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Editorial

Orginal Articles

Case Report

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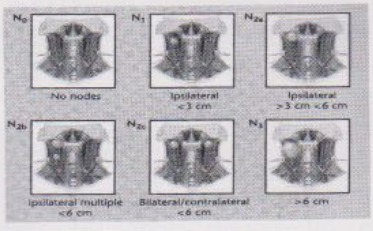
Neck Dissection : Past, Present & Future

Introduction

The single most important factor affecting prognosis for patients with squamous cell carcinoma of the upper aerodigestive tract is the stage of the disease at the time of initial diagnosis and treatment. Once dissemination to regional lymph nodes takes place, the probability of fiveyear survival, regardless of the treatment rendered, reduces to nearly one-half of that seen in early staged patient. Thus management of metastasis to the cervical lymph nodes is of paramount importance in treatment of patients with tumours of head and neck. Neck dissection in its various forms is the standard procedure for surgical treatment of clinical, subclinical and subpathological cervical lymph node metastasis. Opinions vary however, as to the indications for neck dissection and type of dissection for different situations. A clear knowledge about the surgical anatomy including fascial neck spaces, head-neck lymphatics and various lymph nodes, head-neck nerves is a must pre-requisite for attempting neck dissection. Especially a clear conception about the lymph node groups and their distribution in neck is a mandatory.

Previously lymph nodes in neck were named differently according to their anatomical location and structural relation. But later on, in order to establish a consistent and easily reproducible, user friendly method for description of regional cervical lymph nodes which establishes a common language between the clinician and the pathologists, the Head-Neck Service at Memorial Sloan-Kettering cancer center has described a leveling system of cervical lymph nodes. This system divides the lymph nodes in the lateral aspect of the neck into five nodal levels as I, II, III IV & V. In addition, lymph nodes in the central compartment of the neck are assigned levels VI and VII. The American joint committee on Cancer (AJCC) and the International Union Against Cancer (UICC) has agreed upon a uniform staging system for metastatic cervical lymph nodes. This nodal staging system is depicted below. (N-staging)



Source: Head & Neck surgery &Oncology ,3rdedition, Jatin P. Shah

The past

The surgeons of nineteenth century were aware that cancers of the head and neck metastasize to the cervical lymph nodes. They often regarded the finding of metastatic lymphadenopathy as an indication of incurability. In 1880, Kocher recommended that involved lymph nodes be removed with ample resection margins and introduced the so called 'Kocher' incision (a Y shaped incision) for this purpose. In 1888, Jawdynski, a polish surgeon, performed a surgical intervention similar to the technique described 17 yrs later by Crile which was called radical neck dissection. The paper published in a Polish Journal, remained virtually unknown abroad.

In 1905, George Washington Crile of Cleveland, Ohio, published a systematic approach to neck dissection in the Transaction of the southern surgical and Gynecological Association. The paper was based on the results of 121 operations performed upon 105 patients. This paper was accompanied by 12 very clear drawings. Crile's paper was followed by an interesting discussion, nine pages in length, that raised issues such as the use of less radical surgery for early cancers and for primary tumours at specific sites. The paper was based on the personal experience of the author, who had been performing this surgical procedure since 1900. The 'Crile operation' has remained one of the more frequently used eponyms in oncology.

In 1990, Towpik, a warsaw (Poland) physician, published in an international journal a note regarding the centennial of the first description of en bloc neck dissection, putting some facts and dates in a proper perspective. In particular, he pointed out that the first detailed description of en bloc neck dissection was reported in Polish by Jawdynski in 1888. Towpik concluded his note by quoting W Osler: 'in science the credit goes to the man who convinces the world, not to the man to whom the idea first occurs.' In 1906, Crile published a second paper on block neck dissection, this time in the Journal of the American Medical Association, reporting the results of 132 operations, accompanied by the same illustrations that had appeared in the previous publication. The paper was also followed by an interesting discussion. Crile raised radical neck dissection for head and neck cancer to a level equivalent to that of the Halsted procedure for the treatment of breast cancer. Since the time of Crile, much has been done to modify, standardize and establish indications for neck dissections for head and neck cancer. Several surgical schools have favoured a more conservative

operation. In 1926, Bartlett and Callander described neck dissections with preservation of the spinal accessory nerve, the internal jugular vein, the sternocleidomastoid muscle, the platysma muscle, the stylohyoid muscle and the digastric muscle. Conversely, in 1933, Blair and Brown advocated removal of the spinal accessory nerve during neck dissection because resection of the nerve allowed more total removal of the cervical lymph nodes and decreased operating time. By 1944, Sylvestre-Benis had established the place of radical neck dissection in the treatment of laryngeal cancer. The greatest impetus for the development of radical surgery for the treatment of head and neck cancer came from Martin et al., who compiled extensive experience in the treatment of head and neck cancer by both radiation and surgery, from the 1920s to the 1950s. In 1951, Martin and his colleagues published an analysis of 1450 cases of neck dissection. this classic paper was most influential in defining the technique and gaining acceptance for radical neck dissection. Martin et al. refined Crile's original operation and popularized it in the USA in its currently used format.

The technical precepts described by Martin et al. were followed with almost religious consistency by many US surgeons for many years. Conley, another strong proponent of radical neck dissection, stated that 'radical neck dissection is the key to control of metastatic cancer in the neck.' Although this surgical option was effective and considered the 'gold standard' it also cause significant aesthetic and functional morbidity. To prevent the significant long term morbidity of radical neck dissection, including shoulder dysfunction, cosmetic deformity, cutaneous paraesthesia, and chronic neck and shoulder pain syndrome, Suarez developed in 1952 a functional neck dissection. Although often forgotten in the English language literature, Suarez is truly the 'father' of functional neck dissection. Functional neck dissection preserves important structures, such as the sternocleidomastoid muscle, the internal jugular vein and the spinal accessory nerve. There has been a persistent lack of uniformity in classification of various neck dissections. The term functional neck dissection, has been abandoned and replaced by 'modified radical neck dissection.' The various types of modified radical neck dissection have in common the removal of lymph node groups 1 to V with preservation of at least one of the non-lymphatic structures sacrificed in radical neck dissection. During the 1960s, surgeons at the MD Anderson Hospital began to selectively remove only the lymph node groups of the neck that were at highest risk of containing metastases, based on the location of the primary tumour, g. supra-omohyoid neck dissection or a jugular neck dissection (anterior neck dissection).

Present perspective

In response to the increasing types of neck dissections performed in practice and to the variations in technique and, in particular, in terminology, the Committee for Head and Neck Surgery and Oncology of the American Academy of Otolaryngology-Head and Neck Surgery, chaired by Robbins, standardized neck dissection terminology in 1991. A subsequent update was published in 2002. The categories for classifying neck dissection thus established were: radical neck dissection, modified radical neck dissection, selective neck dissection and extended neck dissection. This recently updated classification thus represents a consensus among members of the two major organizations of American head and neck surgeons. The committee opted to divide some neck levels into sub-levels, separating level I into sub-levels IA (Submental lymph nodes) and IB (Submandibular lymph nodes), level II into sublevels IIA (subdigastric lymph nodes) and IIB (supraretrospinal or submuscular recess), and level V into sublevels VA (spinal accessory nodes) and VB (transverse cervical and supraclavicular nodes). For modified radical neck dissection, the structure(s) preserved should be specifically named (e.g.) modified radical neck dissection with preservation of the spinal accessory nerve. Selective neck dissections and the earlier described functional neck dissection have many similarities. Both are most often used electively or for selected patients with a clinically positive neck. There is also a role for selective neck dissection after chemoradiation for head and neck cancer.

Several authors have been looking at ways to perform superselective neck dissections. in light of the pattern of metastases of the cancers of the head and neck. These surgical procedures appear to be oncologically safe and to decrease the morbidity of surgery. Although the overall survival of patients with head and neck cancer has remained largely unchanged since the early 1970s, the morbidity from its treatment has lessened significantly. Surgery still plays the major role in treating cervical metastatic disease. Modifications in the type of neck dissection have been the main factors responsible for the reduction in morbidity from these procedures. Clearly the goal of treatment for cervical lymph node metastasis is regional control of disease. Micrometastasis and minimal gross metastasis may be controlled by radiotherapy alone. However surgery remains the mainstay of treatment of cervical lymph node metastasis since it provides comprehensive clearance of all grossly enlarged lymph nodes and offers accurate histological information on lymph nodes at risk of having micrometastasis in the clinically negative neck.

Instead of all this discussions, a lot of issues to be addressed for the treatment of metastatic neck and clinically negative neck in patients with head-neck cancer. The issues are Influence of primary tumour, factors on decision-making, diagnostic techniques for the neck, elective neck dissection versus observation, modified radical versus selective neck, elective neck dissection versus observation, modified radical versus selective neck dissection, unilateral versus bilateral treatment, timing of neck dissection, the clinically negative and uniformity among hospitals and among surgeons based on evidence.

Conclusion

Many carcinomas within the head or neck will sooner or later metastasize to lymph nodes and various factors control the natural history of this events. Once a neck node metastasis has occurred, further spread of the disease may not happen for many months or indeed years in conditions such as papillary carcinoma of the thyroid. Here lies the justification of excision of metastatic lymph nodes from neck by dissecting it in various forms as the condition demands. Patient treatment should be based on the integration of best research evidence alongside clinical expertise & patient values. In our country there is currently no uniformity regarding the management of patients with head & neck cancer. A nationwide, multicentre study may yield further evidence. This can be used to reach consensus on the diagnostic investigations & treatment of such patients.

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ORIGINAL ARTICLE

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Role of ultrasound in the diagnosis of acute appendicitis in pediatric population.

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Abstract

This study was conducted to evaluate the diagnostic role of ultrasound in clinically suspected cases of acute appendicitis in pediatric population at radiology & imaging department of Sylhet MAG Osmani medical college Hospital. A total of 80 children less than 16 years from January 2014 to October 2016 with clinically suspected appendicitis were included. Abdominal ultrasound with focus on RLQ and graded compression technique was done. Positive ultrasonography was defined as at least one of the criteria of Puylaert. Sonographic data was prospectively correlated with operative and histopathological findings. The study showed 94.6% sensitiviy, 72.7% specificity, 92.1% positive predictive value 80% negative predictive value 80%and 89.5% accuracy. Ultrasound has high sensitivity in acute appendicitis for the assessment of clinically suspected cases of pediatric population. It can be used as an initial screening modality especially in pediatric population, thus reducing additional cost and radiation risk and also reducing rate of negative surgery.

[OMTAJ 2017; 16 (1)]

Introduction

Acute appendicitis is one of the most common causes of acute abdominal pain in all age groups and is considered to be the most frequent condition leading to emergency abdominal surgery in children due to risk of rupture. An early diagnosis of the condition followed by appendisectomy, before complications like gangrene or perforation develops, is the main factor defining the success rate. Although appendicitis occurs rarely in young children, this group can be particularly challenging to diagnose due to atypical clinical presentation, delayed appearance of relevant signs and inability to clearly express their symptoms. In addition, the clinical assessment can be difficult because the child is often troubled and distressed. Different Imaging modalities like ultrasound (USG), computed tomography (CT) and magnetic resonance imaging (MRI) are useful in assisting the diagnosis of appendicitis especially in clinically suspicious cases.

The conclusions drawn from different past comparative studies show standardized CT scan to be the modality of choice for diagnosis of appendicitis in general population due to its higher accuracy than USG.

However the use of ionizing radiation and intravenous or gastrointestinal contrast material make it a relatively more invasive test which negates its use as an ideal choice in pediatric population. USG on the other hand is simple, easily available, noninvasive, convenient and cost effective. Moreover USG in pediatric population cannot only identify inflamed appendices but also gauge the severity of disease.[1] In recent years, ultrasonography has been widely performed during the examination of patients with clinically suspected acute appendicitis because of its safety and diagnostic accuracy.[2]

The aim of this study was to determine the role of ultrasound in children presenting with clinically suspected acute appendicitis. We have selected the Ultrasound as the diagnostic modality of choice because of its wide availability, simplicity, low cost, and noninvasiveness and its value as a standard choice for diagnosis of acute appendicitis in suspected pediatric cases.

Materials and Methods

A retrospective study was conducted at Radiology & Imaging Department of Sylhet MAG Osmani Medical College Hospital, Sylhet on patients referred with the clinical signs and symptoms suggestive of acute appendicitis. A total of 80 children less than 16 years from January 2014 to October 2016 with clinically suspected appendicitis were included. Ultraonography was performed using 3.5 MHz convex and 7.5 MHz linear transducer. The diagnosis was made on the basis

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of imaging studies which was done by senior radiologist having experience of pediatric-abdominal imaging. Sonographic data was prospectively correlated with operative and histopathological findings.

Abdominal Ultrasonography was done by graded compression technique as described by Puylaert. Puylaert introduced graded compression ultrasound in the diagnosis of acute appendicitis in 1986.[3] The result were judged positive if the examination meet at least one of the criteria of puylaert (1) non-compressible swollen appendix with a diameter greater than 6 mm and wall thickness greater than 3 mm, (2) lack of normal wall layer,(3) appendicolith, (4) increase and hyperechogenicity of periappendiceal fat, (5) appendicular abscess and (6) periappendiceal fluid collection.

A self-designed proforma was used to collect relevant data of the study subjects from the medical records. SPSS was used for calculating the results.The informed verbal consent was taken from the parents and their confidentially were maintained. The study protocol was reviewed by the Ethical Committee Board.

Observations and Results

A total of 80 clinically suspected cases of acute appendicitis were examined by sonography. There were 32 female (40%) and 48 male (60%). The mean age of the children was 11.24 ± 3.02 (range 3 to 16 years). USG was done to diagnose or exclude appendicitis in suspected patients. Ultrasound examination showed 38 cases (47.5%) positive for appendicitis and thus they were operated. Out of 38 sonographically positive cases, 03 cases found non appendicitis on histopathology. Sonographic findings of the 38 positive cases are shown in Table1. The remaining 42 cases (52.5%) were negative on USG. Out of these 42 cases, 10 patients with negative findings on imaging studies were later operated due to clinical decision. Among these operated 10 patients, 2 cases had histological findings of appendicitis and 8 cases were non appendicitis. Our study showed 94.6%, 72.7%, 92.1%, 80% and 89.5% sensitivity, specificity, positive predictive value, negative predictive values and accuracy respectively.

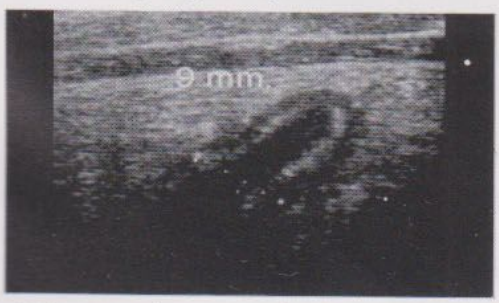

Figure 1: Sonographic image showing swollen appendix

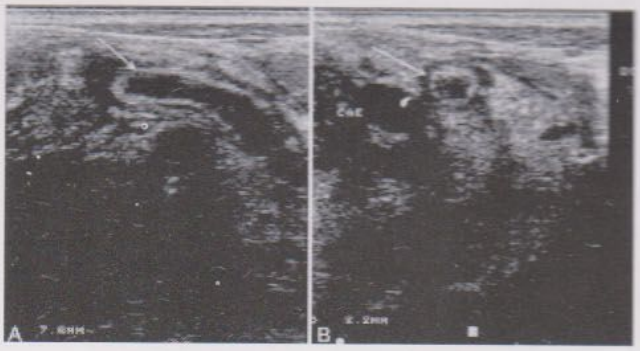

Figure II: Sonographic image showing swollen appendix with periappendicular collection.

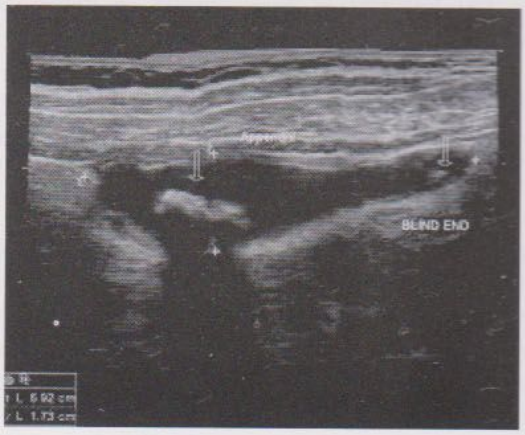

Figure III: Sonographic image showing appendicolith

Table I: Ultrasonographic findings of sonographic positive patients (n -38)

Findings	No of patients	percentage
Swollen appendix	24	63.1%
Free fluid	6	15.7%
Appendicolith	2	5.2%
Echogenic Periappendicular fat	2	5.2%
Periappendicular collection	4	10.5%

Table II: Diameter of appendix in cases of appendiceal swelling (n-24)

Diameter of appendix in mm	No of patients	Percentage
7	4	16.6%
7 - 8	12	50%
8 - 10	6	25%
>10	2	8.3%

Table III: Comparison of USG with histopathology in diagnosis of acute appendicitis

USG	Histopathology		Total
	Appendicitis	Non-appendicitis	
A ppendicitis	35 (94.5%) (true positive)	3 (27.3%) (false positive)	38
N on appedicitis	2 (5.5%) (false negative)	8 (72.7%) (true negative)	10
total	3 7(100%)	11(100%)	48

Table IV: Validity of Sonography in diagnosis of appendicitis

Sensitivity	Specificity	PPV	NPV	Accuracy
94.6%	72.7%	92.1%	80%	89. 5%

Discussion

Diagnosis of acute appendicitis is not always straight forward. Diagnosis is difficult in pediatric population because 33% to 50% present with atypical presentation so that even the most experienced surgeon may remove a normal appendix resulting in higher rate of negative laparotomies.[4] Surgery based on clinical decision alone, to avoid the complications of missed or delayed diagnosis in equivocal cases, leads to removal of 15-20% of normal appendices.[5] This necessitates the need for a standard diagnostic imaging technique that may facilitate to reduce the rates of negative and unnecessary surgeries. Ultrasound and CT scan are widely used imaging modalities for diagnosing appendicitis, however, their preference over one another as the initial modality of choice remains controversial despite many research studies.

Diagnosing appendicitis by ultrasonography was first described by Puylaert in 1986.[3] Its usefulness in the diagnosis of acute appendicitis is now established.[5] Ultrasonography had generally served as primary imaging modality in children suspected of having appendicitis because it is relatively quick to perform, doesn't involve the use of ionizing radiations and because the abdominal musculature of children in comparison to adults generally has less fat content amplifying its overall accuracy and sensitivity.[6,7]However no significant differences were noted in the specificity of ultrasonography between children and adults.[7]

The 2 largest (>5,000 total children) studies found ultrasonography to be 90-92% sensitive and 97-98% specific for appendicitis, other studies have noted sensitivities and specificities as low as 80% and 86%, respectively.[8] The sensitivity and specificity of ultrasonography in our research was about 94.6% and 72.7 respectively. These values are similar to higher values of sensitivity and lower value of specificity of ultrasonography reported by past studies. Also important finding to note here is that the sensitivity and specificity are of smaller range in pediatric population as compared to adults which is quite assuring for consideration of ultrasonography as the initial imaging modality of choice in diagnosing acute appendicitis in pediatric population.

Despite all those benefits associated with ultrasound, many factors have prevented it from becoming standard of care in the diagnostic work-up of appendicitis. These factors include operator dependency, lower accuracy than CT scan, availability, pain, obesity, overlying gas and perforation.[9] It could be speculated that the paucity of body fat in younger children may result in increased difficulty in the diagnosis of appendicitis compared with that in adults. Another important factor accounting for the variability in diagnostic accuracy with graded compression sonography is that many sonographic examinations are not performed by radiologists having dedicated expertise with the procedure.

Recent studies show that CT scan is frequently used in emergency evaluation of pediatric patients with abdominal pain.[10] However it is important to consider the facts here that CT scan involves exposure to ionizing radiations and use of intravenous or gastrointestinal contrast material make it a relatively more invasive test which is not suitable as initial choice.Ultrasound is available to rule out a significant majority of patients successfully. Thus it is better to consider less accurate but safer modality of ultrasound as the initial modality of choice for diagnosis of acute appendicitis in children while considering more accurate but risky modality of CT scan by balancing the future risk of cancer with the use of CT and the risk of missing positive cases with ultrasonography.

Conclusion

USG is accurate, safe and reliable method in the diagnosis of appendicitis in children and should remain the method of first choice because it does not involve the use of ionizing radiation. It helps to reduce cost of treatment, minimize negative appendisectomy and perforation rates.

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ORIGINAL ARTICLE

The Osmani Medical Teachers Association Journal Volume 16 Number 1

Evaluation of the value of color Doppler ultrasonography in the diagnosis of scrotal swellings

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Abstract

This study was performed to evaluate the value of color Doppler ultrasonography (CDUS) as a routine investigation method for diagnosis of scrotal pathologies. This prospective observational study was carried out for a period of 12 months from July 2014 to June 2015 on 78 patients in the age range of 12 to 80 years, who presented with scrotal swellings. After adequate history taking and examination, CDUS was performed. The clinical and sonological diagnosis is were compared with final outcome, which was based on course and outcome of the disease, fine needle aspiration cytology results, and operative findings. Color Doppler ultrasonography accurately diagnosed all cases of epididymitis or epididymo-orchitis, testicular torsion, varicocele, and hydrocele. Of 09 patients diagnosed as testicular malignancy on CDUS, only 7 were subsequently found to have malignancy. Two cases of orchitis were wrongly diagnosed as malignancy. Similarly, of 4 patients diagnosed as orchitis, 1 was found to have seminoma (sensitivity 87.5% and specificity 60%). Overall sensitivity of CDUS in diagnosing scrotal diseases was 98.6% while specificity was 66.6%. Color Doppler ultrasonography is an excellent, safe and reliable method for evaluating patients with scrotal diseases. It aids in diagnosis of testicular tumors and reduces the number of unnecessary exploratory operations. It is especially important in conditions like testicular torsion and epididymo-orchitis where immediate diagnosis is required.

[OMTAJ 2017; 16 (1)]

Introduction

Advent of high resolution ultrasonography and high sensitivity of color Doppler imaging of scrotum haswidened the diagnostic spectrum.[1] Two clinical condition that most commonly warrant an ultrasound examination with Doppler are evaluation of acute scrotal pain and a percevied scrotal mass. Differention of acute inflammatory process from testicular torsion is new domain color Doppler[2] Diagnosis of scrotal diseases has always been a challenge for the clinician due to non-specific signs and symptoms.[3]

The causes of scrotal swelling can be classified as acute and non-acute. Acute causes include torsion, trauma, abscess, and orchitis. Nonacute causes include hydrocele, scrotal hernia, varicocele. Scrotal lesions can also be classified as testicular and extratesticular. The common testicular lesions are torsion, trauma, neoplasms, and inflammatory conditions. Extratesticular lesions include lesions of the spermatic cord, the epididymis, and the scrotal wall. This distinction is important because extratesticular masses are almost always benign while intratesticular solid masses may be malignant. Ultrasonography plays a major role in distinguishing intratesticular from extratesticular abnormalities.

Materials And Methods

This prospective observational study was conducted in the Sylhet M.A.G Osmani Medical College Hospital at Radiology and Imaging Department for period of 12 months from July 2014 to June 2015. Patients having scrotal swelling (unitaleral or bilataral) were included in this study. Inguinoscrotal hernia and undescended testis were the exclusion criteria. A total of 84 patients in the age range of 12 to 80 years old, with scrotal swelling and pain were included in the study. Six subjects were excluded from this study due to exclusion criteria, so study sample became 78.

After adequate history taking and physical examination, CDUS was performed. The patients were scanned with the linear color Doppler multi-frequency (7.5 MHz) transducer using LOGIQ P5 (GE co. Ltd. Korea) ultrasound machine. Sagittal and transverse images were obtained. Additional views were also obtained in coronal and oblique planes, with the patient being upright and performing Valsava maneuver. Diagnostic accuracy of CDUS was determined by comparing it with the final diagnosis, which was based on clinical outcome e.g, positive response to medical treatment), operative

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findings, fine needle aspiration cytology (FNAC), and histopathological examination results. The informed verbal consent was taken from the patient and their confidentiality was maintained. The study protocol was reviewed by the ethical committee of Sylhet M.A.G Osmani Medical College.

Results

The majority of the patients with acute scrotal condition were in their 2 and 3 decades of life whereas those presenting with testicular masses were in their 5th and 6th decades (Table 1). With the help of CDUS, the diagnoses of epididymitis and epididymo-orchitis were made in 18 out of 22 patients who presented with clinical suspicion (Figure 1). All of these 18 patients were conservatively managed and follow-up CDUS revealed findings of resolution.

