perioperative results. J Vasc Surg 2008;47(5): 1094–1098

13. Kuzmik GA, Sang AX, Elefteriades JA. Natural history of thoracic aortic aneurysms. J Vasc Surg. 2012;56(2):565-571.

14. Davies RR, Goldstein LJ, Coady MA, et al. Yearly rupture or dissection rates for thoracic aortic aneurysms: simple prediction based on size. Ann Thorac Surg. 2002;73(1):17-27; discussion 27-8.

15. E.M. Isselbacher, Contemporary Reviews in Cardiovascular Medicine Thoracic and Abdominal Aortic Aneurysms, 2005, pp. 816–828, http://dx.doi.org/10. 1161/01.CIR.0000154569.08857.7A

16. U. Jaffer, R. Gibbs, Mycotic thoracoabdominal aneurysms, Ann. Cardiothorac. Surg. 1 (2012) 417–425, http://dx.doi.org/10.3978/-j.issn.2225-319.2012.08. 17.

17. González-Urquijo M, Dominguez-Porras VA, Tellez-Martinez LG, Lozano-Balderas G, Flores-Villalba E, Fabiani MA. A case report of successful endovascular repair of a giant 15 cm diameter asymptomatic thoracic aortic aneurysm. International Journal of Surgery Case Reports. 2018 Jan 1;51:344-8.

18. L.K. Findeiss, M.E. Cody, Endovascular Repair of Thoracic Aortic Aneurysms, vol. 1, 2011, pp. 107–117