Table 1 : The distribution of the patients according to their age : n= 78)

Age	Frequency	Percentage
10 -20 Yrs	21	26.9 %
21 -30 Yrs	24	30.7 %
31 -50 Yrs	12	15.3 %
51 -70 Yrs	15	19.2 %
71 -80 Yrs	06	7.6 %
Total =	78	100

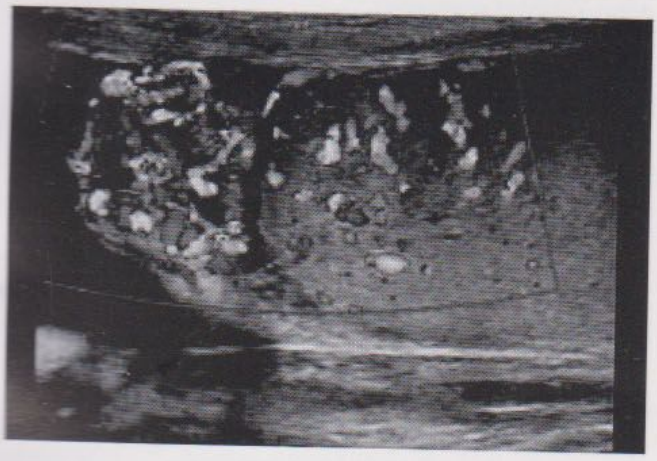

Figure No I : Epididymo-orchitis. Doppler ultrasonography shows an increase in vascular flow.

All patients with symptoms of varicocele were in their 2nd and 3rd decades of life. Of 12 patients, 8 were clinically diagnosed with unilateral and 4 with bilateral varicoceles. These patients were subjected to CDUS, which showed multiple serpiginous anechoic structures adjacent to upper pole of the testis and head of the epididymis with venous flow that accentuated on performing Valsalva maneuver or making the patient upright (Figure II). Doppler ultrasonography confirmed the presence of unilateral varicocele in 6 patients, but detected bilateral varicocele in 2 subjects that were clinically diagnosed as unilateral varicocele. It also confirmed bilaterallity of varicocele in 4 patients. Further, 2 patients who presented with infertility and had normal scrotum clinically were diagnosed as case of varicocele on CDUS. Seventeen patients with clinical suspicion of hydrocele were also subjected to CDUS, which supported the diagnosis. Color Doppler ultrasonography also found hydrocele in 2 clinically unsuspected subjects. On aspiration, only 15 were found to have hydrocele while pyocele was found in 4 cases.

Table II : The Clinical diagnosis, CDUS diagnosis and final outcome (n=78)

Lesion	C. D	CDUS	Intervention	Final Outcome
Epididymitis / Orchitis	22	18	Antibiotics	epididymitis/ orchitis 18
Hydrocele	17	19	Aspiration	Hydrocele 15
				Pyocele 04
Varicocele	12	14	Surgery	Varicocele 14
Epididymal Cysts	08	08	Surgery	Epidymal Cysts 08
Torsion	06	Torsed 05	Surgery	Torsion 05
		Detorsed 01		Detorsed 01
Testicular Mass	13	Mass 09	FNAC	Seminoma 07
				Orchitis 02
		Orchitis 04	FNAC	Orchitis 03
				Seminoma 01
Total	78	78		78

CDUS = Color Doppler Ultrasonography, CD = Clinical Diagnosis
FNAC = Fine Needle Aspiration Cytology

Six patients were clinically diagnosed as cases of testicular torsion. Color Doppler ultrasonography showed absent intratesticular blood flow suggest torsion. One case should minimal intratesticular blood flow with heterogeneous echogenicity suggest detorsion. Surgery was done, 6 cases support the diagnosis. Eight patients were clinically suspected as epididymal cyst. Color Doppler ultrasonography showed cystic lesion in epididymides. Surgery was done and support the diagnosis (Fig IV).

Therefore, we found that CDUS was 100% sensitive and specific for diagnosing scrotal diseases other than testicular masses (Tables II and III). Thirteen patients who presented with enlargement of the scrotum were clinically labeled as cases of testicular mass. The size of the lesion ranged from 0.8 cm to 4.2 cm. They were subjected to CDUS, which showed localized involvement in 36.6% and diffuse involvement in 63.4%. Increased vascularity was revealed in all the subjects, and diagnoses of testicular mass and orchitis were made in 9 and 4 patients, respectively. Subsequently, all 13 subjects with diagnosis of testicular mass were subjected to FNAC. Seven out of 9 patients turned out to be seminoma (Figure III) while 2 misdiagnosed subjects turned out to be orchitis. Four out of 13 clinically diagnosed cases of testicular mass were labeled as orchitis on CDUS (Figure IV). However, FNAC results showed one of them to be seminoma. Color Doppler ultrasonography was 87.5% sensitive and 60% specific in diagnosing testicular masses (Tables II and IV). In all confirmed cases of seminoma, orchidectomy was performed and FNAC diagnoses were comparable to final histopathological examination. Overall sensitivity of CDUS in the diagnosis of scrotal diseases was 98.6% while specificity was 66.6% (Table V).

Table III : Sensitivity and specificity of color Doppler ultrasonography in diagnosis of scrotal diseases other than testicular masses.

Doppler Diagnosis	Final Outcome		Total
	Disease Present	Disease Absent	
Disease Present	64	0	65
Disease Absent	0	0 1	0
Total	64	0 1	65

Sensitivity-100%, Specificity-100%

Table IV : Sensitivity and specificity of color Doppler ultrasonography in diagnosis of testicular masses.

Doppler Diagnosis	FNAC Diagnosis		Total
	Positive	Negative	
Tumor	07	02	09
Non Tumor	01	03	04
Total	08	05	13

** FNAC indicate fine needle aspiration cytology

Sensitivity-87.5%, Specificity-60%

Table V : Overall sensitivity and specificity of color Doppler ultrasonography in diagnosis of scrotal diseases.

Doppler Diagnosis	Final Outcome		Total
	Disease Present	Disease Absent	
Disease Present	7 1	0 2	7 3
Disease Absent	01	0 4	0 5
Total	72	06	78

Sensitivity-98.6%, Specificity-66.6%

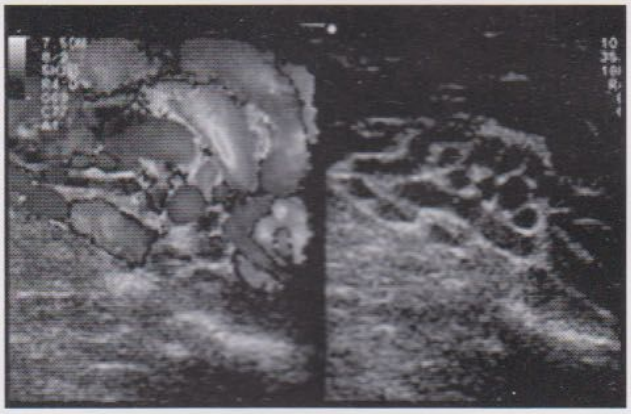

Figure II : Varicocele. Color Doppler ultrasonography demonstraties multiple serpentine vascular channels within the scrotum, which become more prominent after Valsalva maneuver.

Discussion

Grey scale ultrasonography is a well-established modality for diagnosis of scrotal diseases; however, the major limitation of conventional grey scale ultrasonography is lack of specificity for parenchymal changes. Also benign and malignant lesions cannot be distinguished on the basis of ultrasonography alone.[4] Furthermore, in painful scrotum, grey scale ultrasonography cannot accurately differentiate testicular torsion from epididymo-orchitis. Middleton and colleagues studied 5 patients in whom no intratesticular blood flow was identified on symptomatic side while normal flow was detected on the opposite side. However, on grey scale ultrasonography, no abnormality could be detected in 3 patients while 2 subjects had non-specific findings.[4]

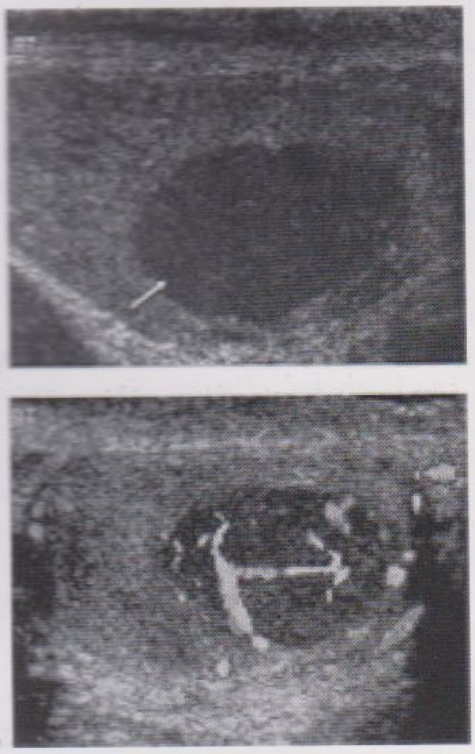

Figure III : Seminoma. Longitudinal ultrasonographic image of the right testis demonstrates a hypoechoic mass with increased vascular flow.

Color Doppler ultrasonography has many advantages over conventional ultrasonography. In addition to detecting non-specific grey scale changes that can occur with testicular ischemia, it also shows blood flow in testicular arteries. Till recently, radionuclide scanning has played an important role in evaluation of equivocal cases of acute scrotal diseases. It has provided useful information regarding scrotal blood flow.[6] However, it cannot accurately depict the anatomy. Middleton and associates evaluated 28 patients with acute scrotal pain by CDUS and scintigraphy. While CDUS correctly diagnosed all the subjects, scintigraphy failed to reach the diagnosis in one.[7] Also CDUS was more rapid, non invasive, and at least as accurate as scintigraphy.[8]

Accurate clinical diagnoses of scrotal diseases are difficult as most patients present with similar signs and symptoms.[3] Color Doppler ultrasonography is currently the most important imaging modality available for diagnosis of scrotal pathologies. It allows accurate evaluation of scrotal conditions as well as normal anatomy. Becker and coworkers concluded a sensitivity of 90.5% and specificity of 98.3% in diagnosis of testicular torsion.[9] Süzer and colleagues found CDUS to be 100% sensitive and 100% specific in diagnosis of acute scrotal conditions.[10] In our study, of 28 patients who had acute presentation, 18 were diagnosed with epididymitis or epididymo-orepidymo. In all the patients, the epididymis was enlarged, hypoechoic, and hyperemic. In 10 patients, in addition to the epididymis, the testis was also hypoechoic and hyperemic. Six patients were diagnosed as cases of testicular torsion. All patients showed mild enlargement, hypoechoic echotexture, and markedly decreased vascularity and one patient showed minimal vascularity with heterogeneous echotexture suggest detorsed. Color Doppler ultrasonography showed sensitivity and specificity of 100%, in diagnoses of inflammatory scrotal diseases and testicular torsion. Thus, our observations are comparable to previous studies. However, CDUS is not without pitfalls. Zoller and associates concluded that detection of intratesticular blood flow cannot exclude testicular torsion.[11]

Derouet and coworkers observed ultrasonography to be 90% sensitive and 55% specific in detection of testicular neoplasms[12] In the present study, CDUS showed a sensitivity of 87.5% and specificity of 60% in detection of testicular neoplasms, which is compatible with the study carried out by Derouet and associates. In our series, 90% of seminomas appeared as solid, homogenous, hypoechoic, and hypervascular lesions compared to normal testicular tissue. In our study, all cases of varicocele were accurately diagnosed and also two patient, who presented with infertility and had no findings on clinical examination, was diagnosed as varicocele.

Other investigations like magnetic resonance imaging can be applied when ultrasonography proves inconclusive. Its use in scrotal diseases is increasing [13,15] however, it is more expensive and not always available. Nuclear scintigraphy which has high sensitivity and specificity in differentiating ischemia from infarction, cannot accurately distinguish ischemia from conditions such as hydrocele, spermatocele, and inguinal hernia and is uncommon due to high accuracy of CDUS.[6]

Therefore, CDUS with its high sensitivity and specificity is the most important investigation for diagnosis of scrotal diseases, presenting especially in emergency clinical setting.

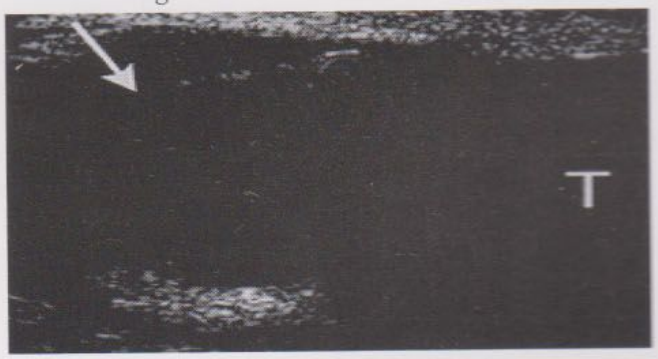

Figure IV: Epididymal cyst. Longitudinal ultrasonographic image of the right epididymis demonstrates a cystic mass with no vascular flow.

Conclusion

We conclude that CDUS, which can simultaneously display scrotal anatomy and perfusion, is an excellent, a safe, and reliable method for evaluating patients with scrotal diseases, whether acute or chronic. It helps to improve patient's management, especially by preventing unnecessary surgical exploration. It is also convenient and easy to perform. But it has its own limitations, including difficulty in detecting intratesticular flow in small children and requiring adequate expertise and experience.[16] Its results are also equipment dependent.

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ORIGINAL ARTICLE

The Osmani Medical Teachers Association Journal Volume 16 Number 1

An Epidemiological study on the Pattern of Fatal Road Traffic Accidents as Revealed by Post-mortem Examination

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Abstract

This study was conducted in The Department of Forensic Medicine, Sylhet MAG Osmani Medical College Hospital from 1st January 2014 to 31st December 2016; all the post mortem cases performed during the study period was analyzed and 281 cases were found RTA, all the RTA cases including Railway accidents were included in the sample to explore epidemiological factors related to RTA at Sylhet region as revealed by post mortem examination. Males are predominantly affected (211, 75.1%), The most affected age group is 30 - 39 yrs (79, 28.10%) and More than 78 per cent of victims were in the 20-59 years age group. It is observed in the study that, in Sylhet districts 43% of accidents involve pedestrians, while in kotwali model police station the figure is almost half of the accidents (48%). Vehicular rear end and head-on collisions constitute about one third of all RTA while there is a difference in the proportion in Sylhet district and Kotwali Police station (15% and 14% of total accidents respectively in Sylhet district while 26% and 04% respectively in Kotwli). Cause of death were Brain injury (lacerations of the brain, brain stem, or spinal cord) 126 (45%), Heart or aortic injury 48 (17%), Sepsis 28 (10%), Circulatory collapse resulting from hemorrhage 34 (12%), Lung injury 17 (6%), Burn 8 (3%), Liver injury 6 (2%), and Multiple fracture 14 (5%). It is evident from the study that productive age group, specially males are mostly affected; the head on and rear end collision are the main type of vehicular affected part which is mostly due to human factor. Head injuries remain the most common and serious types of trauma in RTA and demand good neurosurgical care which may prevent premature loss of life.

[OMTAJ 2017; 16 (1)]

Introduction

Injuries are increasingly recognized as a global public health epidemic. Around the world, almost 16,000 people die every day from all types of injuries. Injuries represent 12% of the global burden of disease, the third most important cause of overall mortality and the main cause of death among 1-40 year age groups. The category of injuries worldwide is dominated by those incurred in road crashes. According to WHO data, deaths from road traffic injuries account for around 25% of all deaths from injury.[1] Motor vehicle accidents (MVAs) are a major cause of both internal and external wounds, many of which cannot be treated with simple dressings - if at all. In this article the authors discuss the importance of recognizing the typical patterns of injury associated with MVAs. This, coupled with a logical sequence for the initial assessment and management of trauma patients, has been shown to contribute to improved outcomes. However, for there to be any significant reduction in the worldwide burden of motor vehicle-related trauma, injury prevention strategies are needed; prevention being better than cure.[2]

According to an advisory committee of WHO declare Accidents as "an unpremeditated event resulting in recognizable damage". The American Safety Council expands the above as "Occurrence in a sequence of events which, usually produces unintended injury, death or property damage. . Road traffic accidents can be defined as any accident involving any type of road user may it is a person walking, standing, running, riding, driving, traveling or working on the road where either of any motorized or non motorized vehicle is involved. In 1896, two deaths were registered in Great Britain due to Motor vehicle. In 1902 The first fatal accident caused by motor cycle was registered in UK . In 1995, Road accidents contributed to about 8, 85,000 deaths yearly in the whole world. Out of this 500,000 is being shared by developing countries.[3]

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Materials and Methods

This study was conducted in The Department of Forensic Medicine, Sylhet MAG Osmani Medical College Hospital from 1st January 2014 to 31st December 2016; all the post mortem cases performed during the study period was analyzed and 281 cases were found RTA, all the RTA cases including Railway accidents were included in the sample. Autopsies were performed by "coronal" (transverse) incision in head & "I" incision in trunk. A proforma specially designed for this purpose was used to collect data.

Result

1616 cases were brought for post-mortem examination to the Department of Forensic Medicine, Sylhet MAG Osmani Medical College during the year 2014 to 2016, Out of which 281 cases were of Road Traffic Accidents (RTA). It is evident from Table No. 1 that RTA is more prevalent in area under Kotwali model police station of Sadar upazilla (36%), whereas average percentage prevalence of RTA among all the police stations of Sylhet District was 17.39.

Table I : Distribution of the RTA cases in relation to the total number of post-mortems during the period January 2014 - December 2016 (n=1616).

Name of police stations/thanas	Post -mortem done for all cases	RTA	Percentage (%)
Kotwali	419	151	36
Jalalabad	108	27	25
Airport	70	09	12.86
Shahporan	96	18	18.75
South surma	124	8	6.45
Beanibazar	66	6	9.1
Moglabazar	69	9	13.04
Biswanath	55	1	1.82
Balagonj	42	00	00
Osmaninogor	45	4	8.89
Jaintapur	58	11	18.97
Kanaighat	89	3	3.37
Gowainghat	103	7	6.80
Zakigonj	71	3	4.23
Gulapgonj	62	6	9.68
Fenchugonj	53	3	5.67
Companigonj	72	2	2.78
Railway	6	6	100
Other	7	7	100
Total	1616	281	17.39

Table II : Distribution of post mortems done according to Police station during the period January 2014 - December 2016 (n=281).

Name of police stations/thanas	Post-mortems donefor RTA cases			
	2014	2015	2016	Total
Kotwali	53	38	60	151
Airport	02	02	05	09
Shahporan	05	05	08	18
Jalalabad	18	07	02	27
Railway	01	02	03	06
Moglabazar	08		01	09
South surma	04	03	01	08
Beanibazar	03	03		06
Gulapgonj	02	04		06
Companigonj	02			02
Fenchugonj	01	01	01	03
Biswanath		01		01
Gowainghat	01	05	01	07
Jaintapur	03	03	05	11
Kanaighat	03			03
Balagonj				0
Osmaninogor	01		03	04
Zakigonj	01		02	03
Other			07	07
Total	80	56	138	281

Table III : Distribution of Post mortem cases by sex during the period January 2014 - December 2016. (n=281)

Sex	No. of Post-mortem	Percentage
Male	211	75.1
Female	70	24.9
Total	281	100

Table IV : Distribution of Post mortem cases by age group during the period January 2014 - December 2016. (n=281)

Age group	No. of Post-mortem	Percentage
00 – 09 yrs	05	1.80
10 – 19yrs	49	17.44
20 – 29 yrs	61	21.70
30 – 39 yrs	79	28.10
40 – 49 yrs	38	13.52
50 – 59 yrs	42	14.95
>60 yrs	07	2.49
Total	281	100

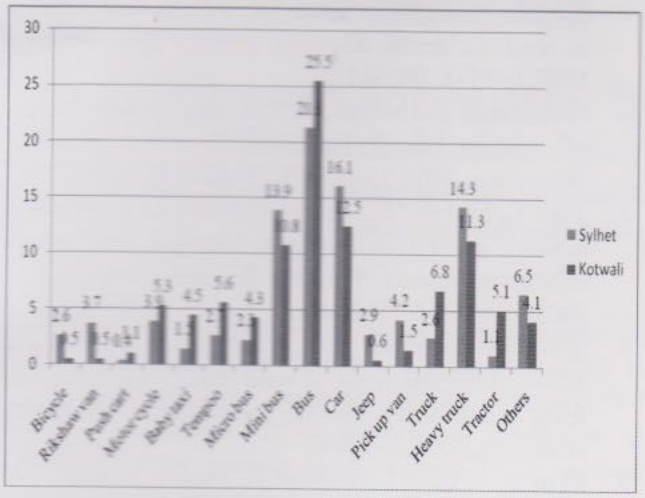

Figure I: Distribution of the Post-mortem cases in sylhet district and kotwali thana according to Modal shares of accidents in 2014-2016.

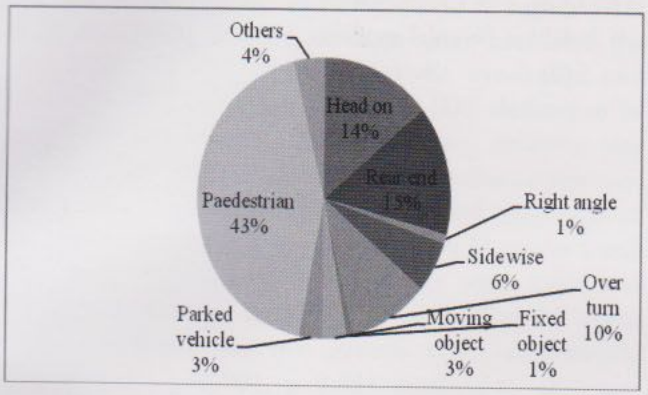

Fig. II: Distribution of type of accidents in Sylhet districts in 2014-2016

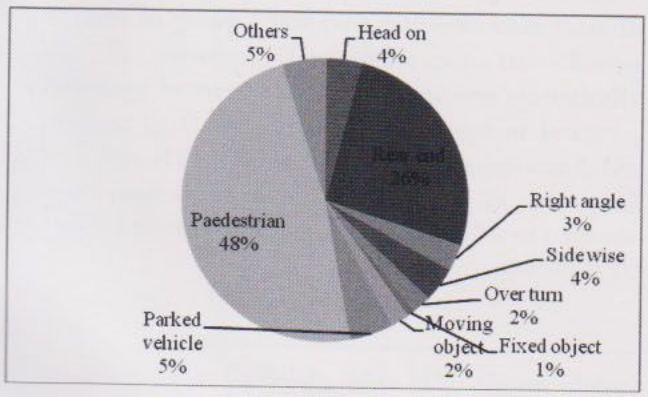

Fig. III: Distribution of type of accidents in Kotwali model P.S. during 2014-2016

It is observed in the study that, In Sylhet districts 43% of accidents involve pedestrians, while in kotwali model police station the figure is almost half the accidents. Vehicular rear end and head-on collisions constitute 15% and 14% of total accidents respectively. The head-on collisions mostly take place on highways which do not have dividers between opposite lanes. Head-on collisions account for just 4% of accidents in kotwali model police station where almost a quarter of all accidents are rear end collisions.

Table V: Distribution of Post mortem cases by cause of death during the period January 2014 - December 2016. (n=281)

Cause of death	No. of death	Percentage
Brain injury (lacerations of the brain, brain stem, or spinal cord)	126	45%
Heart or aortic injury	48	17%
Sepsis	28	10%
Circulatory collapse resulting from hemorrhage	34	12%
Lung injury	17	6%
Burn	8	3%
Liver injury	6	2%
Multiple fracture	14	5%

Discussion

During the study period, 1616 autopsies were carried out in the Department of Forensic Medicine and Toxicology, of which 281 (28 per cent) were of RTA. The highest number of deaths (79, 28%) was in the 30-39 year age group. A study conducted by Farooqui J M et al. in 2013 in India had similar statistics.[4] More than 78 per cent of victims were in the 20-59 years age group, which is in accordance with other studies.[5,6,7] The male predominance in our study also fits well with the reporting of other research of a similar nature.[8,9] This male predominance may be due to the fact that more males work outdoors and therefore are more commonly exposed to traffic accidents. Pedestrians are mostly affected (48%), an increased number of vehicles in the traffic, and reduced attention of drivers and pedestrians related to the usage of the road and footpath; failures to follow traffic rules, associated with improper infrastructure like the absence of footpaths were the greatest cause of accidents.[10]

Most common cause of death was Brain injury (lacerations of the brain, brain stem, or spinal cord) 126 (45%); in the study conducted by Ahmad et al et al in the year 2009, head were commonly affected. A high incidence of brain injury was due to the fact that two wheeler users were not using helmets while light motor vehicle users were travelling without safety measures like seat belts causing dash-board or wind screen injury.[11]

The results of the study will help predict the pattern of RTA injuries and may subsequently help reduce mortalities by identifying the reasons of accidents and cause of death may help prevention of RTA and thereby premature deaths of persons of productive age group. It will also help policy makers in implementing effective emergency services.

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ORIGINAL ARTICLE

The Osmani Medical Teachers Association Journal Volume 16 Number 1

Coronary Angiographic Profile of Patients with Acute Myocardial Infarction with Metabolic Syndrome

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Abstract

Metabolic syndrome comprising obesity, dyslipidaemia, diabetes mellitus and hypertension is highly prevelent among acute myocardial infarction patients. It is a powerful predictor of adverse events among acute myocardial infarction patients. The purpose of this study was to assess and compare the coronary angiographic profile of acute myocardial infarction patients with or without metabolic syndrome. In this comparative cross sectional study a total of 100 patients of acute myocardial infarction were enrolled.Then they were divided into 2 groups . Group I(n=50) fulfilled the IDF(2005) definition of metabolic syndrome and group II (n=50) did not fulfil the IDF definition of metabolic syndrome. Angiographic severity was assessed by – Vessel score, Friesinger score, pattern of lesion, Type of lesion and by Morphological type of lesions. The mean age was 50.5 years in group I and 44.8 years in group II . 96% patients were male and 4% patients were female. The difference of mean BMI between the two groups was statistically significant (p=0.001, p<0.05). cording to coronary artery involvement DVD (40% vs 18%) & TVD (34% vs 14%) were more in group I and SVD (22% vs 46%) was more involved in groupII . Regarding the lesion morphology type B and type C lesions were more in group I and type A lesions were more in group II patients. The difference in lesion morphology between the two groups was statistically significant (p<0.05). Regarding the type of lesions , type II,type III and type IV lesions were more in 1. Dr. group I and typeI lesions were more in group II patients. The coronary angiographic profile of patients with acute myocardial infarction with metabolic syndrome is more aggressive in terms of more severe, more diffuse and more multivessel involvement than that of patients without metabolic syndrome. Metabolic syndrome, Acute Myocardial Infarction, Coronary angiography .

[OMTAJ 2017; 16 (1)]

Introduction

Cardiovascular disease is responsible for approximately 30 percent of all deaths world wide each year. Nearly 80 percent of these deaths occur in low and middle income countries and half occur in women.[1] Coronary heart disease (CHD) is a major cause of mortality and is a global health problem reaching epidemic proportions in both developed as well as in developing countries.[2] Estimates from the global burden of Diseases Study suggest that by the year 2020 this part of the world will have more individuals with atherosclerotic cardiovascular disease than any other region.[3] The concept of metabolic syndrome (MS) has existed for at least 80 years .The frequent simultaneous presence of obesity, hyperlipidemia, diabetes and hypertension was first described in the late 1960s.[4] Several definitions of metabolic syndrome are existing, including the most accepted WHO (1999) and National Cholesterol Education Program: Adult Treatment Panel III (NCEP: ATP III, 2001), International Diabetic Fedaration (IDF 2006) definition. Obesity, hyperglycaemia and dyslipidemia are common components in all definitions. A small population based study showed the prevalence of metabolic syndrome in women (>45 years) of Bangladesh is 6.2%.[5] In patients with hypertension or type 2 diabetes mellitus, the prevalence of metabolic syndrome ranges from 35% to 80%.[6]

Dyslipidemia is more complex in the MS than has been generally appreciated in the general population. Elevated serum Triglycerides are an independent risk factor for coronary heart disease. High density lipoprotein (HDL) cholesterol levels are inversely related to CAD and are protective cholesterol against CAD in both men and women. Low level of HDL-C is also an independent risk factor for CHD.[7] In type-2 diabetes and impaired glucose tolerance (IGT), cardiovascular disease is a leading cause of disability and premature death

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.Diabetes mellitus is an independent risk factor for CHD, increasing risk by two times for men and four to five times for women.[8] Obesity is a major risk factor for coronary artery disease and cardiovascular mortality in men and women. Obesity promotes insulin resistance, hyperinsulinemia, hypertension, hypertriglyceridemia and low HDL cholesterol .Visceral fat typical of android obesity has a greater association with metabolic syndrome, hyperinsulinemia and CAD in both men and women . The greater the degree of over weight, the higher is the risk of coronary mortality.[9] Both systolic and diastolic hypertension have positive, continuous and graded relationship to CHD The potential mechanism by which hypertension may cause coronary events include impaired endothelial function, increased endothelial permeability to lipoproteins, increased adherence of leukocytes, increased oxidative stress, hemodynamic stress triggering acute plaque rupture and increased myocardial wall stress and oxygen demand.[10]

In patients with MS relative risk for atherosclerotic coronary vascular disease (ASCVD) ranges from 1.5 to 3 when diabetes not yet present, risk for progression to Type II diabetes averages about five fold increase, compared with those without the syndrome. ASCVD risk in MS is greater than the sum of its measured risk factors as evident from epidemiological studies and the risk rises geometrically instead of linearly[11]

Prevalence of MS varies with age and sex. In the USA the prevalence of MS is 7% in aged 20-29 years and 44% in aged 60-69 years. When severity of MS increases the angiographic severity of CAD increases as well.[12] The clustering of metabolic abnormalities that constitute the metabolic syndrome is occurring in approximately 25% of general population . "Insulin resistance" is a common pathogenic mechanism and seen to be the most important risk factors.[13]

Materials and Methods

This was a Comparative Cross-sectional study done in Department of Cardiology, M A G Osmani Medical College Sylhet during 1st January 2010 to 31 December 2011. All Patients with acute myocardial infarction with or without metabolic syndrome admitted in the Coronary Care Unit of Sylhet MAG Osmani Medical College Hospital who subsequently undergone coronary angiography were taken as study population. Among the study population those who fulfilled the inclusion and exclusion criteria enrolled in the study by nonprobability, consecutive, convenient and judgmental sampling. The study population was divided into two groups as follows Group I: Patients presented with features of acute myocardial infarction having metabolic syndrome and study Group II: Patients presented with features of acute myocardial infarction without metabolic syndrome. Data was collected by both quantitative and qualitative methods using a pre-tested questionnaire.

After admission at Coronary Care Unit of Cardiology Department all patients were assessed for confirm diagnosis of Acute myocardial infarction using the. ACC/ESC universal definition of myocardial infarction. Then all patients were assessed for presence of Metabolic syndrome using the International Diabetes Federation (IDF) definition for Metabolic syndrome. Equal number of AMI patients with age and sex matched without metabolic syndrome was also taken. Informed consent was taken from each patient or from legal guardian who fulfilled the inclusion criteria. Initial evaluation of the patient was done by history and clinical examination and recorded in the preformed data collection sheet. Demographic profile and Pulse, BP, Body weight, height were measured . Waist circumference measured with a cloth tape at the level of umbilicus. Waist-hip ratio measured. Risk factors of myocardial infarction like hypertension, smoking, dyslipidemia, diabetes mellitus and obesity were noted. Drug history was taken regarding anti hypertensive, anti platelet, anti ischaemic, lipid lowering drugs. Baseline laboratory investigation ECG, Troponin-I, lipid profile, FBS, HbA1C and Echocardiography. Echo was done to see the heart failure , wall motion and LV function (LVEF %).

Then predischarge Coronary angiogrphy was done in clinically stable patients or with 4 weeks in all patients who fulfilled the criteria. Angiogrphic findings was reported by two cardiologist who not performed the Coronary angiogram. It was validated by 3rd cardiologist. Angiographic severity of coronary artery disease was assessed by : Number of vessel involvement (Vessel score) , Percent (%) stenosis of vessel (Friesinger scor, lesion morphology, Type of lesion . All the information were properly noted in the preformed data sheet. Findings was recorded in CD and preserved. Among them 48 patients who fulfilled the IDF definition of metabolic syndrome categorized as study group I (AMI with Metabolic syndrome) and 52 patients who did not fulfil the IDF definition of metabolic syndrome categorized as study group II (AMI without Metabolic syndrome). Then coronary angiographic profile of both groups compared. Data were analyzed by using statistical package for social science (spss) version 16. The quantitative data was expressed as mean and standard deviation and qualitative data as frequency distribution and percentage. Quantitative data was compared between groups using student' t -test; multivariate logistic regression analysis.

Qualitative data compared between groups with Chi square(χ^2) test or Fisher's Exact test. P>0.05 was considered significant and p>0.05 considered not significant.

Results

A total of 100 patients with acute myocardial infarction with or without metabolic syndrome underwent coronary angiogram were included in this study.

Patients were categorized into two groups on the basis of metabolic syndrome . Group I (AMI with Metabolic syndrome) had 48 patients and Group II (AMI without Metabolic syndrome) had 52 patients .

Table I: Age distribution of the study patients (n=100).

Age in years	Group I (n = 48)	Group II (n = 52)	p
	Number	Number	0.003[s]
30	2	4	
31 – 40	4	15	
41 – 50	17	13	
51 – 60	23	18	
> 60	2	2	
Mean (SD)	50.5 (8.3)	44.8 (10.4)	

s = significant, unpaired t-test ;

Table II: Sex distribution of the study population between the groups (n=100).

SEX	Group I (n = 48)	Group II (n = 52)	p
	Number	Number	0.04[s]
Male	44	52	
Female	4	0	

s = significant, Chi-square test

Table II shows sex distribution of the study patients. In group I, male were 44 and female 4 . In group II, male 52 and female 0 . There was statistically significant difference in sex distribution between the two groups (p<0.05 .

Table III: Distribution of the study population according to waist circumference (n=100).

Waist Circumference	Group I (n= 48)		Group II (n =52)		p
	Male	Female	Male	Female	0.001[s]
Central obesity	44	4	0	0	
Normal	0	0	52	0	
Total)	44	4	52	0	
Mean (SD	97.7(2.5)		74.1 (3.2)		

s=significant, Unpaired t- test; Group I = AMI with MS; GroupII = AMI Without MS

Table IV: Distribution of the study population according to waist hip ratio .

Waist-Hip Ratio	Group I (n= 48)		Group II (n =52)		p
	Male	Female	Male	Female	0.001[s]
< 0.9	0	0	52	0	
> 0.9	44	4	0	0	
Mean (SD)	1.02 (0.02)		0.79 (0.03)		

s=significant, Unpaired t-test.

Group I = AMI with MS Group II = AMI without MS

Table V: Distribution of the study population according BMI (n=100).

BMI (kg/m^2)	Group I (n= 48)		Group II (n =52)		p
	Male	Female	Male	Female	0.001[s]
18.5-24.9	0	0	7	0	
25-29.9	31	2	44	0	
≥ 30	13	2	1	0	
Mean (SD)	29.9 (1.6)		26.9 (1.5)		

s=significant, Unpaired t-test.

Table V shows the distribution of the study population according to the BMI. In group I 33 patients and in group II 44 patients were over weight . In group I 15 patients and in group II 1 patients were obese. The mean body mass index was 29.9 (SD1.6) kg/m and 26.9 (SD1.5) kg/m in group II . There was statistically significant difference in mean body mass index between the two groups (p<0.05).

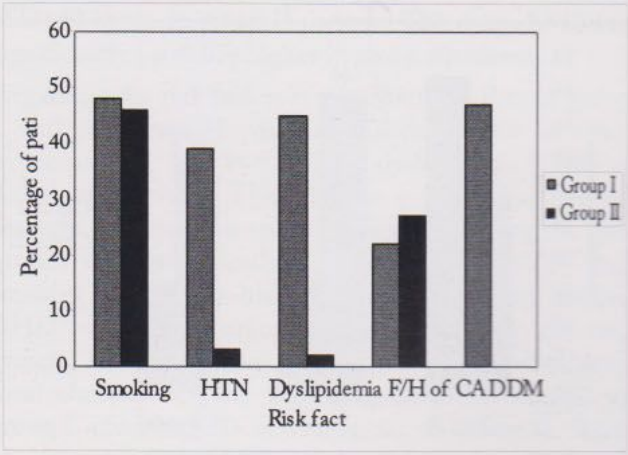

Figure 1: Prevalence of risk factors between two groups (n=100)

Figure 1 compares the risk factors between the two groups. Diabetes Mellitus was present in 47 patients in group I and none in group II .The difference in the prevalence of DM between the two groups was statistically significant ($p<0.05$).

Table VI: Angiographic features of the study population (n=100).

Variables	Group I (n= 48)	Group II (n =52)	p
	Number	Number	
CAD present (70 s tenosis or LM50% stenosis)	41	30	0.003[s]
CAD absent (<70 stenosis or LM<50% stenosis)	7	22	
No. of diseased vessels:			
SVD	11	23	0.01[s]
DVD	20	4	0.01[s]
TVD	17	3	0.01[s]
LM lesion	3	0	0.46[ns]

Ns = not significant, s = significant

Data were analysed using Pearson Chi-Square test.

Table VII: Distribution of the study patients according to Friesinger score .

Friesinger Score	Group I (n= 48)	Group II (n =52)	p
	Number	Number	0.001[s]
0	1	2	
1 4	6	22	
5 9	18	20	
10 14	16	5	
15	7	3	
Mean (SD)	9.8 (SD 4.5)	6.2 (SD 4.0)	

s = significant

Table VII shows Friesinger index of the study patients. The mean difference between the two groups was statistically significant ($p<0.05$) in z test.

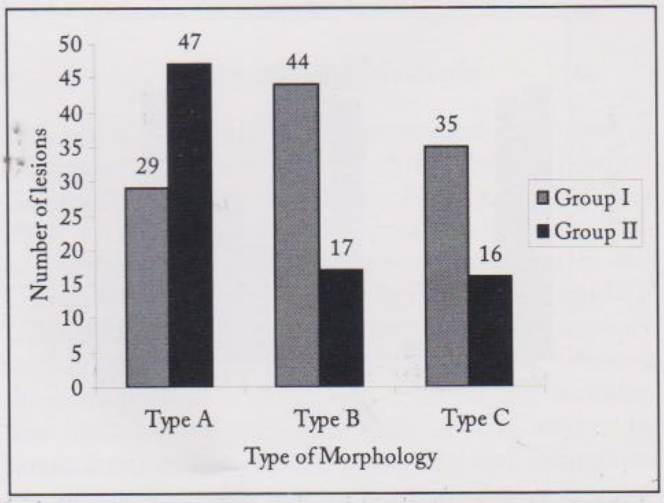

Figure I: Comparison of morphological type of lesions between the two groups

Figure II. shows the distribution of study patients according to the morphological type of lesions.In LAD, LCX and RCA involvement type B and type C lesions are more in group I patients and type A lesions are more in group II patients. The difference in type of lesion involvement between the two groups was statistically significant ($p<0.05$).

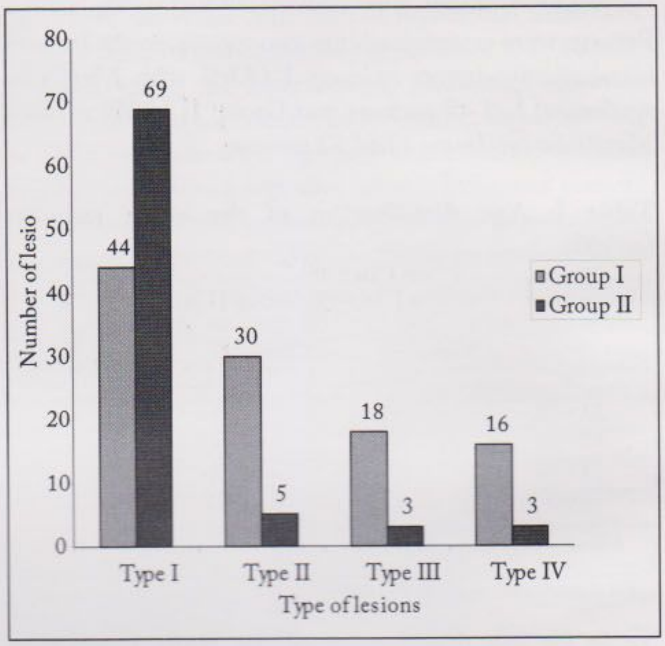

Figure III: Comparison of Type of lesions between the two groups (n=100)

Figure III shows Type II, III and IV lesions are more in group I patients and Type I lesion is more in group II patients. The difference in type of lesion involvement between the two groups was statistically significant ($p<0.05$).

Table VIII: Distribution of study patients according to the ECG findings (n=100)

ECG findin		Group I (n= 48	Group II (n =52	p
		Number	Number	0.68[ns]
STEMI		30	28	
	Acute Anterior MI	18	20	
	Acute Inferior MI	9	9	
	Inferior MI with	2	4	
	Inferior MI with Posterior extension	3	1	
NSTEMI		18	20	

ns = not significant, Chi-Square test.

The table VIII shows the ECG findings of the study patients. In group I 30 patients and in group II 28 patients were STEMI . On the other hand 18 patients in Group I and 20 patients in group II were NSTEMI . STEMI was more in both groups than NSTEMI .But the difference statistically was not significant in Pearson Chi-square test (p>0.05).

Table IX: Distribution of biochemical variables of the study patients (n = 100) .

Clinical Findings	Group I (n= 48)	Group II (n= 52)	p
	Mean (SD)	Mean (SD)	
Fasting Blood Sugar (mg/dl)	192.3 (41.7)	99.2 (19).	0.001^{s}
HbA1C (%)	7.9 (1.2)	5.7 (0.5)	0.001^{s}
Troponin I (mg/dl)	22.3 (9.4)	6.9 (4.3)	0.001^{s}
Total Cholesterol (mg/dl)	222.3 (41.9)	166.7 (19.8)	0.001^{s}
LDL Cholesterol (mg/dl)	140.5 (33.4)	112.2 (11.8)	0.001^{s}
HDL Cholesterol (mg/dl)	31.3 (3.5)	39.9 (4.4)	0.001^{s}
TG (mg/dl)	266.2 (28.8)	150.1 (21.2)	0.001^{s}

s=significant, unpaired t-test ;

Table X: Logistic regression analysis of coronary artery disease with risk factors .

Parameters	OR	Lower	Upper	p
Age(>50 years)	1.06	1.020	1.114	<0.01^{s}
Sex	2.54	0.536	12.058	>0.05^{ns}
Smoking	2.68	1.130	6.375	<0.05^{s}
Hypertension	1.27	0.559	2.870	>0.05^{ns}
Diabetes Mellitus	2.42	1.032	5.647	<0.05^{s}
Dyslipidemia	1.86	1.512	2.281	<0.01
Waist Circumference	0.23	0.027	1.972	>0.05^{ns}
BMI	1.67	0.698	3.941	>0.05^{ns}

s=significant; ns=not significant.

Dependent variable=AMI with Metabolic syndrome . independenedt variable =age,sex, smoking, hypertension,dyslipidaemia, waist circumference,BMI. Logistic regression analysis of coronary artery disease with risk factors was done in table X . Age, smoking, diabetes mellitus and dyslipidemia were associated significantly for acute myocardial infarction with metabolic syndrome in multivariate analysis for acute myocardial infarction with metabolic syndrome in Binary Logistic Regression Analysis (BLRA).

Discussion

The mean age was 50.5 (SD 8.3) years in group I and 44.8 (SD 10.4) years in group II, statistically significant difference was found in age distribution between the two groups. Majority (48% in group I and 36% in group II) of the patients were in 5th decade in both groups. The mean age in their study patients was 49.46(SD13.24) years with MS according to IDF criteria and 50.55(SD13.24) years with MS according to ATP-III criteria, (p <0.001), which closely resemble with our study. On the other hand, observed higher mean age in their study, where they found the mean age of the patients was 59.8(SD10.1) years in group I and 60.7(SD10.8) years in group II.[14] Most of the patients (96%) were male and only 4% patients were female. Male female ratio was 24:1 in the whole study population, which indicates that male patients were predominant in this study.

In our country females are less likely do angiogram then male because of economic dependency, social and cultural barriers and negligence to the female patients by family and society ,moreover most of our females are housewife and have no regular income source. The mean waist circumference in group I was 97.7(SD2.5) and in group II was 74.1 3.2. The mean difference of waist circumference between the two groups was statistically significant (p=0.001, p<0.05). In group I all 48 patients had increased waist circumference and in group II all 52 patients had normal waist circumference. Another study showed mean waist circumference of male patients were 96 (SD4.9) cm in group-I and 84 (SD5.6) cm in group-II patients[15]. The mean difference in waist hip ratio was statistically significant (p<0.05) . In our study the mean BMI was 29.9 (SD1.6) kg/m in group I patients and 26.9 (SD1.5) kg/m in group II patients. The mean BMI was significantly (p<0.05) higher in group I patients.

Regarding the risk factors it was observed that in group I and in group II patients diabetes (94% vs 0%), hypertension (78% vs 6.0%) and dyslipidemia (90% vs 4.0%) respectively. The difference of prevalence of diabetes, hypertension and dyslipidaemia among the two groups were statistically significant (p < 0.05) and smoking and family history of ischemic heart disease (IHD) were not significant (p>0.05) between the two groups. The fasting lipid profile of this study, the mean total cholesterol (TC) was 222.3(SD41.9) (mg/dl) in group I and 166.7(SD 19.8) (mg/dl) in group II. LDL cholesterol was 140.5(SD 33.4) (mg/dl) in group I and 112.2 (SD11.8) (mg/dl) in group II, triglyceride (TG) was 266.2(SD28.8) (mg/dl) in group I and 150.1(SD21.2) (mg/dl) in group II, HDL cholesterol was 31.3(SD3.5)

(mg/dl) in group I and 39.9(SD4.4) (mg/dl) in group II. The mean difference of fasting lipid profile of this study was statistically significant ($p<0.05$) between the two groups . 36% patients in group I and 40% patients in group II had NSTEMI. Diagnosis was almost similar between two groups, no significant ($p>0.05$) difference was found between two groups. Another study mentioned that ST-segment elevation acute myocardial infarction (AMI) was the most prevalent diagnosis at admission 65.1% in group I and 62.4% in group II, which is comparable with our study.[16] Coronary angiographic severity was assessed by vessel score and Friesinger score. It was observed that 17 patients in group I and 3 patients in group II had vessel score-3. Vessel score-2 was found 20 patients in group I and 4 patients in group II. Vessel score-1 was found 11 patients in group I and 23 patients in group II. Vessel score-3 was significantly ($p<0.05$) higher in group I and vessel score-1 was significantly ($p<0.05$) higher in group II.

Friesinger score-0 was in group I 1 patient and in group II 2 patients, score 1-4 was in group I 6 patients and in group II 22 patients. Friesinger score 5-9 was in group I 18 patients and in group II 20 patients. Friensinger score 10-14 was found 16 patients in group I and 5 patients in group II. Friensinger score ?15 was found 7 patients in group I and 3 patients in group II .The mean Friesinger score was 9.8±4.5 in group I and 6.2±4.0 in group II . The mean (SD) Friesinger score was significantly ($p=0.001$) higher in group I patients. In another study have showed Friesinger score 0 in 37.0%, score 1-4 was 07.0%, score 5-10 was 32.0% and score 11-15 was 24.0% in their study patients, which are comparable with our study.[17]

Multivariate logistic regression showed that metabolic syndrome had a strong association with age , sex , diabetes, hypertension, dyslipidemia, Smoking are significantly associated with coronary artery disease which is also supported by other studies . From this study it is concluded that coronary angiographic profile of patients with acute myocardial infarction with metabolic syndrome showed more severe, more diffuse and more multivessel involved coronary artery disease as compared to the patients with acute myocardial infarction without metabolic syndrome.[12]

Conclusion

As the coronary angiographic profile of patients with acute myocardial infarction having metabolic syndrome is more aggressive than that of patients with acute myocardial infarction without metabolic syndrome, so we recommend the patients having metabolic syndrome should be controlled by appropriate method to prevent morbidity and mortality from acute myocardial infarction. Patients with metabolic syndrome if develops acute myocardial infarction there prognosis is worse than that of patients without metabolic syndrome.

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Correlation between Endoscopic & Histopathological findings of gastric lesions.

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Abstract

Endoscopy is one of the very effective tools in the diagnosis of gastric lesion but histopathological examination of mucosal biopsy specimen is very much accurate to reach a concrete diagnosis. This study was worth performing to see the correlation between endoscopic diagnoses with histopathological outcome in a tertiary care hospital. This was a cross-sectional study conducted in the department of pathology, Sylhet MAG Osmani Medical College, over a period of one year from January 2016 to December 2016. The simple random sampling technique was applied to collect 74 endoscopic biopsy materials. Histopathology was done with full precautions by maintaining standard procedures. Male sex of advancing age group from lower socio-economic status was the predominant demographic findings. Our study outcome revealed that endoscopic diagnosis had correlated in 38.1% cases with histopathological findings, which was found consistent with other related studies. Though there was ambiguity, this study outcome showed that endoscopy was poorly correlated with those of histopathological diagnoses; till endoscopic examination and histopathological examination of suspected gastric lesions are complementary to each other.

[OMTAJ 2017; 16 (1)]

Introduction

Gastric cancer is one of the threatening lethal diseases and the second most common cause of cancer related deaths in the world; approximately 650,000 deaths globally each year by gastric carcinoma. The prevalence of gastric cancer has a large variation throughout the world. Over the past 50 years the incidence of gastric cancer in USA and Western Europe has dramatically decreased, but in most regions of Latin America and Asia, the incidence still remains very high. The highest incidence rate of gastric carcinoma is in Japan and China.[1] It is also a major problem in India.[2] It has been hypothesized that incidence of gastric cancer is determined by environmental factor rather than genetic factors, due to its dramatic changes of incidence from place to place and from one generation to the next.[3] Epidemiology of gastric cancer has been attributed to various environmental factors, which include dietary factors, salt contents of soil and drinking water, Helicobacter pylori infection, socio-economic status & smoking.[4]

Endoscopy is one of the very effective tools in the diagnosis of gastric carcinoma but histopathological examination of mucosal biopsy specimen is the most accurate one, which reveals the detailed information about the results and authenticate the endoscopic findings.[5] Over the years it has been realized that the endoscopic appearances of gastric lesion are highly suggestive but are not confirmatory and they need histopathological confirmation. To facilitate diagnosis of different lesions, endoscopic & histopathological studies are complementary.[6-7]

Human GIT which is a long and tortuous organ and is an important site for wide variety of lesions that includes congenital, inflammatory and neoplastic conditions. Histopathological study of biopsy specimens taken from gastric lesion are used to confirm endoscopic diagnosis in suspected malignancy or to rule out in the endoscopically benign appearing lesions and also are performed for monitoring the course, determining the extent of a disease as responses to therapy and for the early detection of complications.[8]

In Bangladesh there is no exact data regarding the incidence. From various hospital based information it is quite evident that the incidence of the disease is not negligible in our country.[9] The aim of this study is to correlate the histopathological findings with endoscopic biopsy of gastric lesions along with age and sex distribution.

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Materials and methods

This was a cross-sectional study performed in the department of Pathology Sylhet MAG Osmani Medical College with the collaboration of the department of gastroenterology Sylhet MAG Osmani Medical College Hospital over a period of one year from January 2016 to December 2016. Patients with the gastrointestinal complaints had undergone endoscopy for diagnosis by gross visualization. The clinicians usually took endoscopic biopsy of suspected lesions for confirming the diagnosis by histopathological evaluation. We included patient of both the gender of all ages with suspected gastric lesions in the study. All the participants were explained about the merits of this study and thereby ethical issues were followed. Simple random probability proportionate sampling was followed to collect the study samples.

Usually every working day had a routine schedule to do the histopathology of the supplied surgical tissue specimens irrespective of the source in the department. We chose two specific days in a week to collect these calculated 74 samples of endoscopic gastric tissue for histopathology in this study duration. The department of gastroenterology sent each endoscopic biopsy that kept in a labeled bottle containing 10% neutral formalin to the department of pathology, SOMC. Gross examination of specimen was done and noted accordingly. Tissue fixation, processing & sectioning followed by Haematoxylin & Eosin staining were done observing the entire standard. Microscopic examination was done and the histopathological diagnosis was noted. All the Data were collected and analyzed by SPSS software for drawing a statistical inference.

Results

Histopathological diagnosis was made in all these 74 endoscopically biopsied specimens. Among them 47 (63.5%) were male and 27 (36.5%) were female with male female ratio 1.74:1. The age range of patients was from 25 years to 90 years with a mean of 55.13 years. All these patients were divided into several age groups to observe the distribution of endoscopic findings according to age. In the lower age group, such as in 20-29 and 30-39 years had no significant finding. As the age advanced, the findings also increased. Specimens from age group 40-49 years (24.3%) & 50-59 years (24.3%) had shown all the types of endoscopic findings. Incidence of ulceroproliferative lesion (n=22, 29.7%) was the top endoscopic findings among the gastric lesion. In histopathological observation adenocarcinoma (n=47, 63.51%) was the maximum and this incidence was found in all age groups except 20-29 years age group (n=0). As the age advanced, the findings also increased. Endoscopic biopsy specimens of all the age groups except age group 50-59 years (24.3%) showed the presence of all the types of histopathological finding. There were 12 cases of adenocarcinoma in specimens from patients of 50-59 years, 60-69 years and >70 years age groups.

Table I: Age and Sex distribution of study group

Age group of the patient	Frequency (n)	Percent (%)	Sex of the patient		
			Male (M)	Female (F)	Ratio M:F
20-29	2	2.7	1	1	1.74:1
30-39	6	8.1	0	6	
40-49	18	24.3	10	8	
50-59	18	24.3	12	6	
60-69	14	18.9	11	3	
>70	16	21.6	13	3	
Total	74	100.0	47(63.5%)	27(36.5%)	

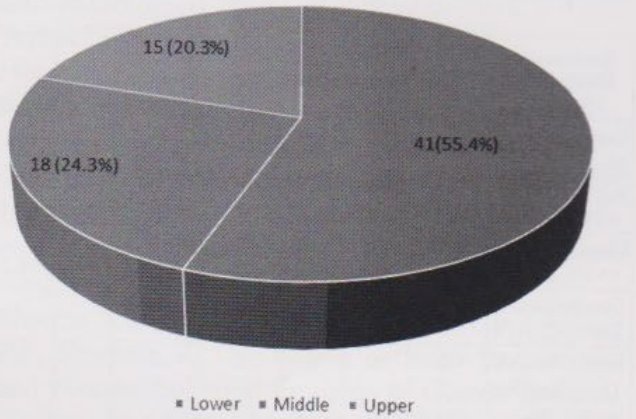

Figure: Pie-chart showing the distribution of different socio-economic status of the participants.

Out of 41 specimens from patients with lower-socio-economic status, 34 were diagnosed as adenocarcinomas in histopathological observation, rest of the 7 cases were diagnosed as gastritis, ulcer and dysplastic changes; so this finding was significant. Adenocarcinoma was predominant in specimens from middle class, 8 out of 18 and from upper socio-economic class 5 out of 15.

Table II: Histopathological diagnosis distribution according to socio-economic status

Histopathological Diagnosis	Socio Economic Status			Total (n=74)
	Lower	Middle	Upper	
Normal Findings	0	1	2	3
Gastritis	3	3	4	10
Ulcer	1	5	3	9
Dysplastic Change	3	1	1	5
Adenocarcinoma	34	8	5	47

The correlation between endoscopic findings with histological findings is shown in Table III. Among the 74 endoscopic biopsy specimens, the highest 22 (29.7%) were diagnosed as ulceroproliferative lesion. Histopathology of these ulceroproliferative lesions showed, gastritis in one, ulcer in 4 and adenocarcinoma in 17 cases. Endoscopically second most diagnosed, 19 were proliferative lesion; histopathology showed 8 cases had adenocarcinoma, with the rest having benign conditions. Out of the third most endoscopically prevalent diagnosed 16 cases of ulcerative lesions, histopathologically 10 had adenocarcinoma; with the rest 6 were benign findings - gastritis and ulcer. 9 endoscopically diagnosed specimens of irregular mucosa with loss of gastric fold, all of which were revealed adenocarcinoma by histopathology.

Table III: Correlation between endoscopic and histopathological diagnosis

Endoscopic Diagnosis (n=74)	Histopathological Diagnosis (Total n=74)					p value	Correlation
	Normal Findings	Gastritis	Ulcer	Dysplastic Change	Adeno carcinoma		
Congested & Friable Mucosa n=8, 10.8%	2	2	0	1	3	<0.005	38.1%
Proliferative Lesion n=19, 25.7%	1	6	0	4	8		
Ulcerative Lesion n=16, 21.6%	0	1	5	0	10		
Ulceroproliferative Lesion n=22, 29.7%	0	1	4	0	17		
Irregular Mucosa with Loss of Gastric Fold n=912.2%	0	0	0	0	9		

Test of association was performed by "chi-square test" and correlation by "Cramer's V test".

Discussion

In this study histopathological observation was done for a total of 74 endoscopic biopsied specimens collected from the gastric lesions. Out of these 74 cases, male (n=47, 63.5%) participants were more than that of female (n=27, 36.5%) with a M:F 1.74:1. Poudel A et al observed almost the same picture, here in 43 cases, 29 (67.4%) were male and 14 (32.6%) were female with a M:F 2.07:1[10] . Alim MA studied 165 patients with endoscopically diagnosed and histopathology proven adenocarcinoma of stomach were selected, of which 111 (67.2%) were male and 54 (32.7%) female and male female ratio was 2.05:1[11] . The fact was that the male confronts risk factors more so chances of gastro-intestinal complaints were more. Moreover, sometimes the social system masked the clinical complaints of female and they suffered the worst. Age range was not limited and there were participants from 25 years to 90 years with a mean age of 55.13 years. Poudel A et al had the similar information in their study[10]. Age and sex related findings in 50 study samples of the research work of Sharma S et al consistent with our findings[8]. Out of all the age group specimens from age group 50-59 years (24.3%) showed the presence of all the variety of histopathological finding. There were 12 cases of adenocarcinoma in specimens from 50-59 years, 60-69 years and more than 70 years. Regarding age group, both investigating procedures proved the worse gastric lesion increased as well as the age advanced. Parkin DM et al found that the incidence rises progressively with age, with a peak incidence between 50 and 70 years.[12]

In study outcome of Alim MA the mean age of the patient with adenocarcinoma was 47 years with 52 out of 165 patients were from the age group of 40-49 years and least affected groups were extreme ages[11] The patients who supplied the specimens were asked about their personal history to find out the association of endoscopic and histopathological findings with socio-economic status. It was presumed that socio-economic condition might have influence over nutrition level, personal hygiene, treatment, medication which could act as etiological factor for developing gastric disorders including carcinoma. We found 56% participants were from lower socio-economic status, and participants from middle and upper socio-economic were 24% and 20% respectively. Out of 41 specimens from patients with lower-socio-economic class, 34 were diagnosed as adenocarcinoma in histopathological observation, rest of the 7 were diagnosed as gastritis, ulcer and dysplastic change. So this finding was significant. Adenocarcinomas were predominant in middle class, 8 out of 18 and also in upper socio-economic class 5 out of 15. A large scale study done by Parkin DM showed that incidence rate was significant in lower socio-economic groups, and in advancing aged people in developing countries. Incidence rises progressively with age, with a peak incidence between 50 and 70 years.[12]

Among the 74 specimens, the endoscopic and histopathologic findings were poorly correlated, 8 (10.8%) specimens showed congested & friable mucosa on endoscopy while histopathology showed normal finding in 2 cases, gastritis in 2, dysplastic change in 1 and adenocarcinoma in 3 cases. In 19 endoscopically diagnosed proliferative lesions, histopathology showed normal finding in 1, gastritis in 6, dysplastic change in 4 and adenocarcinoma in 8 cases. 16 endoscopically diagnosed case of ulcerative lesion histopathologically showed adenocarcinoma in 10, ulcer in 5 and gastritis in 1. There were almost proximate correlations between 22 (29.7%) cases of ulceroproliferative lesion with histopathological findings. Ulceroproliferative lesions were reported suspicion of gastric carcinoma and

Histopathology showed 17 had adenocarcinoma while among the rest 4 had ulcer and one had gastritis.

All of the 9 endoscopically diagnosed irregular mucosa with loss of mucosal fold, were diagnosed as adenocarcinoma by histopathology and this established a good correlation between endoscopic and histopathological findings. Similarly, Sharma S also found endoscopy of their 50 study sample had overall poor correlation with histopathology with the exception of endoscopically suspected gastric carcinoma.[8] Good correlation of endoscopy with histopathology was observed in detection of gastric carcinoma. However, our study outcome found that endoscopic diagnosis had 38.1% correlation with histopathological findings. Similarly, Poudel A et al found the correlation of endoscopic and histopathological diagnosis of these gastric lesions was 34.9%.[10] Different population with different socio-economic status, poor health education, varying outcome of endoscopic and histological findings and misinterpretations of endoscopic and histopathological findings might be the factors that inducing this ambiguous correlation. Eventually histopathological examination of gastric mucosa was the yardstick to reach a concrete diagnosis.

Conclusion

Usually endoscopy of upper GIT is almost a routine advice for the patient suffering from any gastric disorders. Sometimes endoscopic diagnosis is failed to reach a conclusive diagnosis of benign gastric lesions. Histopathology of biopsied tissue from any gastric lesion is more preferable. Though there was ambiguity, this study outcome showed that endoscopic result was poorly correlated with those of histopathological interpretations. In fact, endoscopy is incomplete without biopsy and histopathology is the gold standard for the confirmation of endoscopically detected diagnosis. Proper biopsy specimens from gastric lesion (5-6 from inner margin and from all directions) along with proper tissue processing and staining followed by meticulous observation can minimize the risk of misinterpretation. A large scale multicentered studies with regular supervision of endoscopic examination followed by histopathology of suspected gastric lesions are simultaneously necessary.

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ORIGINAL ARTICLE

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Correlation between Body Mass Index and GOLD staging of severity in chronic obstructive pulmonary disease patients - A cross sectional study

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Abstract

The correlation between low body mass index (BMI) and poor prognosis of patients with chronic obstructive pulmonary disease (COPD) is a common clinical observation and it varies with different stages of COPD To find out any correlation between BMI and severity of obstruction [Global Initiative for Chronic Obstructive Lung Disease (GOLD) staging] of COPD patients. We conducted a cross sectional study among 100 male patients of COPD in the Department of Medicine, Sylhet M.A.G. Osmani Medical College Hospital, Sylhet during the period from 1st July 2013 to 30th June 2015.We classify the severity of obstruction in COPD patients according to GOLD staging through spirometry. BMI of all the patients was measured. Correlation between BMI and severity of obstruction (post bronchodilator forced expiratory volume in 1st second (FEV1) % predicted) in COPD patients were determined. Analysis was carried out using Statistical Package for Social Sciences (SPSS) 21.0 software for windows. Pearson correlation, one way analysis of variance (ANOVA) analysis was used to determine the relationship between BMI and post bronchodilator FEV1%predicted. Mean age of the study subject was 58.18 ± 9.29 years. Commonest age group was 50-59 years (40%). Mean BMI of stage 1 COPD subjects was 26.21, stage 2 was 22.91, stage 3 was 20.78, and stage 4 was 15.71. One way ANOVA showed that BMI of the patients were decreasing with increasing severity of the disease (GOLD) and it was statistically significant (P < 0.05). There was positive correlation between severity of airway obstruction and BMI in COPD patients.

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Introduction

Chronic Obstructive Pulmonary Disease (COPD) is a major cause of morbidity and mortality in adults and is the fourth leading cause of death in the world.[1] Chronic Obstructive Pulmonary Disease (COPD) is a common preventable and treatable disease, characterized by persistent airflow limitation that is usually progressive and associated with an enhanced chronic inflammatory response in the airways and the lung, to noxious particles or gases. Exacerbations and comorbidities contribute to the overall severity in individual patients.[2] COPD is a systemic disease. Malnutrition in COPD is due to increased metabolic demands caused by basal oxygen consumption, release of cachexia producing cytokines like tumor necrosis factor, interleukin6,[3-4] etc. The association between low body mass index (BMI) and poor prognosis of patients with COPD is a common clinical observation and it varies with different stages of COPD. Nutritional depletion and weight loss are features of COPD. There are many studies documented the prognostic value of low body weight in patients with COPD.[5-6] Patients with low BMI are at increased risk for developing severity of COPD.[5] Low BMI is also an independent negative determinant of survival in patients with COPD.[6]

Mitra et al[2] stated that association between BMI and poor prognosis of patients with COPD is a common clinical observation and it varies with different stages of COPD. With severity of the obstruction (GOLD staging) BMI of the patient decreases and it was statistically significant. Hence, BMI is an important parameter to assess the functional status, and prescribing correct medical therapy and pulmonary rehabilitation programs in COPD patients. Despite its importance, little information is available regarding BMI alteration in COPD from a population-based study. Limited studies have been conducted in Bangladesh to show the correlation between BMI and Global Initiative for Chronic Obstructive Lung Disease (GOLD) staging in COPD patients. The specific objectives of our study were to classify the severity of obstruction in COPD patients according to GOLD staging through spirometry, to find out the BMI of patients and to find out any correlation between severities of obstruction in COPD patients (through spirometry) with their body mass indices.

Materials and Methods

This was a cross sectional study carried out in the Department of Medicine, Sylhet M.A.G. Osmani Medical College Hospital, Sylhet during the period from 1st July 2013 to 30th June 2015. 100 male smokers at least 10 pack years smokers and male patients of ≤40 years of age with symptoms of COPD (dyspnea, chronic cough or sputum production, forced expiratory volume in 1st second/forced vital capacity (FEV 1/FVC) <0.7 on spirometry, and without any significant post bronchodilator FEV reversibility, that is, less than 12% and 200 ml). Patients who were suffering from or who were known to have tuberculosis (acid fast bacilli (AFB) smear positive or negative), bronchiectesis, pneumonia, lung cancer, interstitial lung diseases, occupational lung diseases, respiratory failure were excluded from our study. Informed written consent was obtained from the patients or attendants after full explanation of the details of the disease process and purpose of the study. Height and weight was determined barefoot and in lightweight indoor clothing and the body mass index [BMI (weight in kg/height in meter5)] calculated.

Detailed history of all the patients was taken that included severity of symptoms, duration of the illness, detailed smoking status, and occupational history. Past history was also taken thoroughly to exclude past history of tuberculosis or lung cancer. Examination of the respiratory system was also done thoroughly in all patients. Chest X-ray postero-anterior (CXRPA) view were done in all the patients to see for radiological changes associated with COPD like signs of hyperinflation, hyperlucency of the lungs, and also to exclude other diseases like tuberculosis (present or past), lung cancer, bronchiectesis, and interstitial lung disease. Diagnosis of COPD based on clinical history and confirmed by pulmonary function testing. All subjects performed spirometry (Forced expiratory volume in 1 second [FEV_1], Forced Vital Capacity [FVC] and FEV_1 /FVC ratio) using RMS Helios 702 spirometer (Recorders and Medicare systems private limited, MEDSPIROR, India) in the Department of Medicine Sylhet MAG Osmani Medical College Hospital, Sylhet. Pre and postbronchodilator spirometry of all the patients was done. Patients with post-bronchodilator FEV_1/FVC less than 0.7 and significant reversibility (improvement of 12% and 200 ml of FEV_1) were excluded. Patients without significant reversibility were selected. Staging of COPD was done as per GOLD Criteria, stage-I: FEV_1 /FVC < 0.70, FEV_1 80% predicted, stage-II: FEV_1/FVC < 0.70, FEV_1 50-79% predicted, stage-III: FEV_1 /FVC <0.70, FEV_1 30-49% predicted and stage-IV: FEV_1 /FVC < 0.70, FEV_1 <30% predicted or FEV_1 < 50% predicted if respiratory failure present.[7] All the collected data were compiled and analyzed using the SPSS (Statistical package for social science) 21 for windows. Mean, standard deviation (SD), and confidence interval were determined. Pearson correlation and one way analysis of variance (ANOVA) analysis were used to determine the relationship between BMI and post-bronchodilator FEV_1 %predicted. P value < 0.05 was considered statistically significant.

Results

All the patients of the study population were in age range of 40-80 years. The mean age of all the patients was 58.10 (SD ± 9.29) years. Commonest age group was 50-59 years (40%) [Table 1]. All the patients of our study were male. In our study among whole study population (n = 100) we found different comorbid conditions such as five (05%) patients had congestive cardiac failure, 17 (17 %) had diabetes mellitus, another 47 (47%) had hypertension, and 32 (32%) had no associated comorbidities. The COPD patients were classified by their post-bronchodilator FEV1% predicted in four stages according to GOLD. Among 100 study population, 18 (18) patients were in stage 1, 32 (32%) in stage 2, 29 (29%) in stage 3, and 22 (22%) in stage 4.

Table I: Baseline characteristics of participants (n=100)

Variables	Frequency	Percent
40 -49 years	20	20
50 -59 years	40	40
60 -69 years	29	29
70 - 79 years	11	11.00

Mean ± SD (58.10 ± 9.29)

In our study we found the mean ages of the study population in different stages of COPD were different. The mean ages of the patients in four stages of COPD were shown in Table II. The mean age of stage 1 was 47.15 (SD ± 4.38), stage 2 was 57.00 (SD ± 8.00) years, stage 3 was 59.41 (SD ± 7.74) years and stage 4 was 67.12 (SD ± 4.41) years. From the above table and by applying one way ANOVA, it was found that severity of obstruction increases with age of the patients which was statistically significant (P < 0.05). In Table II we also showed the mean BMI of the COPD patients in their different GOLD stages. Applying the Pearson correlation test we found that BMI and post FEV 1%

predicted were positively correlated (R = 0.902, P < 0.05). Now by applying one way ANOVA, we found that BMI of the patients were decreasing with severity of the disease (GOLD) and it was statistically significant (F = 149.473, P < 0.05). The scatter diagram in Figure: 1 shows that there was positive correlation present in between post FEV 1%predicted and BMI in COPD patients. The BMI was better in the study populations where post FEV 1%predicted value was higher.

Table II: Mean ages and mean BMI with standard deviation (SD) of different stages of COPD patients (n=100)

Stages of COPD(GOLD0)	Mean ages (± SD) IN YEARS	Mean BMI (KG /m^2
1	47.15 (±4.38)	26.21(1.32)
2	57.oo(8.00)	22.91(2.00)
3	59.41(7.74)	20.78(1.09)
4	67.12(4.41)	15.71(1.77)

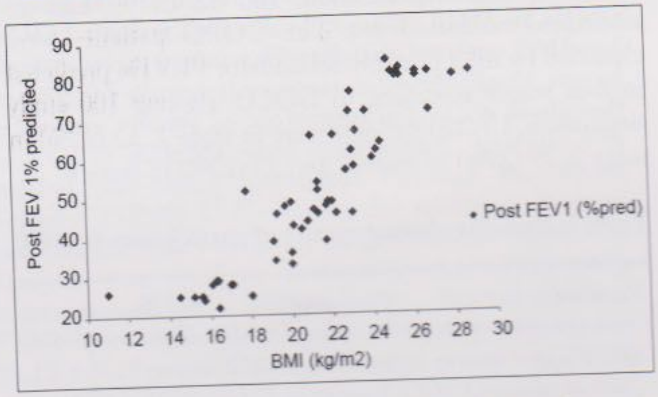

Figure 1: Scatter diagram showing correlation between body mass index (BMI) and post force expiratory volume in 1st second % predicted in chronic obstructive pulmonary disease patients

Discussion

COPD is a common and progressive chronic inflammatory condition that is responsible for a largeamount of morbidity and mortality worldwide. COPD is not only associated with airway inflammation but also with considerable systemic inflammation.[8] Effects of systemic inflammation include unintentional weight loss, skeletal muscle dysfunction, increased risk of cardiovascular disease osteoporosis, gastroesophageal reflux disorder, and depression, among others.[9] Nutritional depletion and weight loss are the features of COPD. The exact mechanisms are uncertain,[10] but decreased food intake and increased energy expenditure in breathing are the most important.[11] Hypoxia has been shown to stimulate the production of inflammatory mediators and to contribute to the development of malnutrition in COPD patients.[12] Evidence of systemic inflammation is measured either as increased circulating cytokines, chemokines and acute-phase proteins, or as abnormalities in circulating cells.[13]

There are several studies [13-15] which have documented the association between low body mass and poor prognosis and mortality in patients with established COPD In addressing the association between BMI and severity of obstruction of COPD (GOLD), Nemery et al.[16] raised the possibility that subjects who are susceptible to COPD may be leaner than subjects who were not susceptible. Thus, it is not clear whether low body weight is a risk factor for COPD or merely a consequence of established lung disease. Several studies has demonstrated improved survival in COPD patients with a high BMI compared to COPD with low BMI. Annemie et al.[17] found that low BMI was significant independent predictor of increased mortality in 400 COPD patients.Vestbo et al.[18] followed 1898 COPD patients prospectively for 7 years and found that BMI and free fat mass index were significant predictors of mortality . In the ANTADIR (Association Nationale pour le Traitement a Domicile de l'Insuffisance Respiratoire Chronique) network, the prognostic value of obesity in patients with COPD was clearly demonstrated. During the 7.5 years of follow-up, the highest survival and lowest hospitalization rates were observed in obese COPD patients.[19]

In our study the mean age of study population was 58.10 (SD ± 9.29) years and maximum number of the patients were more than 50 years of age, which was consistent with the previous literatures as the disease has highest prevalence in 5th and 6th decades of life.[20-21]As COPD is more common in male in our country, all the patients in our study were male.[22] In 2009, Kohansal et al.[23] that severity of airflow obstruction increases more with age. The study was consistent to our study as we showed that with increase severity of GOLD staging average age of the patient was also increasing. In 2009, Qiu et al.[24] demonstrated that there was a positive correlation present in between BMI and FEV1/FVC, FEV1% predicted. Sahebjami et al.[25] also demonstrated a correlation between BMI and pulmonary function tests and they recommended BMI as a criterion to evaluate the nutritional status of COPD patients. Thus these above studies are consistent with our present study. In the Platino study [26] a population based epidemiologic study conducted in five Latin American cities (2008) showed that up to normal BMI (i.e., BMI up to 25.00 kg/ m~) FEV 1% predicted is positively and linearly correlated with BMI, that is, with increase in FEV

1%predicted, BMI also increased and vice versa. But in cases of pre-obese or obese patients they are not linearly correlated.

In our study the mean BMI of the population is 21.36 (SD ± 3.84) kg/m2. And thus our study is consistent with the above study. A study conducted by Vestbo et al.[27] Findings from the Copenhagen City Heart Study showed that there was no correlation between BMI and post bronchodilator spirometry (post FEV 1/FVC, post % predicted), that is, severity of obstruction. In the above study total number of population was 1,898 that was large scale study. But in our study total number of cases was 100. Another study published by Ischaki et al.[28] also demonstrated that there was no correlation between BMI and severity of obstruction (determined by spirometry) in COPD patients. In our study we found that BMI was positively correlated with both post-bronchodilator FEV 1% predicted. This was consistent with the findings of Mitra et al.[2] who studied the relation between BMI and severity of obstruction in 101 male COPD patients and found that BMI of the patients were decreasing with increasing severity of the disease (GOLD) and it was statistically significant ($P < 0.05$) . We need further studies involving larger sample size is required to confirm the correlation between BMI and severity of obstruction (GOLD) in COPD patients. Moreover, our study was cross sectional study and we believe longitudinal study is also required to find out the correlation between BMI and severity of obstruction (GOLD) in COPD patients.

Conclusion

In this study we found out that there was a positive correlation present in between BMI and severity of obstruction in COPD patients. With severity of the obstruction (GOLD staging) BMI of the patient decreases and it was statistically significant.

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ORIGINAL ARTICLE

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Outcome of Single Stage Transanal Endorectal Pull through for Short Segment Hirschsprung's Disease in Children

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Abstract

Traditionally, Hirschsprung's disease (HD) was treated in a staged procedure of colostomy, the definitive procedure then closure of colostomy. Eventually many pediatric surgeons became more interested in the one-stage approach with favourable outcome. Aims and objectives: To evaluate the overall outcome of single stage transanal endorectal pull through (TEPT) procedure for short segment HD. Materials and Methods: We evaluated 31 patients with short segment HD, aged up to 12 years in a prospective interventional study. Single stage TEPT procedure was done. The mean age was12.0 ± 17.6 months; 20 boys (64.5%) and 11 girls (35.5%). The mean duration of operation was 100.8 ± 11.8 minutes and the mean length of resected aganglionic segment of bowel was 28.4 ± 3.9 cm. Length of postoperative hospital stay was 5.0 ± 0.8 days. Outcome was uneventful in 74.2% patients and 25.8% cases developed some form of complications. Perianal excoriation developed in 22.6% cases, which improved by conservative treatment. Only one case developed postoperative intestinal obstruction and was managed surgically. Conclusion: Single stage TEPT operation in short segment Hirschsprung's disease offers san improved approach and may be used by any experienced pediatric surgeon. Hirschsprung's disease, transanal endorectal pullthrough.

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Introduction

Hirschsprung's disease is a common cause of pediatric intestinal obstruction. It is a developmental disorder of the enteric nervous system and is characterized by an absence of ganglion cells in the distal colon resulting in functional obstruction,[1] due to lack of propagation of propulsive waves and an abnormal or absent relaxation of the internal anal sphincter.[2] The incidence of HD is 1: 5000 live births, male to female ratio in short segment disease is 4:1, and when entire colon is involved the male to female ratio is 1:1[3]. Once HD is diagnosed, surgery is usually indicated (Kessmann 2006),[4] and surgery is the only proven way to treat HD. Surgical therapy for HD implies removal of aganglionic bowel and bringing of normally innervated intestine to the anus. Traditionally, this was achieved by creation of a colostomy followed by one of the pull-through procedures (Swenson, Duhamel, Soave), then colostomy closure in the same setting or later (2 or 3 stages).[5] There is a risk of damage to sacral nerve responsible for fecal and urinary incontinence as well as sexual dysfunction with the Swenson procedure, while occurrence of fecoloma in the retained segment in Duhamel procedure and increase incidence of constipation and entrocolitis in Soave procedure.[5] Multistage procedures involve high morbidity and mortality of the patient and prolonged psychological stress of the parents. Eventually many pediatric surgeons became more interested in the one-stage approach, and results have been favorable when compared with a staged procedure.[5]

The advantages of primary TEPT are: it eliminates the need for laparotomy therefore the risk of intestinal adhesion is reduced. It also offers the advantage of staying away from the pelvic structure, preserving the sphincter, blood supply and innervations. Therefore urinary and fecal incontinences are less likely to be happened. It has advantage of less operating time, less intra operative blood loss and decreased hospital burden. It gives excellent cosmetic results.[6] It has the advantage of shorter hospital stay, lower cost, minimal intra abdominal dissection, no visible scar.[7] Satisfactory postoperative results with avoidance of colostomy and its associated complication increases compliance of primary TEPT to parents and patient. In recent years single stage transanal endorectal pull through operation for short segment Hirschsprung's disease is being performed successfully in different institute of Bangladesh but there is no study in Sylhet MAG Osmani Medical college Hospital. So this study is designed to evaluate outcome of primary TEPT in this setting.

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Materials and Methods

This prospective study was carried out in the Department of Pediatric Surgery, Sylhet MAG Osmani Medical College Hospital, Sylhet during the period from July 2009 to June 2011. Thirty one patients with short segment Hirschsprung's disease, aged up to 12 years of either sex were included. Hirschsprung's disease with intestinal obstruction and failed decompression, massive dilation of proximal bowel and intestinal perforation; and any previous colorectal surgery were excluded. The diagnosis was confirmed by barium enema and partial thickness rectal biopsy and histopathology. Further, the level of the contrast tapering was taken as an indicator of the level of aganglionosis. Preoperative bowel preparation started 48 hours before surgery with rectal irrigation using normal saline every 12 hours. They were kept on non-residue diet 24 hours before surgery. Third generation cephalosporin was administered at induction of anesthesia and continued for 3 days after operation.

Under general anesthesia the patient was kept in suspended lithotomy with the pelvis elevated positioned. The anal canal was exposed with atrumatic silk stay suture placed in the anal mucosa circumferentially at four points. The anal mucosa is incised circumferentially approximately 0.5 to 1cm above the pectinate line using diathermy needle to develop the sub mucosal plane. The dissection was continued proximally using blunt dissection and cauterization of submucosal infiltrating vessels. The muscle layer was pushed away. The traction of the mucosal tube facilitates proximal mucosal dissection until reach the level proximal to peritoneal reflection approximately 7 to 12 cm above the pectinate line. The peritoneal reflection a distinct double layer muscular cuff appears around the mucosal tube. The muscular cuff was opened circumferentially to pull the full thickness intraperitoneal recto-sigmoid tube, with its mesentery and blood vessels. Mobilization of the colon was continued as proximal to the grossly obvious transition zone. The mesenteric vessels were cauterized close to the wall of the mobilize colon and its mobilization was continued until the transition zone and thick dilated proximal segment was detected either by visual inspection or estimated based on preoperative studies.

After resection of the aganglionic segment the normally innervated bowel was pulled through the muscular cuff. Coloanal anastomosis was performed in single layer with fine absorbable suture. Part of colon from proximal and distal resected segment was sent for histopathology. Following pull through procedures the patient was maintained on intravenous fluid and nasogastric suction until gastrointestinal activity return. Oral feeding started with oral rehydration solution 24-48 hours postoperatively, followed by formula or breast feeding or liquid diet 24 hours later. The Folly catheter was removed on 2nd POD. Intravenous antibiotics (Amoxycillin and Metronidazole) were continued for 3rd POD then oral antibiotics for another 7 days. The patients were discharged 3-5 days after surgery if no complications occurred. First rectal digital examination was performed after 14 days and anastomotic dilation is begun by metallic anal dilator.[8] The parents was advised to perform dilatation twice daily and the size of the dilator was increased weekly until the rectum reached the desired size, which depends on the patient's age. Outpatient visits was arranged on 2nd week then monthly for 6 months. Data were processed and analyzed with the help of SPSS (Statistical Package for Social Sciences) Version 16.0. Informed written consent was taken and an approval of the protocol was obtained from the institutional ethical committee of Sylhet M.A.G Osmani Medical College, Sylhet before the commencement of the study.

Results

There were 20 male (64.5%) and 11 female (35.5%) with the median age at diagnosis being 11 months 26 days (range, 19 day to 6 years). Majority of the patients were below the age of 6 months [19(61.3%)] and 12 (38.7%) were older children (Table I). The radiologic transition zone in contrast study was in the rectum or rectosigmoid in 25 cases (80.6%) and did not demonstrate in 6 cases (19.4%). Rectal biopsy showed absent of ganglion cell in 31 (100.0%) cases and thickened hypertrophied nerve bundle in 12 (38.7%) cases.

Table 1 : Distribution of the patients by age and sex (n=31)

Baseline characteristics	Frequency	Percentage
19 days to 1 month	9	29.0
1 to 6 months	10	32.3
6 months to 2 years	8	25.8
2 to 5 years	3	9.7
5 to 6 years	1	3.2
Mean age (SD) months	12.0 ± 17.6	
Male	20	64.5
Fema	11	35.5

The length of resected aganglionic segment of bowel was ranged from 20 to 35 cm with the mean 28.4 ± 3.9 cm. The duration of operation ranged from 80 to 120 minutes with the mean 100.8 ± 11.8 minutes. The average time of bowel movement was 23 hours (range 12 to 48 hours). Bowel moved within 24 hours of operation in 25 (80.6%) patients and within 48 hours operation in 5 (16.1%) and but in one patient (3.2%) bowel did not move due to development of post operative intestinal obstruction. The mean hospital stay was 5.0 ± 0.8 days (range, 4-6 days). There was no mortality in this series. Outcome was uneventful in 23 (74.2%) patients and 8 (25.8%) cases developed some form of complications. Perianal excoriation developed in 7 (22.6%) cases, which was improved by conservative treatment. Only one (3.2%) case developed postoperative intestinal obstruction and managed surgically by proximal colostomy (Table II).

Table II : Outcome of operation and complications (n=31)

Outcome	Frequency	Percentage
Uneventful recovery	23	742
Complications	08	25.8
Perianal Excoriation	07	226
Intestinal Obstruction	01	3.2

Discussion

The treatment of HD is to resect the aganglionic segment of distal colon and pull through normally innervated colon and anastomose this bowel at the anorectal region preserving the sphincter muscle. This can be achieved by traditional staged procedures involving colostomy and single stage procedures without colostomy. Single stage TEPT procedure has been the latest development in its historical progress.[6] In this study, the age of the patients ranged from 19 days to 6 years with the mean age of 12.0 ± 17.6 months. Similar age of at presentation of HD reported in other studies such as one month to 6 years,[7] 18 days to 4 years,[9] 7 days to 14 years,[10] 20 days to 12 years.[11] In this study 64.5% patients were male and 35.5% were females with a ratio of 1.8:1 indicating a male preponderance of HD. This result was in agreement with other studies.[12-14] All reported male preponderance of HD. The radiologic transition zone in contrast study was in the rectum or rectosigmoid in 80.6% and did not demonstrate in 19.4%. Langer et al.[15] found transitional zone in recto sigmoid region in 68.4% of children with HD. Rectal punch biopsy showed absence of ganglion cell in 100.0% cases and thickened hypertrophied nerve bundle in 38.7% cases. The diagnostic accuracy of rectal punch biopsy was 99.7%.[3] In 94% of the patients the diagnosis of Hirschsprung's disease was confirmed or refuted by the first biopsy. There were no false-positive or false-negative results.[16] Both these studies supported the present study.

In the present study the length of resected aganglionic segment of bowel was ranged from 20 to 35 cm with the mean 28.4 ± 3.9 cm. Several studies were in agreement with the present study.[6,9,17] In this study, the duration of operation ranged from 80 to 120 minutes with the mean 100.8 ± 11.8 minutes. Similar mean operation time reported in several other studies.[6,9,17,18]

In most of the patients, bowel moved between 12 to 24 hours after operation. The average time for return of bowel function after operation was 23 hours (range 12 to 48 hours). This results correlated with several other studies.[7,9,17] Length of postoperative hospital stay ranged from 4 to 6 days with the mean 5.0 ± 0.8 days in the current study. This result was supported by Langer et al.[15] In the current study, 22.6% patients developed postoperative perianal excoriations This may be due to frequent liquid stool. Perianal excoriation was improved by conservative treatment and with reduction of frequency of bowel movement; and was resolved within 3 months. Tariq et al.[19] reported perianal excoriation in 49% of patients but generally resolved within 3 months. In another study Elhalaby et al.[17] showed perianal excoriation up to 32.2% and resolved with conservative treatment.

In this study, one patient developed postoperative intestinal obstruction which was managed by transverse colostomy and follow up regularly. There was no death in the present series. This result was consistent with other studies [5,15] may be due to proper selection of patient for TEPT, skill personnel, proper management and small numbers of patients. The limitations of the study were (1) frozen section biopsy could not be done in this study due to unavailability of the service in this institute, (2) small sample size, (3) follow up period is short.

Conclusion

The result of single stage transanal endorectal pull through operation offers an improved approach to the child with in short segment Hirschsprung's disease and may be used by any experienced pediatric surgeon. However further studies involving multicentre and large sample documenting the long term results of this approach.

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ORIGINAL ARTICLE

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Angiographic Profile of Coronary Artery Disease in a Tertiary Care Center in North-East Part of Bangladesh.

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Abstract

Coronary artery disease (CAD) is leading cause of mortality worldwide and its incidence has been rising across the globe. There is an alarming increase in incidence of Coronary artery disease (CAD) in South Asian countries including Bangladesh, afflicting people here at a relatively younger age. However, very few data are available regarding angiographic profile of CAD in North-East part of Bangladesh. to see the angiographic profile of coronary artery disease. Materials and Methods: This was a cross sectional study conducted Department of Cardiology, Sylhet MAG Osmani Medical College Hospital during the period of January 2009 to December 2015. A total of 2019 patients with IHD included and angiographic severity of coronary artery disease was assessed. Out of 2019 patients 1761 (87.2%) were male. Their mean age was 49.33 ± 10.03 years; 44.3% patients were smokers, 33.2% patients were hypertensive, 27.0% were diabetic, 5.9% had dyslipidemia and 4.7% had family history of CAD. On angiography revealed single vessel disease (28.7%), triple vessel disease (23.8%) and double vessel disease (22.4%); while normal in 25.1% of cases. Friesinger score showed more extensive CAD in 53.3% of cases. Patients with IHD have a comparable age to other population in Bangladesh but younger than western populations. A higher prevalence of single vessel disease in this region of Bangladesh but double vessel disease, triple vessel disease and normal CAG are not infrequent.Coronary artery disease, angiographic profile, risk factors.

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Introduction

Coronary artery disease (CAD) is leading cause of death and account for approximately 12 million deaths annually world-wide.[1] A substantial number of reports indicate that the prevalence of CAD has increased both in the developed and in the developing countries.[2-4] By the year 2020, coronary heart disease and stroke will hold first and fourth positions respectively, in the World Health Organization's list of leading causes of disability.[5] The prevalence of CAD varies considerably by populations, may be up to 10 folds.[6] South Asians are unduly prone to develop CAD. Most notable features of CAD in this population are the extreme prematurity and severity; 2-4-fold higher prevalence, incidence, hospitalization and mortality; 5-10 years earlier onset of first myocardial infarction (MI) and 5-10-fold higher rates of MI and death before the age of 40 years.[7]

Incidence of first myocardial infarction (MI) among Asians at age less than 40 years is 9.7% in men and 4.4% in women, which is 2 to 3.5 fold higher than that in the West European populations. In South Asians about 25% of all cases of AMI occur under the age of 40. Thus, an increasing number of young patients are being admitted with AMI in Bangladesh.[8] The INTERHEART study showed that the mean age of first MI in South Asian (Bangladesh, India, Pakistan, Sri Lanka and Nepal) population is 53 years, whereas, that in Western Europe, China and Hong Kong it is 63 years.[9] The exact prevalence of CAD in Bangladesh is not known. Only a limited number of small-scale epidemiological studies are available. Probably the prevalence of IHD was first reported in 1976, which was 0.33%,[10] More recent data indicates CAD prevalence between 1.85%,[11] and 3.4%,[12] in rural and 19.6% in an urban sample of working professionals.[13] Despite marked disparity in values, there seems to be a rising prevalence of CAD in Bangladesh.

Traditionally there are some conventional risk factors like age, male sex, family history of premature cardiovascular disease, hypertension, smoking, dyslipidaemia, metabolic syndrome, diabetes mellitus (DM), lack of exercise and obesity.[14] The excess burden of CAD among South Asians appears to be primarily due to dyslipidaemia that is characterized by high levels of

apob, triglycerides (TG), and Lp(a); borderline high levels of low-density lipoprotein cholesterol (LDL-C); and low levels of high-density lipoprotein cholesterol (HDL-C) and apoA1.[15] A genetically elevated level of lipoprotein(a) has been found to produce premature atherosclerosis in South Asians leading to its higher prevalence among populations under age 40.[16] Liberal use of saturated fats and trans fats, deep frying, reuse of cooking oil, and overcooking leading to destruction of folates may all contribute to dyslipidaemia in this population.[17] Control of different risk factors for IHD is important as it is associated with decreased mortality and morbidity.[18] Coronary angiography provides anatomic data on the extent of human coronary atherosclerosis that cannot be obtained by other means, and the value of this technique in elucidating coronary risk factors has been demonstrated repeatedly.[19]

Coronary artery size in Indians has been reported to be significantly smaller when compared to that of the western population. This has been attributed to body habitus, build and the body surface area. The smaller dimension of some coronary artery segments has important diagnostic and therapeutic implications since for any interventional procedure the absolute size of the coronary arteries matters. It has been reported that occlusion or thrombosis is more common in vessels less than 2.5 mm in diameter.[20] There are many studies done in Bangladesh and abroad regarding the pattern of coronary angiogram in different settings. But few studies were done regarding angiographic profile of patients with IHD (i.e. chronic stable angina, ST elevated myocardial infarction (STEMI), Non-ST elevated myocardial Infarction (NSTEMI) and unstable angina (UA)]. This study was designed to determine the coronary angiographic profile of patients admitted in CCU of Sylhet MAG Osmani Medical College Hospital.

Materials and Methods

This was a cross sectional study conducted among the patients admitted at CCU of Sylhet MAG Osmani Medical College Hospital during the period of January 2009 to December 2015. A total of 2019 patients with IHD included. The inclusion criteria were patients of any age and both sexes with IHD underwent coronary angiography. Immediately after admission of a patient with IHD, a proper diagnostic work up were made by taking detail history and clinical examination. A 12 lead ECG was done and serum troponin I was measured. The patients' demographic information, cardiovascular history and risk factors (ie, smoking, dyslipidemia, hypertension, diabetes mellitus, and family history) were recorded along with baseline clinical data and admission data like systolic blood pressure (SBP) diastolic blood pressure (DBP) and heart rate were also recorded.Patients of IHD were diagnosed according to latest definition of ischaemic heart diseases. Ischaemic heart diseases were classified as ST segment elevated MI, Non ST-elevation MI, Unstable angina and stable angina. Data were collected using structured pretested format. Patients were managed according to the protocol of the hospital. Echocardiography was performed at day 3 to calculate left ventricular ejection fraction (LVEF).

Acute reperfusion procedures [thrombolysis] were recorded. Venous blood samples were drawn on the day of admission to measure concentrations of admission random plasma glucose and troponin I; after overnight fasting to detect lipid profile on the following morning and fasting plasma glucose determination on day 4. After proper preparation diagnostic coronary angiography was performed via the trans-femoral approach using standard techniques. Cine angiographic films were analyzed independently by two experienced operators who were no knowledge of the patient's clinical information. Coronary artery disease (CAD) was evaluated by the degree of stenosis relates to the percentage reduction in the internal diameter of the vessel.

Coronary artery stenosis was assessed by quantitative coronary angiography (CAG) and stratified into significant and non-significant stenosis.[21] Significant coronary stenosis of left anterior descending (LAD), right coronary artery (RCA) and left circumflex coronary artery (LCX) if there was 70% stenosis and non-significant stenosis if <70% stenosis. Significant coronary stenosis of left main coronary artery (LMCA) if there was 50% stenosis and non-significant stenosis if <50%) stenosis[22] Angiographic severity of coronary artery disease was assessed by vessels score,[23] and Friesinger score.[24] Severity of CAD according to Friesinger score: less extensive CAD (score 0-4) and more extensive CAD (score >5).[14] Lesion morphology was assessed by ACC/AHA (Modified) Lesion morphology classification into Type A (High Success, >85%; Low Risk), Type B (Moderate Success, 60% to 85%; Moderate Risk) and (Low Success, <60%; High Risk).[25] The collected data were analyzed by Statistical Package for Social Science (SPSS) for windows version 22.0. Descriptive analysis was made to describe the angiographic profile.

Results

The age of the patients ranged from 16 to 85 years with the mean age of 49.33 ± 10.03 years. Most of the patients were in the age group 30-50 years (56.6%) and between 51 to 70 years (40.3%). Male were predominant,

with a ratio of 6.83:1. Risk factors were current smoker (44.3%), hypertension (33.2%), Diabetes mellitus (27.0%), dyslipidaemia (5.9%) and family history of CAD (4.7%) (Table-I). Clinical diagnosis was Stable angina (39.8%), ST elevation MI (40.0%), Non- ST elevation MI (11.9%) and unstable angina (8.3%) (Table-II). Single vessel disease was more frequent (28.7%), followed by triple vessel disease (23.8%) and double vessel disease (22.4%); while normal angiography was in 25.1% of cases (Figure-1). Friesinger score showed more extensive CAD in 53.3% of cases (Table-III). The most common lesion morphology was mixed type (47.8%) followed by type C (19.3%); no change was recorded in 19.1% of cases (Table IV).

Table I: Baseline characteristics of participants (n=2019)

Baseline characteristics	Frequency	Percentage
Age (years)		
Mean ± SD	49.33 ± 10.03	
<30	42	2.1%
30-50	1143	56.6%
50-71	813	40.3%
> 70	21	1.0%
Sex		
Male	1761	87.2%
Female	258	12.8%
Risk factors		
Current smoker	894	44.3%
Hypertension	670	33.2%
Diabetes nellitus	545	27.0%
Dyslipidaemia	120	5.9%
Family history of CAD	94	4.7%

Table II: Distribution of participants according to Friesinger score (n=2019)

Friesinger score	Frequency	Percentage
Mean	6.27 ± 4.55	25.1%
Less extensive CAD	942	46.7%
More extensive CAD	1077	53.3%

Table III: Distribution of participants according to lesion morphology (n=2019)

Lesion morphology	Frequency	Percentage
No change	385	19.1%
Type A	22	1.1%
Type B	140	6.9%
Type C	389	19.3%
Mixed type	965	47.8%
Noncritical	118	5.8%

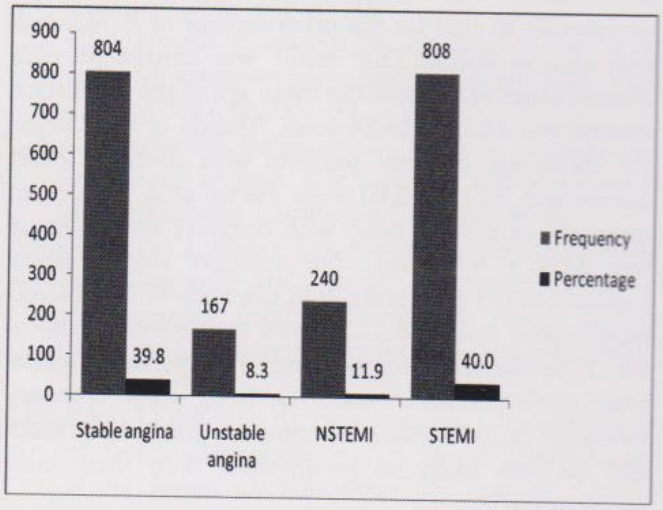

Figure I: Distribution of participants according to clinical diagnosis (n=2019)

NSTEMI: Non- ST elevation MI; STEMI: ST elevation MI

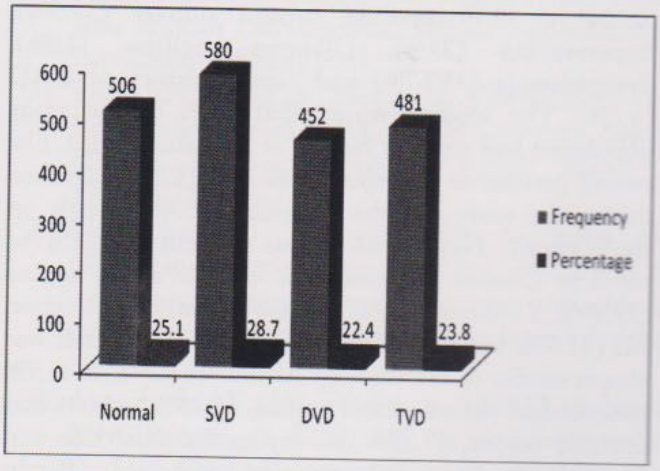

Figure II: Distribution of participants according to vessel score (n=2019).

SVD: Single vessel disease; DVD: double vessel disease; TVD: Triple vessel disease

Discussion

Bangladesh has been experiencing epidemiological transition from communicable disease to non-communicable disease (NCD). The overall mortality rate has decreased significantly over the last couple of decades. But deaths due to chronic diseases, specially cardiovascular disease is increasing in an alarming rate.[26] Among CVDs, IHD is the leading cause of death in Bangladesh.[27] The disease also tends to be more aggressive and manifests at a younger age in our neighbor country India.[28] However, in our study, the mean age of presentation was 49.33 ± 10.03 years which is comparable to that for the other regions of Bangladesh and also in India. This result was consistent with Bhattacharjee et al.[29] that the mean age of the population studied was 48.97 ± 14.54 years. Akanda et al.[30] found the mean age of their patients with coronary heart disease was 50.15 ± 8.80 years. Parvin et al.[31] reported mean age of their patients with coronary artery disease was 52.8 ± 9.5 years. But younger than western populations (65 ± 12 years).[32] In this study 87.2% of CAD patients were male and 12.3% were female with a ratio of 6.83:1. Similar male preponderance was reported in several other studies. Women suffering from acute coronary syndrome or myocardial infarction are likely to be older and are less likely to be smokers than their male counterparts.[33,34]

Regarding risk factors this study showed current smoker (44.3%), hypertension (33.2%), Diabetes mellitus (27.0%), dyslipidaemia (5.9%) and family history of CAD (4.7%). Bhattacharjee et al.[29] found that current smoker (60.44%), hypertension (50.55%), Diabetes mellitus (34.06%), and family history of CAD (4.39%). Sekhri et al.[35] reported current smoker (39.5%), hypertension (21%), Diabetes mellitus (16%), dyslipidaemia (45.67%) and family history of CAD (4.6%). The study revealed that 4.6% of the study population had a family history of premature CAD. The overall prevalence of diabetes was 16% (5.6% diagnosed during the study and the remaining 10.4% already on medication). Hypertension was present in 21% of subjects. Clinical diagnosis was chronic stable angina (39.8%), ST elevation MI (40.0%), Non- ST elevation MI (11.9%) and unstable angina (8.3%). This result was almost similar to the study of Akanda et al.[30] that 25.9% patients had chronic stable angina, 15.23% patients had unstable angina, 47.25% had myocardial infarction and 11.62% had valvular and congenital heart disease. Parvin et al.[31] reported that chronic stable angina in 48%, ST elevation MI in 30.0% and Non- ST elevation MI or unstable angina in 22% of their patients with coronary artery disease.

Single vessel disease was more frequent (28.7%), followed by triple vessel disease (23.8%) and double vessel disease (22.4%); while normal angiography was in 25.1% of cases. This result correlated with Islam et al.[12] that 36.7% patients had single vessel disease, 28.3% patients had double vessel disease, 18.3% patients had triple vessel disease and 16.7% had normal coronary angiogram.

In this regards Bhattacharjee et al.[23] that single vessel disease was more frequent (37.36%), followed by double vessel disease (31.87%) and triple vessel disease (24.17%); while normal angiography was in 6.59% of cases. In another study Akanda et al.[30] found that 14.6% patients had single vessel disease, 18.68% patients had double vessel disease, 40.66% patients had triple vessel disease, 0.47% had left main disease and 25.59% had normal coronary angiogram. In this study Friesinger score showed more extensive CAD in 53.3% of cases. This finding was almost similar to the study of Islam et al. that more extensive CAD in 46.7% of patients. The most common lesion morphology was mixed type (47.8%) followed by type C (19.3%); no change was recorded in 19.1% of cases. This result was Shah et al. found that Shah et al. reported that type B lesion was more frequent (51%) and other types were type A lesion (37%) and type C lesion 12%).

Conclusion

Patients with IHD in North-East part of Bangladesh have a comparable age to other population in Bangladesh but younger than western populations. A higher prevalence of diabetes and hypertension is noted. A higher prevalence of single vessel disease in this region of Bangladesh but double vessel disease, triple vessel disease and normal CAG are not infrequent.

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ORIGINAL ARTICLE

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Role of Transabdominal Ultrasonography In The Detection of Urinary Bladder Tumour.

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Abstract

Bladder cancer is an uncontrolled abnormal growth and multiplication of cells in the urinary bladder, which have broken free from the normal mechanisms that keep uncontrolled cell growth in check. Early detection of the disease may definitely change the fatal outcome and save many valuable lives. To find out diagnostic usefulness of transabdominal ultrasound in detection of urinary bladder tumour. This cross sectional study was done from January 2007 to March 2008. Fifty six (56) clinically suspected bladder tumour patients were included of which postoperative resected tissues were examined histopathologically. All the data were collected in a pre-designed structured data collection sheets and sensitivity, specificity, PPV, NPV and accuracy of ultrasonography in the diagnosis of bladder tumor were calculated for the validity of the study outcome. Highest incidence of tumour was found in 5th - 6th decade of life (50.0%),male (75.0%) were predominant than female (25.0%). Single tumour was observed in 31(66.1%) cases and multiple in 16(33.9%) cases. Highest incidence of tumour location was noted in posterior wall (64.3%).According to transabdominal ultrasonographic findings, bladder tumour was 47 (83.9%), chronic cystitis was 9 (16%). Histopathological findings shows transitional cell carcinoma 37 (66.1%), chronic cystitis 10 (17.9%) sarcomatoid carcinoma 3 (5.4%), adenocarcinoma 2 (3.6%), metastatic adenocarcinoma 1 (1.8%) and leiomyoma 1 (1.8%) cases. Sensitivity, specificity, PPV, NPV and accuracy of transabdominal ultrasound were 93.47%, 60.00%, 91.48%, 66.66% and 87.50% respectively in diagnosis of bladder tumour. Transabdominal ultrasonography is a useful diagnostic tool in diagnosis of urinary bladder tumour.

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Introduction

Bladder cancer is a common urologic cancer that has the highest recurrence rate of any malignancy. The clinical course of bladder cancer carries a broad spectrum of aggressiveness and risk. Low-grade, superficial bladder cancers have minimal risk of progression to death: however, high-grade muscle-invasive cancers are often lethal. The most significant prognostic factors for bladder cancer are grade, depth of invasion, and the presence of CIS (Carcinoma in situ). Approximately 80-90% of patients with bladder cancer present with painless gross hematuria, which is the classic presentation.[1] Twenty to thirty percent of patients with bladder cancer experience irritative bladder symptoms such as dysuria, urgency, or frequency of urination that are related to more advanced muscle-invasive disease or CIS.

In 1895 Rehn discovered the relation of aniline dyes with carcinoma of the urinary bladder.[2] Afterwards it was found that the rubber and cable industry, printing and gas industry, pitch workers are at high risks of developing bladder tumors. Apart from those, smoking, infection, urinary stasis, schistosomiasis are the established causes of the disease.[3]

This disease is not less common in our country in comparison with western countries. But incidences of this disease have not been evaluated in our country. Patients usually report late because the most common symptom is painless haematuria and unless it is profuse, remain unnoticed by the patient for a long time.

Role of radiology in the detection of bladder tumors has greatly increased at the end of last century. Sonography is considered to be reliable noninvasive technique for detecting bladder tumors and for preoperative local staging.[4] It is the initial radiological investigation for detection of bladder carcinomas in patients presenting

haematuria. It is safe, easily available, cost effective and provides images of both upper and lower renal tract. Among the different modalities of radiology, facilities of transabdominal ultrasonography easily available throughout our country. Early detection of the disease may definitely change the fatal outcome and save many valuable lives.

Materials and Methods

This cross sectional study was carried out at the Department of Radiology and Imaging with collaboration of the Department of Urology, Dhaka Medical College Hospital during the period of January 2007 to March 2008. Fifty six (56) clinically suspected patients with bladder tumour were included in this study. Patients unfit for sugery/biopsy were excluded. The postoperative resected tissues were examined histopathologically in the respective department and then the collected reports were correlated with findings of ultrasonography. All the data were collected in a pre-designed structured data collection sheets. For the validity of the study outcome sensitivity, specificity, PPV, NPV and accuracy of ultrasonography in the diagnosis of bladder tumor were calculated after confirmation of the diagnosis by histopathology.

Results

In this study, highest incidence of tumour was found in 5th - 6th decade of life (50.0%). Male (75.0%) were predominant than female (25.0%) (Table I). The most common and constant presentation was found haematuria in 56 (100%) cases, anaemia was present in 46 (82.1%) cases, urinary tract infection with bladder irritability, frequency and burning sensation were found in 15 (26.8%) cases. Lower abdominal pain was present in 20 (35.7%) cases. Obstructive uropathy was found in 4 (7.1%) cases and suprapubic mass due to advanced tumour were found in 3(5.4%) cases (Table II). Most common predisposing factors were smoking (78.6%) and drinking tea/coffee (83.9%) (Table III). Single tumour was observed in 31(66.1%) cases and multiple in 16(33.9%) cases. Regarding location of tumour, highest incidence was noted in posterior wall (64.3%) followed by lateral wall (23.2%), bladder neck (7.1%) and roof (dome) (5.4%) (Table IV). According to transabdominal ultrasonographic findings, bladder tumour was in 47 (83.9%) cases, chronic cystitis was in 9 (16%) cases (Table V). Histopathological findings shows transitional cell carcinoma in 37 (66.1%) cases, chronic cystitis in 10 (17.9%) cases, sarcomatoid carcinoma in 3 (5.4%) cases, adenocarcinoma in 2 (3.6%) cases, metastatic adenocarcinoma in 1 (1.8%) case and leiomyoma in 1 (1.8) cases (Table VI). Using transabdominal ultrasonography 43 (91.5%) cases were diagnosed correctly, 4 cases without tumour were wrongly diagnosed as tumour. Again 6 cases were correctly diagnosed as not tumour and 3 cases were wrongly diagnosed normal that had actually tumour (Table VII). This study shows sensitivity, specificity, PPV, NPV and accuracy of transabdominal ultrasound were 93.47%, 60.00%, 91.48%, 66.66% and 87.50% respectively in diagnosis of bladder tumour (Table VIII).

Table I: Demographic profile of the patients (n=56)

Age (years)	Frequency (n)	Percentage (%)	Mean (SD)
Age (years)			
20-40	17	30.4	49.46 (12.78)
41-60	28	50.0	
61-80	11	19.6	
Gender			
Male	42	75.0	
Female	14	25.0	

Table II: Clinical presentation of the patients (n=56)

Clinical presentation	Frequency (n)	Percentage (%)
Haematuria	56	100.0
Anaemia	46	82.1
Signs and symptoms of UTI	15	26.8
Lower abdominal pain	20	35.7
Obstructive uropathy	4	7.1
Palpable mass	3	5.4

Table III: Predisposing factors of bladder neoplasia (n=56)

Predisposing factors	Number of patients	Percentage
Smoking	44	78.57
Tea/coffee drinking	47	83.9
UTI	10	17.9
Dye/paint handing	2	3.6

Table IV: Sonographical findings of the tumours (n=47)

Tumours	Number of patients	Percentage
Number		
Single	31	66.1
Multiple	16	33.9
Location		
Posterior wall	31	64.3
Lateral wall	11	23.2
Bladder neck	3	7.1
Roof (dome)	2	5.4

Table V: Transabdominal ultrasonographic findings of the patients (n=56)

USG findings	Number of patients	Percentage
Bladder mass		
Polypoid	35	62.5%
Solid sessile	09	16%
Urothelial thickening	03	5.5%
Chronic cystitis		
Thick irregular wall	09	16%

Table VI: Histopathological findings of the tomours (n=56)

Findings	Number of patients	Percentage
Transitional cell carcinoma	37	66.1
Chronic cystitis	10	17.9
Sarcomatoid carcinoma	3	5.4
Adenocarcinoma	2	3.6
Squamous cell carcinoma	2	3.6
Metastatic adenocarcinoma	1	1.8
Leiomyoma	1	1.8

Table VII: Transabdominal USG findings of bladder tumour compared to histopathology.

USG findings	Histopathology	
	Positive	Negative
Bladder tumour (47)	43	4
Other(9)	3	6
Total	46	10

Table VIII: Validity test of Transabdominal USG in diagnosis of bladder tumour

	Percentage (%)
Sensitivity	93.47
Specificity	60.00
Positive predictive value	91.48
Negative predictive value	66.66
Accuracy	87.5 0

Discussion

Bladder tumour can occur at any age, it is generally a disease of middle and elder age. In this study 50.0% cases were found in 5th- 6thdecade. Mean age was 49.46 12.78 years whereas in other study it was 63 years for man.[5] In this study male female ratio of bladder tumour was 3:1. In another study males suffer four times more than female.[6] Ratio of incidence of bladder tumour among smoker and non smokers was 3.67:1 in our study. Similarly in other study shows cigarette smokers have up to a fourfold higher incidence of bladder cancer than non-smokers.[7] In this study, we selectively took the cases of haematuria and found 91.49% cases as bladder tumour. Blooms and Henry reported the incidence of haematuria in 80%-95% cases.[8] Anaemia and urinary tract infections were also common presenting symptoms. In this study, tumours were mostly seen on posterior wall (64.3%) and lateral wall (23.2%). Bladder tumour occurs usually in posterior and lateral wall especially near the ureteric orifices and less common on the bladder neck, dome and anterior wall.[9]

Most of the tumors were transitional cell carcinoma (66.1%) in our study. The great majority of bladder tumours are TCC (90%) which includes Grade I&II and carcinoma in situ.[10] In this study, 3 cases were wrongly diagnosed by USG as chronic cystitis were invasive into bladder wall and 4 cases were falsely positive due to thickening and irregularity of bladder wall which was interpretated as tumour. Olsen et al. also stated that transabdominal ultrasound could identify the recurrences of 5 mm or above in size significantly.[11] Below 5 mm in dimension, when positioned in the dome of the bladder or at severe trabeculation the ultrasonic scanning lead to a misdiagnosis. This study showed sensitivity, specificity, PPV, NPV and accuracy of transabdominal ultrasound were 93.47%, 60.00%, 91.48%, 66.66%and 87.50% respectively in diagnosis of bladder tumour. Stamatiou et al. revealed 87.1% sensitivity, 98.1% specificity, 94.4% PPV and 95.4% NPB.[12] Malone et al. studied the accuracy of transabdominal ultrasound (TAUS) in the diagnosis of early superficial bladder carcinoma and it was 82%.[13] Fang et al. showed 78.5% accuracy result.[14] Rafique and Javed found 96.0% sensitivity of transabdominal ultrasound in diagnosis of bladder carcinoma . Kumar, Talwar and Nandy revealed 66.7% sensitivity, 93.3% specificity, 90.9% PPV and 73.7% NPV of transabdominal ultrasound in diagnosis of bladder carcinoma.[15] So in comparison with previous study, result of this study shows transabdominal ultrasound is highly sensitive in detection of bladder tumour.

Conclusion

It can be concluded that transabdominal ultrasound is the effective diagnostic tool for detection of bladder tumour in patients presenting haematuria.

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ORIGINAL ARTICLE

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Ascitic fluid cholesterol may be a good parameter to assess the severity of liver cirrhosis.

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Abstract

This cross sectional study was conducted to see the value of ascitic fluid cholesterol for staging of liver cirrhosis. A total 50 patients with cirrhotic ascites were enrolled. Most of the cirrhotic patients (36%) were of 41-50 years of age (Mean±SD: 49.55±12.77 years). Among study subjects most (78%) were male, rest (28%) were female. Most of the cirrhotic ascites were due to hepatitis B virus (HBV) infection (72%), 20% caused by hepatitis C virus (HCV) and 8% due to non-B non-C (NBNC). Most of them were in Child-Pugh (CP) stage C (72%), rest were in stage B (28%). Ascitic fluid cholesterol in CP stage B was 10.44±6.38 mg/dl, whereas in CP stage C was 7.83±5.86 mg/dl (p=0.193). Although the result was not statistically significant but it is clear that ascitic fluid cholesterol gradually decrease as the worsening of the liver function. Here sample size was small which may be the cause of non-significant result and large scale study may be needed. In view of simplicity, easy availability and cost effectiveness for staging of cirrhosis of liver ascitic fluid cholesterol may be a good parameter.

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Introduction

'ASCITES' describe pathologic fluid accumulation within peritoneal cavity. Cirrhosis of liver is the commonest cause of ascites (~80%).[1] The increase portal pressure in patient with cirrhosis is counterbalance by serum ascites protein gradient and the protein concentration in ascites in patient with cirrhosis seems inversely related to the degree of portal pressure.[2,3]

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Since there is a close correlation between total ascitic protein and total cholesterol, one can assume that ascitic cholesterol as well as lipoprotein concentration were inversely correlated to the height of portal pressure[4]. In patient with cirrhosis, there is impaired hepatic lipoprotein synthesis and abnormalities in transcapillary-lymph hydrodynamics results in lower selectivity for the movement of HDL and LDL from plasma to ascites.[5]

For a number of chronic diseases, including cirrhosis, it has been a challenging issue for physicians to elaborate reliable tools for predicting outcome. Prognostic scores represent a quantitative estimation of the 'reserve' in terms of liver function and the capacity to stand up resource-spending therapy such as transplantation or other aggressive therapeutic interventions. Among various scoring system Child-Pugh score (CP) has been widely used to address these basic issues. It included three continuous variables (serum bilirubin, albumin and prothrombin time) and two discrete (quantitative) variables (ascites and encephalopathy). But in developing countries like Bangladesh due to financial constrain less expensive, simple and single biochemical tool is required for staging of liver cirrhosis. Since ascitic fluid cholesterol can be determined more easily and cost effectively, it may be an excellent parameter to assess the degree of portal pressure as well as severity of liver cirrhosis.

Materials And Methods

This cross sectional study were conducted in department of Hepatology, Bangabandhu Sheikh Mujib Medical University (BSMMU) from January 2013 to December 2013. 50 patients with ascites due to cirrhosis of liver as evidenced by- history and clinical features suggestive of cirrhosis, ultrasonographic evidence of ascites and small size liver with coarse liver echotexure, endoscopicevidence of oesophageal varices, serum ascites albumin gradient (SAAG) > 1.1 g/dl and/or cirrhotic changes in liver biopsy were included. Whereas patient with spontaneous bacterial peritonitis, presence of co-existing disease that would alter serum cholesterol level (e.g. Diabetes mellitus, hypertension, renal failure, familial hypercholesterolemia, thyroid disorder, cardiovascular diseases etc.), ascites due to nephroticsyndrome, congestive cardiac failure, malnutrition, mixed aeitiology

(e.g. cirrhosis with tuberculosis/ malignancy), Budd-Chiari syndrome, fulminant hepatic failure, chemotherapy or radiotherapy already commenced, use of lipid lowering drugs, biliary cirrhosis and chylous ascites were excluded. All the data were checked and edited after collection. It was expressed as Mean ± SD, frequencies or in percentage. Statistical analysis was done using SPSS-16 (statistical package for social sciences) win version 16 software programme.

Results

Table I: Age distribution of the study population (n=50)

AGE (YEARS)	NUMBER	PERCENTAGE (%)
20	0	0
21-30	6	12
31-40	5	10
41-50	18	36
51-60	13	26
61-70	5	10
>70	3	6
MEAN±SD: 49.55±12.77		

Most of the cirrhotic patients (36%) were of 41-50 years of age. Among study subjects 78% were male, rest (28%) were female. Most of the cirrhotic ascites were due to hepatitis B virus (HBV) infection (72%), 20% caused by hepatitis C virus (HCV) and 8% due to non-B non-C (NBNC). Most of the cases were in Child-Pugh (CP) stage C (72%, n=36), 28% patients found in Child-Pugh stage B (n=14), none of the patients with cirrhotic ascites found in Child-Pugh stage A. Mean ascitic fluid cholesterol in study subjects was 8.425±5.96 mg/dl. Ascitic fluid cholesterol in patients with CP stage B was 10.44±6.38 mg/dl, whereas in CP stage C it was 7.83±5.86 mg/dl. Difference in cholesterol level in CP stages was not significant (p= 0.193)

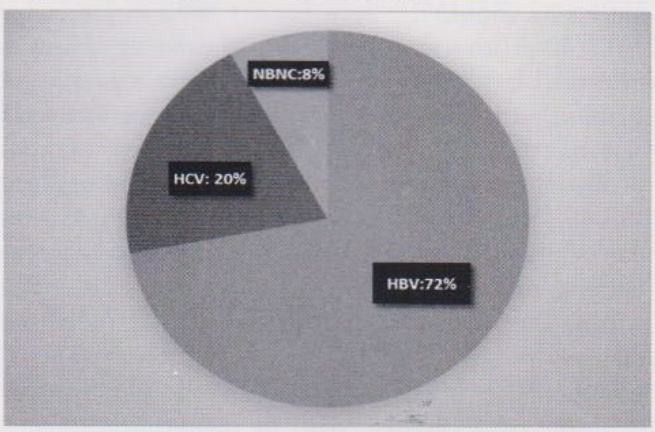

Figure I: Aetiology of cirrhotic ascites (n=50)

Table II: Ascitic fluid cholesterol in study patients (n=50)

CP STAGE	CHOLESTEROL(mg/dl)	p value
B (n=14, 28%)	10.44±6.38	
C (n=36, 72%)	7.83±5.86	

Discussion

In this study most of the cirrhotic patients (36%) were of 41-50 years of age and most cirrhotic cases were male (78%) which was supported by Alam et al. 2008 [6]. In this study hepatitis B virus (HBV) was the most common cause of cirrhosis (72%) followed by hepatitis C virus (20%) and the remaining 8% causes were unknown (NBNC). Afroz et al. 2007 also found HBV as a leading cause of cirrhosis in Bangladesh [7]. Most of the cirrhotic patients were in Child-Pugh (CP) stage C (72%), 28% patients found in CP stage B, none of the patients found in CP stage A. In our study most (92%) of the cirrhosis was due to chronic viral hepatitis (HBV/HCV), whereas Bijoor & Venkatesh (2001); Gerbes et al. (1990) and Jungst et al. (1986) found a significant percentage of study subjects with alcoholic cirrhosis [4,8,9]. Due to religious and cultural background no patients with cirrhosis in our study was found due to alcoholism. It was also noted that cirrhosis due to non-alcoholic fatty liver disease (NAFLD) was not included in our study as there was presence of other co-existing diseases (such as diabetes mellitus), which may alter serum cholesterol as well as ascitic cholesterol level and it is a part of lipid metabolic disorder. In our study ascitic fluid cholesterol in cirrhotic patients with CP stage B was 10.44±6.38 mg/dl, whereas in CP stage C it was 7.83±5.86 mg/dl. The difference was not statistically significant (p = 0.193). Although the result was not statistically significant but it was clear that ascitic fluid cholesterol gradually decrease as the worsening of the liver function and the result was consistent with the Bijoor & Venkatesh (2001), Gerbes et al. (1990) and Jungst et al. (1986) [4,8,9]

Conclusion

In view of simplicity, easy availability and cost effectiveness ascitic fluid cholesterol may be a good parameter for staging of liver cirrhosis. Small sample size may be the cause of non-significant result and large scale study should be needed.

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ORIGINAL ARTICLE

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Analysis of the Elongated Styloid Process: A Cross-Sectional Study.

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Abstract

This cross-sectional study aimed to evaluate styloid process elongation using digital radiographs, noting their length according to sex and location and also measure and classify the types of elongated styloid processes. A total 205 digital radiographs of symptomatic adult patients were evaluated in the Department of Radiology and Imaging, Sylhet MAG Osmani Medical College Hospital between January 2016 and June 2017. Among them 112 radiographs fulfilled the inclusion criteria with the age ranging from 20 to 72 years old; 50 (44.6%) were male and 62 (55.4%) were female. The mean length of styloid process was 36.90 ± 7.80 mm (right side) and 36.25 ± 6.47 mm (left side); difference was not statistically significant (p=0.497). The mean length was 37.70 ± 9.69 mm (male) and 36.26 ± 5.86 mm (female) in right styloid process; difference was not statistically significant (p=0.333). The length of styloid process was 35.72 ± 8.03 mm (male) and 36.68 ± 4.89 mm (female) in left styloid process; difference was not statistically significant (p=0.439). Bilateral elongation was in 91 (81.2%) and Type-I(elongated) elongation was more frequent (54.5%). In conclusion bilateral and type I elongation are more frequent in elongated styloid process. No difference in length of elongated styloid process between right and left side; and between male and female of left and right side.

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Introduction

Styloid process is derived from the Greek word "Stylos" means a pillar. Embryologically styloid process, the stylohyoid ligament and the lesser cornu of hyoid bone are developed from the second brachial arch called Reichert's cartilage. The styloid process is a cylindrical, long cartilaginous bone which arises from the temporal bone in front of the stylo-mastoid foramen. The attached structures include stylopharyngeus, stylohyoid and styloglossus muscles, and stylohyoid and stylomandibular ligaments. The apex of the styloid process is clinically important as it is located between internal and external carotid arteries, just lateral to the tonsillar fossa. The tip of the styloid process is continuous with the stylohyoid ligament, which extends to the lesser cornu of the hyoid bone.[1,2] The stylohyoid ligament has a potential for calcification because of its cartilaginous origin.[3]

The typical length of the styloid process is 20 to 30 mm, although it varies in length from person-to-person and even from side to side in the same person. The styloid process length which is longer than 30 mm was considered to be elongated styloid process.[3,4] An elongated styloid process occurs in about 4% of the general population, although only a small percentage of these patients are symptomatic. The actual incidence is with a female-to-male predominance of 3:1.[3]

Enlarged styloid processes or calcified stylohyoid ligament causing mass effect on the adjacent structures, the nerves and vessels resulting in cervical and craniofacial pain that may be confused with other causes of head and neck pain.[5,6] The styloid process elongation may cause symptoms such as dull aching pain localized in either or both the sides of the throat.

The pain may be referred to the ear or mastoid region of the affected side. It may cause pain on swallowing (dysphagia) or an abnormal sensation of foreign body in the pharynx. More uncommonly symptoms, such as tinnitus or otalgia, may occur. When these symptoms are present, it is called Eagle's syndrome.[7] The elongated styloid process is diagnosed by both radiographical and physical examination.[8]

When the literature was reviewed no study has been conducted to analyse the elongated styloid process in Bangladesh. So the present study was designed to analyse the elongated styloid process.

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5. Professor, Radiology & Imaging, Sylhet MAG Osmani Medical College.

Materials and Methods

The study is based on 112 digital radiographs consecutively done in the Department Radiology and Imaging Sylhet MAG Osmani Medical College Hospital, Sylhet during the period from January 2016 to June 2017. The radiographs of 205 symptomatic patients with advise for styloid process had been taken. Inclusions criteria were age 10 years and above, both sexes, and X-rays that allow the visualization of the start and end points of the styloid process from both sides.

All radiographs were obtained from Plain Computed Radiography system (Fuji CR-IR 392, Japan) under standard exposure factors (KVp and mAs). The length of styloid process was measured with the rule on both sides from caudal margin of tympanic plate to tip of SP, regardless of whether or not the SP was segmented. Consultant Radiologist evaluated the images. SPs measuring more than 30 mm were considered as elongated. If the stylohyoid or stylomandibular ligaments were ossified, they were measured along with the SP, as part of the ESP because radiographically it is difficult to distinguish ossified ligaments from SP as a separate entity. The type of elongation of the SPs was also classified as per Langlais et al.[9] [Figure 1], who rated the types of elongation: elongated or type I: characterized by a continuous and full mineralization of the complex; pseudoarticulated or type II: in which the styloid process apparently interacts with the stylomandibular and stylohyoid ligaments by a single pseudo joint; and segmented or type III: characterized by a lack of mineralization contiguity of the process or stylohyoid ligament. In this case, the measurement was performed from the initial point to the most distal point, regardless of the distance between the segments.

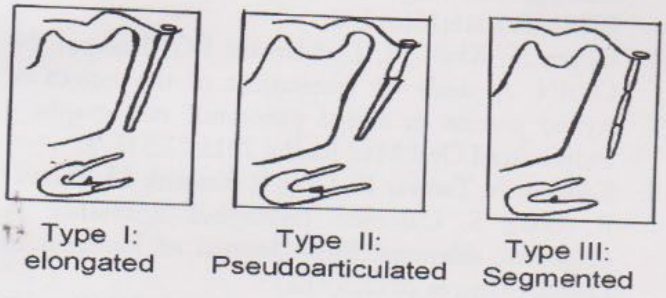

Figure I: Morphological classification of type of styloid process (Type I: elongated, Type II: Pseudoarticulated, Type III: Segmented)

Data regarding age, sex, right and let sides, length and type of elongation of the SPs and apparatus used were processed and entered into SPSS (Statistical Package for Social Sciences) version 22 software and the statistical calculations were obtained. The informed verbal consent was taken from the patient and there confidentiality were maintained. The study protocol was reviewed by ethical committee board. For data analysis, the absolute distribution, percentages, and statistics measures were obtained: mean, standard deviation, and minimum and maximum values (descriptive statistical techniques) and unpaired t test was done to see the level of significance.

Results

The mean age of the patients was 40.77 ± 12.48 (range, 20-72) years; 50 (44.6%) were male and 62 (55.4%) were female. The mean length of SP on the right and left side were 36.90 ± 7.80 mm and 36.25 ± 6.47 mm respectively; difference was not statistically significant (t=0.681; p=0.497) [Table I]. In the right side, mean length of SP of male was 37.70 ± 9.69 mm and of female was 36.26 ± 5.86 mm; difference was not statistically significant (t=0.973; p=0.333) [Table II]. In the left side, mean length of SP of male was 35.72 ± 8.03 mm and of female was 36.68 ± 4.89 mm; difference was not statistically significant (t=-0.777; p=0.439) [Table II]. According to Langlais' classification (Figure 1), 61 (54.5%) SP was of Type I (Elongated), 37 (33.0%) SP was type II (pseudoarticulated) and 14 (12.5%) SP was of Type III (segmented) Unilateral elongation was in 21 (18.8%) and bilateral elongation in 91 (81.2%).

Table I: Length of the right and left styloid process

Length of SP (mm)	Right side	Left side	p-value
Mean	36. 90	36.25	p=0.497
Standard deviation	± 7.8 0	± 6.47	
Range	27-82	27-70	

Table II: Length of the right and left styloid process in relation to sex

Length of SP (mm)	Male	Female	p-value
Right side	37. 70 ± 9. 69	36.26 ± 5.86	p=0. 3 33
Left side	35.72 ± 8.03	36. 68 ± 4.80	p=0.439

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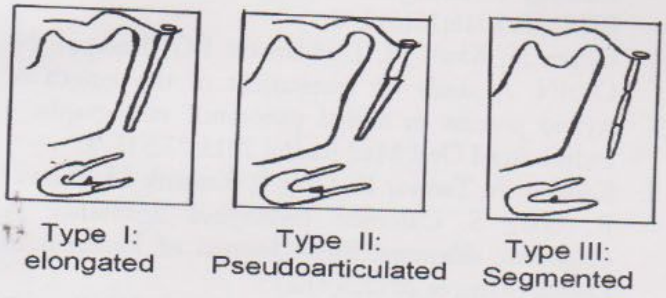

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Discussion

Anatomical variation in the length of the styloid process and its stylohyoid chain is said to have profound anatomical, anthropological as well as of clinical importance. Knowledge of the clinical appearance and radiographic characteristics of styloid process would enable differential diagnosis of different pathological changes in the orofacial and perioral area. The elongation of styloid process is considered an anomaly which can be accompanied by calcification of the stylohyoid and stylomandibular ligaments, which can trigger a series of symptoms such as dysphagia, odynophagia, facial pain, ear pain, headache, tinnitus and trismus.[10] Therefore this study was conducted to see the variation in the styloid process in this region of Bangladesh.

In this study the mean age of the patients was 40.77 ± 12.48 (range, 20-72) years which is almost similar to the study by Bagga et al.[11] where the mean age of the patients was 34.54 ± 14.62 years. This study revealed that 44.6% were male and 55.4% were female. Bagga et al.[11] reported 62.1% males and 37.9% females in their study subject which are dissimilar to our study.

In this study the mean length of SP on the right and left side were 36.90 ± 7.80 mm and 36.25 ± 6.47 mm respectively; difference was not statistically significant (p=0.497). Gupta et al.[4] reported the mean length of SP on the right and left side was 29.19 ± 6.86 and 28.16 ± 6.44, respectively. A study conducted in India revealed that the average length of the left styloid was 25.41 ± 6.32 mm and that of the right styloid was 25.53 ± 6.62 mm.[12]

Mean length of styloid process is more in our study as the study only includes elongated styloid process. In the right side, mean length of SP of male was 37.70 ± 9.69 mm and of female was 36.26 ± 5.86 mm; difference was not statistically significant (p=0.333). whereas in the left side, mean length of SP of male was 35.72 ± 8.03 mm and of female was 36.68 ± 4.89 mm; difference was not statistically significant (p=0.439). This result correlated with the study of Shete et al.[2] that the average length of SP on the left side was 34.54 ± 7.54 mm and 33.02 ± 6.70 mm in male and female population, respectively. The average length of SP on the right side was 35.30 ± 7.46 mm and 34.54 ± 7.31 mm in male and female population, respectively. Male patients had longer SP than female patients reported in the study of Gupta et al.[4] These results were in accordance with studies done by More and Asrani,[12] and Sudhakara et al.[13]

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The limitations of the study were (1) Single centre study, (2) consecutive sampling (3) small sample size. Digital radiography is useful for detection of an elongated styloid process. Moreover a radiographic classification of the styloid process may aid in surgical planning in elongated styloid process. However further evaluation involving multicentre and large sample is warranted. In conclusion, bilateral elongated styloid process is high and type I elongation is more frequent. No difference in length of elongated styloid process between right and left side; and between male and female of left and right side.

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ORIGINAL ARTICLE

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Clinical and Biochemical Pattern of Hypothyroid Patients Attended In a Secondary Level Hospital of Bangladesh

Ajoy Roy Chowdhury[1], Syed Abul Foez[2], Md Ziaur Rahman Chowdhury [3], Abul Kalam Mohammed Shoab [4], Habibur Rahman [5], Premananda Das [6],

Abstract

This retrospective study was done in 250 bedded hospital, Moulvibazar, Sylhet, Bangladesh from January 2015 to July 2016 and total 1105 requisitions for screening of hypothyroidism were analysed. 33.94% of the total 1105 cases had thyroid dysfunction in the form of subclinical or overt hypothyroidism. In the hypothyroid group generalised weakness, cold intolerance, weight gain and dermal myxoedema were found more common. Primary infertility, dysfunctional uterine bleeding (DUB) and low mood were common. Only aches and pains, alopecia, constipation were found in a few cases. The average age of female with subclinical hypothyroidism was 31.2 years and 46 years in male. On the other hand the average age of female with overt hypothyroidism is 36.9 years and 49.2 years in male. In both overt and subclinical hypothyroid cases, hypothyroidism was more common in female and often under-diagnosed. Therefore routine evaluation of female patients with weight gain, generalised weakness, infertility, dysfunctional uterine bleeding and mental depression should be screened for thyroid function tests.

[OMTAJ 2017; 16 (1)]

Introduction

Hypothyroidism is one of the most common endocrine disorder which is more common in female than male.[1] In adults it presents with a range of non-specific to typical sign symptoms.[2] Many of common sign-symptoms of hypothyroidism like increase tiredness, weight gain, constipation, menorrhagia are frequently seen in euthyroid patients.[3] The classic picture of the slow and thick skinned,deep voiced patients with weight gain,cold intolerance, bradycardia and constipation make the diagnosis easy.[4] Milder symptoms are however more common and hard to distinguish from other cases of non specific tiredness.[5] Many cases are detected on biochemical screening.[6]

Special difficulties in diagnosis may arise in certain circumstances:1) Children with hypothyroidism may not show classic features but often have a slow growth velocity, poor school performance and sometimes arrest of pubertal development,2) Young women with hypothyroidism may not show obvious signs and should be excluded in all female with oligomenorrhoea, amenorrhoea, menorrhagia, infertility or hyperprolactinaemia, 3) The elderly show many clinical features that are difficult to differentiate from normal ageing. [7,8] Considering these aspects an attempt was made to study the clinicobiochemical spectrum of hypothyroidism to make the relative importance of thyroid function tests with symptoms.

Materials and methods

A hospital based retrospective study was done in 250 bedded hospital, Moulvibazar, Sylhet, Bangladesh during the period of January 2015 to July 2016. During the study period total 1296 requisitions were received and sign-symptoms were written in a register by prescribed questionnaires. Out of them known 89 cases of hypothyroidism, 34 known cases of hyperthyroidism and 68 cases referred with clinical suspicion of hyperthyroidism were excluded. Remaining 1105 requisitions were studied.These cases were referred for screening or confirmation of clinical suspicion of hypothyroidism. All these cases were clinically analysed on a preset proforma and arranged into 2 groups. Group-I: included cases referred with high index of suspicion having 2 or more of the sign-symptoms of hypothyroidism (Table I) and the remaining cases were included in group-II and this group included cases referred with vague or non-specific sign and symptoms.These two groups were further graded as subclinical, overt hypothyroidism and normal cases

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5. Assistant Professor, Endocrinology, Sylhet MAG Osmani Medical College.
6. Assistant Professor, Microbiology, Sylhet MAG Osmani Medical College.

(Table II) based on the results of FT3, FT4 & TSH levels. Serum Free T3, Free T4 and TSH were determined by immunoassay method using kits from Siemens through IMMULITE 1000 analyzer. Normal range for FT3, FT4 and TSH were 1.5-4.1 pg/ml, 11.5-22.7 pmol/L and 0.4-4 iu/ml respectively. The sensitivity of assay for TSH was .004 iu/ml.

Table I: Sign-symptoms of hypothyroidism

Symptoms	Signs
1. Diminished sweating	1. Slow movements
2. Hoarseness	2. Delayed ankle reflex
3. Pa raesthesia	3. Coarse skin
4. Dry skin	4. Periorbital puffiness
5. Constipation	5. Myxoedema
6. Hearing impairment	6. Cold skin
7. Weight gain	7. Bradycardia
8. Cold intolerance	
9. Depression	

Table II: Definitions of hypothyroidism

Diagnosis	TSH	Thyroxin levels
Subclinical hypothyroidism		
Grade-1	4 – 10 μiu/ml	Normal
Grade-2	10.1 -20 μiu/ml	Normal
Grade-3	>20 μiu/ml	Normal
Overt hypothyroidism	Raised	Low

Results

Analysis of the 1105 cases revealed that 607 cases were referred with high index of clinical suspicion (Group I) and 498 cases were referred with vague symptoms or occasional sign and symptoms of hypothyroidism (Group II). Among the study subjects 711 (64.34%) were female and 394 (35.66%) were male (Figure I).

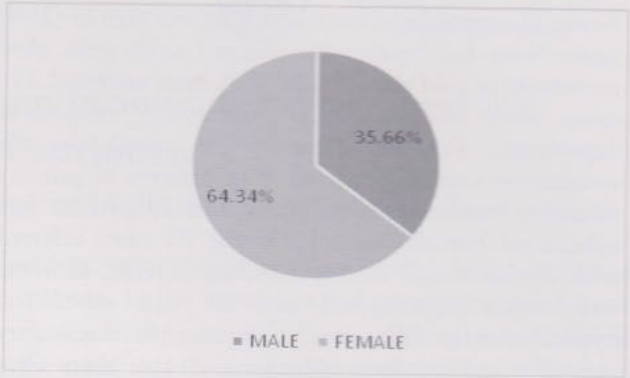

Fig I: Sex distribution of study population

Table III: Distribution of cases in Group-I and Group -II

	Subclinical hypothyroidism	Overt hypothyroidism	Normal
Group I	(607) 242 (39.87%)	46 (7.58%)	319 (52.55%)
Group II	(498) 79 (15.87%)	8 (1.60%)	411 (82.53%)
Total	(n=1105) 321 (29.05%)	54 (4.89%)	730 (66.06%)

Out of 1105 cases 33.94% had thyroid dysfunction in the form of subclinical or overt hypothyroidism (Table 3). In group-I, 242 (39.87%) had subclinical hypothyroidism and 46 (7.58%) were overt hypothyroidism, while 52.55% cases were incorrectly clinically classified as hypothyroidism and they had normal biochemical thyroid profile. In group II, 79 (15.87%) cases had subclinical hypothyroidism, 8 cases (1.60%) had overt hypothyroidism and 411 (82.53%) had normal thyroid profile.Out of total 1105 cases, 54 (4.89%) cases were overt hypothyroidism, 321 (29.05%) cases were subclinical hypothyroidism and 730 (66.06%) cases were found normal biochemically. Females were found predominant in both overt and subclinical cases (77.78%) and (87.85%) respectively. (Table IV)

Table IV: Sex distribution of hypothyroid cases

SEX	OVERT	SUBCLINICAL
Male	12(22.22%)	39(12.15%)
Female	42(77.78%)	282(87.85%)

The analysis of the clinical presentation of overt hypothyroidism is given in Table V. Weight gain was a common symptom in both the groups (60.86% and 50% respectively). Myxoedema was the commonest sign in both groups accounting for(34.78%) of cases in Group-I and (25%) in Group-II. Generalized weakness (65.21%) and weight gain (60.86%) were the commonest symptoms in Group-I followed by mood changes and dry skin. Cold intolerance was present in(32.60%) and change of voice in (4.34%) cases. However in Group II weight gain was the most common symptom (50 %) followed by mood changes (37.5%). In Group-I Myxoedema was commonest, bradycardia. in (4.34%) and delayed ankle jerks in (13.04%) cases. In

Group II, myxoedema and coarse skin was seen in (25%) cases. None had bradycardia, delayed ankle jerks, slow movement or cold skin. Out of 1105 cases reviewed, 198 cases were referred from gynaecology outpatient department. Primary infertility (86 cases) was the commonest cause for referral. Five patients of primary infertility were overt hypothyroid and 29 patients had subclinical hypothyroidism. Of the 73 cases referred with dysfunctional uterine bleeding (DUB), fourteen were overt hypothyroid and 27 had subclinical hypothyroidism. 39 cases were sent for secondary infertility and recurrent abortion and 4 of them were found overt hypothyroid and 12 were found subclinical hypothyroidism. Rest 107 patients were found euthyroid states.59 patients with goitre were referred by surgeons and out of them three were detected to have subclinical hypothyroidism and none had overt hypothyroidism. Nine patients were referred from ENT outpatient department for change of voice, found 1 are overt hypothyroid and rest were normal.

Table V: Clinical presentation of overt hypothyroid cases

Symptom	% Occurrence		Sign	%Occurrence	
	Group-I (n=46)	Group-II (n=8)		Group-I (n=46)	Group-II (n=8)
Generalised weakness	65.21	37.5	Myxoedema	34.78	25.0
Weight gain	60.86	50.0	Coarse skin	32.60	25.0
Mood changes	52.17	37.5	Delayed ankle jerks	13.04	Nil
Dry skin	45.65	25.0	Slow movements	8.69	Nil
Constipation	43.47	12.5	Cold skin	8.69	Nil
Menorrhagia	36.95	25.0	Bradycardia	4.34	Nil
Cold intolerance	32.60	Nil			
Poor mentation	15.21	Nil			
Headache	13.04	37.5			
Increased hair fall	10.86	37.5			
Hoarseness of voice	4.34	Nil			
Impaired hearing	Nil	Nil			
Aches and pains	4.34	12.5			

Discussion

Hypothyroidism is often under diagnosed. In our study 33.94% cases had thyroid dysfunction in the form of subclinical or overt hypothyroidism. In Group-II, 15.87% patients referred with vague symptoms had elevated TSH levels while 1.60% had overt hypothyroidism. Whereas in group I, 39.87% of patients with typical clinical sign-symptoms had subclinical hypothyroidism, 7.58% overt hypothyroidism and 52.55% cases had a normal biochemical profile and were incorrectly classified clinically as hypothyroid. Bajaj et al[1] concluded that clinical parameters alone are insufficient in establishing adiagnosis of hypothyroidism and biochemical tests should be a routine criterion for establishing the diagnosis of hypothyroidism.In community surveys the most specific and discriminating features of hypothyroidism aredecreased sweating, hoarseness of voice, paraesthesia, cold intolerance, delayed reflexes and periorbital oedema.[2,4] However in our study generalized weakness, weight gain and mood changes were common. The commonest sign in both the groups was myxoedema, which accounted for 34.78% of cases in Group-I and 25% in Group II. Cold intolerance was present in 32.60%, change of voice in 4.34% and delayed reflexes in 13.04% cases in group I.

This study also shows that in certain subgroups of patients (e.g. primary infertility) subclinical hypothyroidism was prevalent. In hypothyroidism the FSH and LH secretions are usually in the normal range for the follicular phase of menstrual cycle but there is no ovulatory surge. The women therefore have irregular anovulatory cycles, excessive menstrual bleeding and tend to be infertile. On conceive these patients may have normal outcome of pregnancy or an increased likelihood of abortion, stillbirth and premature delivery.[4] Menorrhagia was seen in 35.18% of hypothyroid cases. Therefore screening for hypothyroidism in these cases is of great significance. Patients with mood changes also had high (50%) incidence of thyroid dysfunction. This highlights the importance of evaluating all cases of depression and mood changes for hypothyroidism.

Conclusion

This study suggests that the problem of hypothyroidism is more common in female and often under-diagnosed.Therefore routine screening for hypothyroidism should be carried outin female patients with symptoms of weight gain, generalized weakness, mood changes, infertility and dysfunctional uterine bleeding (DUB),so that these cases can be diagnosed and managed earlier.

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ORIGINAL ARTICLE

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Complications after total laryngectomy in nonradiated laryngeal and hypopharyngeal carcinoma.

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Abstract

This observational study is aim to find various complications after total laryngectomy in Otolaryngology and Head-Neck Surgery department, Sylhet MAG Osmani Medical College Hospital, Sylhet. One year from January 2015 to December 2015. The presentation, diagnosis and management of these complications are discussed along with voice rehabilitation after total laryngectomy . There were 15 male Patients all are non radiated. age of the patients ranged from 25-75 years complication included wound infection (04) pharryngocutaneous fistula (03), Heamatoma (01), Partial Flap necrosis (01) and no complications (06). Wound infection and pharyngocutaneous fistula are most common complications after total laryngectomy. Low postoperative haemoglobin levels are important risk factors for development of pharyngocutaneous fistula in total laryngectomy patients.

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Introduction

Laryngeal carcinoma is the most common carcinoma in head and neck region and representing about 1% of all malignancies.[1] It accounts for 40% of all head and neck malignancies. Hypopharyngeal cancer is a rare disease representing about 0.5% of all malignancies and constituting only 3%-5% of all head and neck cancers.[2] Laryngeal and Hypopharyngeal cancers are more common in men than in women. In Bangladesh the cancer of larynx and hypopharynx comprises of around 21% of all cancer in males.[3] Squamous cell carcinoma is by far the most common type of tumour, comprising 90% or more of all laryngeal malignancies.[4] arises after strong socioeconomic association, being twice as common in the more deprived groups compared to the more affluent groups. Tobacco smoking and alcohol are the main risk factors for laryngeal and hypopharyngeal cancer and their effects are synergistic.[5]

Staging of Laryngeal and hypopharyngeal cancers are based on the results of physical examinations, investigation reports, endoscopy, and biopsies. The most common system used to describe cancer stages is the American Joint Committee on Cancer (AJCC) TNM system. For laryngeal and hypopharyngeal cancers, the TNM system is based on 3 key pieces of information. T stands for tumour, N stands for spread to near by lymph nodes in the neck, M stands for metastasis (spread to distant organs). A computed tomography (CT) scan with intravenous contrast is usually the first and often the only radiographic study required to assess a laryngeal tumour. The CT scan is quite accurate in assessment of laryngeal and hypopharyngeal lesions, particularly with reference to tumor extension in the paraglottic space and invasion of cartilages and adjacent soft tissues.[7]

Treatment requires a multidisciplinary team, including surgeons, oncologists, nurses and speech therapists.[8] Three main treatment options for laryngeal and hypopharyngeal cancer are Surgery, Radiotherapy and Chemotherapy along with voice rehabilitation. Total laryngectomy is a radical procedure which involves removal of whole of the larynx and some parts of hypopharynx, hyoid bone and infrahyoid muscles connected to the larynx. This surgical procedure is sometimes associated with bilateral anterior selective neck dissections (levels II, Ill and IV).[9] It is useful in the treatment of advanced laryngeal cancer and as a salvage procedure when previous partial laryngeal surgery or radiotherapy has failed.[10] Complications following total laryngectomy can cause serious implications on the final outcome of the treatment. Early complications of total laryngectomy include haematoma, wound infection, superficial flap necrosis, chyle leak, pharyngo-cutaneous fistula and injury toThe incidence of laryngeal and hypopharyngeal cancer has a the posterior pharyngeal wall.[11]

After Total laryngectomy some complications occurs in our institute. This study is planned to see the complications

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this operation. The results of this study will be used to minimize the complications and to improve the quality of life of a laryngectomee patient. Total laryngectomy in radiated neck has more complications in comparison to that in non-radiated neck, such as in irradiate cases chance of pharyngocutaneous fistula is 40-60 % but in non-irradiate cases only 4-6%. To find out various complications after total laryngectomy with respect to their presentation diagnosis & management. This study was conducted on 15 male patients who underwent total lanryngectomy in one year

Materials and methods

This is an observational study. Otolaryngology and Head-Neck Surgery department, Sylhet MAG Osmani Medical College Hospital, Sylhet. One year from January 2015 to December 2015.

Inclusion criteria All patients undergoing total laryngectomy for histologically proven laryngeal and hypopharyngeal squamous cell carcinoma with No. N1, N2, or N3 Neck with no H/O radiotherapy. Radiated patients, flap reconstruction & Patients refuse undergoing total laryngectomy. Purposive sampling technique was used in this study patients of histologically proven carcinoma of larynx and hypopharynx with or without neck node metastasis undergoing total laryngectomy in the Department of Otolaryngotogy and Head Neck surgery Sylhet M.A.G. Osmani Medical College Hospital are selected.

All patients will be assessed thoroughly by taking history, clinical examination and necessary investigations for general anaesthesia and for distant metastasis. Those will meet the inclusion criteria will be selected. Post operative complications during their stay in the hospital and after discharge from hospital a regular follow up visit record was maintain at 1 month & 3 months, recurrence will be assess clinically. During follow up thorough clinical examination & appropriate investigations were done

Results

in this study 15 male patients inclued thosewho are previously non-radiated . The age of the patient rangedfrom 25-75 years. Most of the cases are supraglottic carcinoma 8(53.3%), pyriform fossa 4(26.7%), Glottic carcinoma in 3(20.0%) and no subglottic carcinoma. This study out of 4 pyriform fossa cases, 3 patients presented in stage II and 1patient in stage III, 8 supraglottic cases, 2 patients presented in stage, I 4 patients in stage II and 2 patients in stage III. Among 3 glottic cases all patients presented in stage I.

Table I: Distribution of study population according to age (n=15)

Age	Frequency	Percentage (%)
<40 yrs	2	13.3
40-49 yrs	4	26.7
50-59 yrs	5	33.3
60 yrs	4	26.7
Total	15	100.0

Table II: Distribution of the patients by site of growth (n=15)

Site of carcinoma larynx	Number of patients	Percentage %
Pyriform fossa	4	26.7
Supraglottic	8	53.3
Glottic	3	20.0
Subglottic	0	0.0
Total	15	100.0

Table III: Distribution of the patients by preoperative TNM staging of carcinoma larynx (n=15)

Site	TNM stage			
	Stage I	Stage II	Stage III	Stage IV
Pyriform fossa	0	3	1	0
Supraglottis	2	4	2	0
Glottis	3	0	0	0
Sub-glottis	0	0	0	0

Out of 4 pyriform fossa cases, 2 patients presented in nodal metastasis stage N3, 8 supraglottic cases, 4 patients presented in nodal metastasis stage N2. Among 3 glottic cases 3 patients presented in metastasis stage N3.

Table IV: Distribution of the patients by preoperative nodal metastasis of carcinoma larynx and hypopharynx (n=15)

Site	Nodal metastasis			
	N_0	N_1	N_2	N_3
Pyriform fossa	0	1	1	2
Supraglottis	0	1	4	3
Glottis	0	0	0	3
Sub - glottis	0	0	0	0

Tracheostomy was done pre operatively in 6(40%) patients and in the remaining patients 9(60%) done at the time of operation.

Table V: Time of performing Tracheostomy (n-15)

Tracheostomy	No. of patients	Percentage%
Before operation	6	40.0
During operation	9	60.0

Histologically all 15(100%) were squamous cell carcinoma.

Table VI: Distribution of the patients by histological classification of primary tumour (n=15)

Classification	No. of patients	Percentage %
Squamous cell carcinoma	15	100 .0
Adeno carcinoma	00	0.0
Others	00	0.0

Among the 15 patients operated 3 (20%) patients developed pharygocutaneous fistula within 7th to 15th post operative day and these three patients were managed conservatively which involved adequate drainage, frequent dressings and fresh blood transfusion.

Table VII: Distribution of the patients by postoperative complication after total laryngectomy (n=15)

Complications	Number of patients	Percentage %
Pharyngocutaneous fistula	3	20.0
Wound inf ection	4	26.7
Haematoma	1	6.7
Flap necrosis (partial)	1	6.7
No complications	6	40.0

With these conservative management fistula healed completely within 3 to 4 weeks. Wound swab was sent for culture and sensitivity and antibiotics changed accordingly. No drainage or debridement required. Wound healed within 2-3 weeks with conservative treatment and adequate aseptic dressing.1(6.7%) patient developed post operative heamatoma which was drained immediately. This patient developed wound infection later on and was managed conservatively. 1(6.7%) patient developed flap necrosis which was partial and was managed conservatively with frequent dressing.1(6.7%) Patient developed stomal stenosis, which was managed surgically. Tracheostomy of this patient was done pre operatively.1(6.7%) patient developed stomal recurrence 4 months after surgery, which was confirmed by biopsy. The case was inoperable and he was sent for radiotherapy. The patient did not come back for further follow up.

Discussion

Head and neck cancer ranks as the sixth most common form of cancer worldwide. The larynx is the second most common site of cancer in the head and neck region. About 12,300 new cases of laryngeal cancer are diagnosed annually in the United States; one-third will die of this disease. The incidence of laryngeal cancer is higher in men vs. women (5:1). People in the fifth and sixth decade of life are most often affected. Excessive tobacco and alcohol use are the primary etiologic factors in the development of laryngeal cancer.[29] Carcinoma of larynx is an important malignancy in head and neck region. It accounts for 40% of all head and neck malignancies . In Bangladesh the cancer of larynx and hypopharynx comprised around 21% of all cancer in males.[30]

Total laryngectomy is generally done for advanced cancers of the larynx and hypopharynx. Stage III and IV squamous cell carcinoma of larynx, malignant tumour of larynx other than squamous cell carcinoma, radiation induced perichondritis which is not improved conservatively, hypopharyngeal carcinoma extending into larynx with vocal cord fixation, subglotic carcinoma, recurrence following (chemo) radiation, and occasionally for intractable aspiration and advanced thyroid cancer invading the larynx. Advantage of this operation to improve the cure rate or disease free survival, to preserve normal quality of life by preserving the speech, normal swallowing. It is an excellent oncologic procedure and secures good swallowing without aspiration. It has disadvantages such as having a permanent tracheostomy; that verbal communication is dependent on oesophageal speech, and/or tracheooesophageal fistula speech or an electrolarynx; hyposmia; speech difficulty, swallowing difficulty, tracheostomy problem such as increase chest infection, stenosis crusting, problem with loss of occlusion, lifting and the psychological and financial/employment implications. Even in the best centers, about 20% of patients do not acquire useful verbal communication.[19]

The main options for the treatment of advance laryngeal

and hypopharyngeal cancer are total laryngectomy. The main advantage of surgery before radiotherapy is good wound healing, good voice rehabilitation, less chance of Pharyngocutaneous fistula and less chance of stomal stenosis.

In this study age distribution of laryngeal carcinoma was in between 25-75 years. 5(33.3%) patients were between 50-59 yrs, 4(26.7%) patients were in 40-49 years, 4(26.7%) patients were more than 60 years and 2(13.3%) patients below 40 years. The mean age was 49.27±10.85 years. Most of the patients were from middle class 7(46.7%) and poor 6(40%). This finding is almost similar to study of Aslam et al1[1] that was found age of the patients ranged from 40 to 65 years with an average age of 52.5 years. In this series 14(93.3%) cases are smoker, 9(60.0%) used to chew betel leaves and 1(6.7%) was alcoholic. A similar study by Stankovic[31] was found smoking 91.2%. In present study, hoarseness of voice is the most common presenting complaint in 13(86.6%) cases, dyspnoea & stridor in 6(40%) and dysphagia in 3(20%) cases. In this series, most of the cases are supraglottic carcinoma 11(73.3%). Glottic carcinoma in 4(26.7%) and no subglottic carcinoma. The incidence of supraglottic growth is higher in our country. Smoking was the main etiological factor in 93.3% cases. In this study out of 4 pyriform fossa cases, 2 patients presented in nodal metastasis stage N3, 8 supraglottic cases, 4 patients presented in nodal metastasis stage N2. Among 3 glottic cases 3 patients presented in metastasis stage N3.

In the present study, pharyngocutaneous fistula developed in 20% patients. This rate is consistent with work of Parkib et al,[33] who in large series of 125 patients of laryngectomy reported 22% incidence of fistula. The highest incidence of pharyngocutaneous fistula was reported as 66%. The lowest incidence of pharyngocutaneous fistula was 2% as reported by Thawley.[21] Out of three patients developed pharyngocutaneous fistula in the post operative period and two patients had preoperative tracheostomy. This is consistent with the observation of a previous study that patient requiring pre operative tracheostomy had a higher fistula rate.[34] In Memorial Sloan-Kettering Cancer Center in New York, Weingrad and Spiro analyzed that multiple factors are responsible to fistula formation. The only significant association was the extent of surgery. Of 48 patients who underwent laryngectomy pharyngocutaneous fistula developed in only 2 (4%).[20]

Joseph and Shumrick discussed cases having surgery alone, planned combined therapy and curative radiation with subsequent salvage surgery. They reported a 100% fistula rate in six patients who had radiotherapy for cure followed by subsequent laryngectomy and radical neck dissection.[21] Three patients developed pharyngocutaneous fistula in our series were managed conservatively. Conservative management involved adequate drainage, neck compression and frequent dressings which is similar with the statement of Qureshi et al.[35] But the pattern of fistula management by Weingrad and Spiro was different which included simple closure and flap repair.[20] Here, wound infection occurred in 26.6% of total laryngectomies. This rate is in accordance with the finding of Aslam et al.[1] The factors probably responsible are absence of well trained and well oriented nursing staff, inability to maintain absolute sterilization in the post operative period especially during repeated suction and also because of the contamination from the visitors.

Out of this 5 cases of wound infection, one developed flap necrosis which was partial.Whereas Thawley[20] opined that wound slough should not occur frequently in the surgical treatment of laryngeal or inferior hypo pharyngeal tumours. In his series of over 200 patients with laryngeal cancer treated with various types of laryngectomy procedure only 4% developed wound slough.[5] One patient (6.6%) developed haematoma under the flap.

In the follow up period 1 developed pharyngeal stenosis. However, other series has revealed few case of pharyngeal stenosis1.one patient (6.6%) developed tracheostomal stenosis. Subsequently he developed stomal recurrence. A lower rate of 5% was evident in the series of Mantravadi et al.[26] Stomal recurrence, as defined by Keim et al, occurs as "a diffuse infiltrate of neoplstic tissue at the junction of amputated trachea and skin". It may be seen initially as an asymptomatic localized bulge on one side of the tracheal stoma or as a circumferential lesion causing upper airway obstruction. Once this type of recurrence becomes evident, the prognosis is dismal despite aggressive surgical therapy or high dose irradiation. Since the treatment results are so poor, several prophylactic measures have been suggested. These include thorough irrigation of the operative site before closure, wider dissections and more recently, elective postoperative irradiation for high risk patients.[26] Aslam et al[1] opined that postoperative radiotherapy to the neck reduces the risk of nodal metastasis after total laryngectomy.

Conclusion

Wound infection and pharyngocutaneous fistula are most common complications after total laryngectomy. Low postoperative haemoglobin levels are important risk factors for development of pharyngocutaneous fistula in total laryngectomy patients. Complicationsfollowing total laryngectomy are infrequent but when they occur

patient's morbidity is considerably increased. Assessment of risk factors and early recognition of complications are necessary to reduce the complications after total laryngectomy. So total laryngectomy is the main stay of treatment of advance laryngeal and hypopharyngeal carcinoma before radiotherapy because of good wound healing, good voice rehabilitation, less chance of pharyngocutaneous fistula and less chance of stomal stenosis.

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each consisting 25 patients during the period of March 2012 to January 2016 who were underwent one of the two repairs technique operated in Sylhet MAG Osmani Medical College Hospital and different clinics of Sylhet. Patients with bilateral hernias were also included, but only one side was operated on. Patients with recurrent or strangulated hernias and an aponeurosis of the external oblique that was divided, tiny and/or weak were excluded from the study. Other exclusion criteria were history of forced hernia reduction with subsequent hospitalization, a history of infection or presence of any scar in the inguinal area. This is a prospective comparative study of 50 inguinal hernias repaired randomly allocated into group D (Desarda) and group L (Lichtenstein) each consisting 25 patients.

The participants were given detailed information on the trial and surgery. The patient signed a written informed consent. The protocol details were discussed with the study team and the surgical procedures were practiced to achieve standardization. Patients were followed for a minimum of 2 years. All patients were given antimicrobial prophylaxis of 1gm Ceftriaxone IV within 30 mins of incision. All operations were performed under spinal anaesthesia. The operations were performed by the respective surgeons and surgeons in training with equal proportions in both groups. In L group the Lichtenstein tension free mesh rapair was performed as described by Amid.[10] An 8 × 12 cm polypropylene mesh (Prolene; Ethicon, Somerville, NJ, USA) was trimmed to a foot-like shape to fit the inguinal floor. The mesh was sutured to the ligament of Poupart using a nonabsorbable continuous 2/0 suture (Prolene; Ethicon) and secured cranially using an absorbable 2/0 suture.

In D group the Desarda repair was performed as it was originally described in 2001.[11] Continuous nonabsorbable suture (2/0 Prolene; Ethicon) was used to secure the aponeurotic strip to the inguinal ligament laterally, and the strip was secured to the internal oblique muscle medially with interrupted, absorbable sutures. For both techniques, the skin was closed with interrupted vertical mattress suture with nonabsorbable suture. Patients were encouraged to resume normal activities as soon as possible. Inpatients were examined until discharge and follow up appointments at 7, 30 days and 6, 12 and 24 months after surgery. Recurrences and other complications were recorded. Pain was measured using a visual analog scale which ranged from 0 (no pain) to 100 (maximum, unbearable pain). Return to basic activity was described as the patient's ability to perform elementary activities (dressing, walking, bathing); usual household activities (preparing food, cleaning house).Outcomes Measure: The primary outcomes were hernia recurrence and chronic pain, defined as moderate (VAS 30-54) or strong (VAS > 54) pain lasting more than 6 months after surgery. The secondary outcomes were general and local complications, length of time to return to various levels of everyday activity, foreign body sensation, and abdominal wall stiffness in the groin area.

All the data from the proforma was entered and analyzed in the SPSS version 22. The descriptive statistics like quantitative variables were presented in the form of mean ± standard deviation while qualitative as frequency and percentage. The mean difference was determined using Student t-test while post stratification significance and difference was determined by chi square test. A value of P?0.05 was considered as significant.

Results

Baseline characteristics including demographics and co-morbidities were similar in two groups (Table I).

Mean operating time and return to home activities was more in group L, post operative pain and days to return to basic activities were comparable in the two groups. The rates of early and late complications were similar in two groups (Table II). The percentage of patients with foreign body sensation in the operated groin was higher in the L group than in the D group but did not reach the level of significance. There was no recurrence in any study group (table III and IV).

Table I: Baseline characteristics

Baseline characteristics	Group-D (n=25)	Group-L (n=25)	p-value
Age (years)	48.08 ± 6.92	48.36±6.75	*p=0.711
Sex (Male)	25	25	
Co morbidities			
Hypertension	6 (24%)	7 (28%)	† p=0.737
Diabetes	5 (20%)	4 (16%)	‡ p=0.713
COPD	3 (12%)	2 (8%)	‡ p=0.637
Smoking	13 (52%)	12 (48%)	† p=0.777
Right sided hernia	17 (68%)	16 (64%)	† p=0.785
Left sided hernia	8 (32%)	9 (36%)	† p=0.785
Irreducible hernia	3 (12%)	3 (12%)	

Figure I: Unpaired t test, Chi-Square (χ^2) and Fisher's Exact test were applied to analyse the data.

Table-II: Mean Operating time, Post operative pain and days to return to daily activities and cost

Variables	Group-D (n=25)	Group-L (n=25)	p-value
Operating time (minutes)	53.84 ± 8.19	65.60 ±6.34	p<0.001
Pain scoring by VAS			
At 6 hours	65.6 ±11.6	72.8 ± 8.4	p=0.015
At 24hrs	43.2 ± 19.7	54.0 ± 9.1	p=0.017
At 3 days	27.6 ± 13.3	34.0 ± 8.2	p=0.046
Return to basicactivity (days)	2.36 ± 1.47	3.08 ± 1.3	p=0.096
household activities(days)	4.28 ± 1.43	7.04 ± 3.38	p<0.001

Figure II: Data were presented as mean standard deviation. Unpaired t test was applied to analyse the data.

Table-III: Complications

Variables	Group-D (n=25)	Group-L (n=25)	p-value
Intra operative	None	None	
Post operative			
Scrotal edema	2 (8%)	3 (12%)	p=0.637
Scrotal hematoma	1 (4%)	1 (4%)	
Seroma	2 (8%)	5 (10%)	p=0.447
Hydrocele	1 (4%)	1 (4%)	

Figure III: Fisher's Exact test was applied to analyse the data.

Table-IV: Follow up

Variables	Group-D (n=25)	Group-L (n=25)	p-value
At 12 months			
Foreign body sensation	3 (12%)	6 (24%)	p=0.463
At 24 months follow up			
Foreign body sensation	1(4%)	4(16%)	p=0.349
Recurrence	None	None	

Figure IV: Fisher's Exact test was applied to analyse the data.

Discussion

No significant differences in clinical outcomes were observed during a 2 year follow up of adult male patients with a primary inguinal hernia operated on with either the Desarda or the Lichtenstein technique. Currently, the results of hernia treatment, even those that have taken into account the EHS guidelines, vary from moderate to excellent. The mean recurrence rate for the standard Lichtenstein procedure is about 1% in hernia-specialized centers but can be much higher in community hospitals (about 4%), and the reported rate even reaches 18% in some articles.[12] The data published so far for other mesh techniques vary: 0 to 4.2% recurrences for Prolene Hernia System (PHS),[13] 0 to 4% for Rutkow,[14] 1.6 to 19.0% for the Transabdominal Pre-Peritoneal Inguinal Hernia Repair (TAPP).[11] The summarized frequency of postoperative complications reported in the available literature is between 15 and 28%.[15,16] When active postoperative monitoring is applied, the frequency can even reach 50%.[11] The most frequently reported complications were hematoma, seroma, surgical-site infection, chronic pain, and recurrence.[17] Death and major worsening of the treated patients' quality of life were rare but also reported.[18] These data suggest the need for father investigation of the clinical problem.

The Desarda technique for inguinal hernia repair is a new tissue-based method. Despite the objections presented by some authors,[19] application of the external oblique muscle aponeurosis in the form of an undetached strip (which makes the posterior wall of the inguinal canal stronger) has been established as a new concept in tissue-based hernia repair. The technique is original, new, and different from the historical methods using the external oblique aponeurosis, proposed initially by McArthur,[20] In our study, there were no statistically significant differences between the patients enrolled and randomized to the Desarda and Lichtenstein groups. The recurrence rate was the same in both groups. In one case in the Desarda group, the recurrence was obviously the result of a technical error. The aponeurotic strip created was too long, resulting in a large newly formed deep inguinal ring and reherniation. In the second case of recurrence, weakening of the entire posterior wall was found during reoperation, but no typical reherniation was seen. In the Lichtenstein group, the recurrences were typical. This additionally supports the idea that surgical technique is crucial for a good final result.

The percentage of other early and late complications was comparable. The higher ratio of seromas after use of the Lichtenstein method can be explained by the influence of the synthetic mesh on surrounding tissues. This is consistent with other studies and the known influence of polypropylene on tissue.[21] Foreign body sensation and abdominal wall stiffness were expressed by 12 to 16% of the Desarda group patients and 17 to 22% of the Lichtenstein group patients at different time points, and the results are within the range (4.5-43.8%) reported by other authors for mesh techniques.[22] Surprisingly, these mesh-related sensations were experienced similarly by patients from both groups and did not change even after the participants were informed of the technique used after 2 years of follow-up.

Paradoxically, in the modern world the cost of the medical treatment becomes the real issue. The cost of inguinal hernia treatment, a tiny fraction of all health expenses, is not insignificant, however, especially in developing countries in Asia or Africa. One indisputable advantage of Desarda technique is its low cost. That is why many published articles recently demonstrated an interest in the technique.[23-26] The cost of the Desarda operation is low because a synthetic prosthesis is not needed. The price of composite meshes or even heavy polypropylene meshes, as well as their accessibility, could be important issues in developing countries. The limitations of the study were- (1). This study included small number of sample, (2) Randomization could not be done.In conclusion successful inguinal hernia

treatment without meshimplantation can be achieved using Desarda repair as it is effective as standard Lichtenstein procedure but causing less economic burden to the patient. So it can be considered as a cost effective method of hernia repair among low socio economic groups. However a randomize control clinical study involving large sample is warranted.

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ORIGINAL ARTICLE

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Changes in Serum Electrolytes in Monopolar Transurethral Resection of Prostate.

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Abstract

Use of hypotonic saline in monopolar transurethral resection of prostate leads to absorption of significant amount of irrigation fluid in systemic circulation. This is invariably associated with different degrees of electrolyte imbalance. The objective of this study is to find out the changes in electrolytes in monopolar TURP and factors associated with it. This is a hospital based prospective study done on 50 patients undergoing TURP in National Institute of Kidney diseases & Urology, Dhaka, between January 2016 to June 2016. S. Electrolytes were assessed preoperatively and postoperatively and comparison was done. There was statistically significant changes in S. Na+& S. K+ level.Mean pre-operative Na+ was 143.5(±1.1) and Post-operative value was 136.3(±1.9) mmol/L. whereas mean values for K+ were 4.1(±0.24) preoperatively & 4.44 (±0.33) mmol/L post-operatively. S. Na+ showed negative correlation & S. K+ showed positive correlation with age of the patient, size of prostate gland, duration of surgery, volume of resected prostate & amount of used irrigation fluid. Though there was significant change of S. K+ level but none of them reached to hyperkalemic or hypokalemic level. 16% of patients showed electrolyte imbalance in the form of hyponatremia (Na+< 135 mmol/L) but no patient developed hyponatremia below 130 mmol/L and overt TUR Syndrome. Electrolyte monitoring should be considered in patients having risk factors of increased fluid absorption. Preoperative low normal values of serum sodium should alert the surgeon to the possibility of postoperative electrolyte derangement.

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Introduction

Benign prostatic hyperplasia (BPH) is the most common benign tumor in men and its incidence is age related. There are various treatment options for BPH, ranging from watchful waiting to surgery. Over the years, Transurethral Resection of Prostate (TURP), as surgical modality for obstructing BPH has gained popularity throughout the world. Despite the introduction of new alternatives for the management of BPH, TURP is still considered the gold standard for surgical management of obstructing benign prostatic hyperplasia[1].

Electrolytes imbalance is one of the most worrisome complications of transurethral resection of prostate especially due to risk of development of overt TUR syndrome. The irrigation fluid used during resection is absorbed via open venous channels and leads to hypervolemic hyponatremia. Hyperkalemia can also occur after TURP attributable mainly to cell lysis and release of intracellular potassium. Acute kidney injury secondary to obstruction or sepsis can lead to hyperkalemia in some cases[2]. Various factors have been attributed to development of electrolyte imbalance in TURP Including volume and type of irrigant used, resection time, weight of tissue resected and use of monopolar or bipolar diathermy[3]. Aziz & Ather[2] Showed that the age of patient, preoperative electrolyte imbalance, mean weight of tissue resected, resection time, hydrostatic pressure in prostatic bed, capsular breach, volume of irrigant used, co-morbidities specially hypertension, chronic kidney disease, congestive cardiac failure are major determining factors in electrolyte balance in TURP[2].

Older patients have more rigid vasculature which allows for persistent opening of venous channels leading to increased fluid absorption and electrolyte derangement. The amount of fluid absorption depends mainly on number and size of venous sinuses opened[4]. The weight of tissue resected serves as a surrogate marker for the number of venous sinuses opened in prostatic bed. Hydrostatic pressure at the prostatic bed is an important factor determining fluid absorption during TURP. This hydrostatic pressure depends upon the height of the irrigating fluid column and pressure inside bladder during surgery[5]. The ideal height of fluid is suggested to be 60 cm. so that 300 ml of fluid is obtained per minute during resection tomaintain good vision and this allows about 20 m1 fluid to be absorbed per minute. The average amount of fluid absorbed by patient is about

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1000 ml[1]. Aziz & Ather[2] also showed that hypertensive patients and preoperative electrolyte derangement adds further problem to electrolyte homeostasis in TURP[2]. Newer techniques, such as bipolar resectoscope and vaporizing the tissue instead of resecting tissue, have reduced fluid absorption and its consequent electrolyte derangement.

Methods and materials

A hospital based prospective study was done on diagnosed cases of benign enlargement of prostate (BEP) undergoing TURP in National Institute of Kidney Diseases & Urology (NIKDU), Dhaka in the period between January 2016 to June 2016. All patients were evaluated by detailed history, physical examination including DRE and necessary investigations. Patients with positive urine culture, coagulopathy, electrolyte imbalance, who received diuretic therapy and other drugs which may affect electrolyte balance (eg, ACEI, ARB), who suffered from any hypervolemic state (eg, CKD, CLD, CCF) and underwent additional procedures during TURP (eg, cystolitholapaxy) were excluded from this study. Objective was to evaluate changes in S. Electrolytes in TURP and factors which may precipitate the problem. In patients who were selected for study, preoperative electrolytes estimation was done within 1 week before operation. TURP was done using a continuous flow resectoscope with monopolar diathermy and 1.5% glycine as an irrigant.

A blood sample was taken within one hour of the end the procedure for electrolyte assessment. If any derangement of electrolytes observed, patients were observed and managed accordingly. Operative parameters, resection time, volume of irrigant used, weight of tissue resected, volume and type of intravenous fluid, per operative & postoperative clinical symptoms was recorded. Deranged electrolytes were defined as presence of any or both of the following, serum sodium <135 mmol/L or >145 mmol/L and serum potassium <3.5 mmol/L or >5.5 mmol/L.

Results

Table I: Changes of serum electrolytes concentration (Na+ and K+) during TURP.

	Base line Mean(±SD)	Post-operative Mean(±SD)	p-value
Na^+ (mmol/L)	143.5(±I.I)	I36.3(±1.9)	<.05
K^+ (mmol/L)	4.1(±0.24)	4.44(±0.33)	<.05
		0.001	

Table I: shows mean level of Na+ (sodium)- at post-operative 136.3(±1.9) mmol/L was statistically significant ($p<0.05$) compared with base line values 143.5(±1.1) mmol/L. Mean level of K+ (Potassium)- at post-operative 4.44(±0.33) mmol/L was statistically significant ($p<0.05$) compared with base line values 4.1(±0.24) mmol/L.

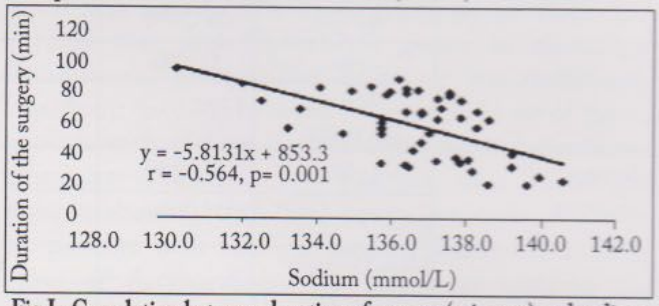
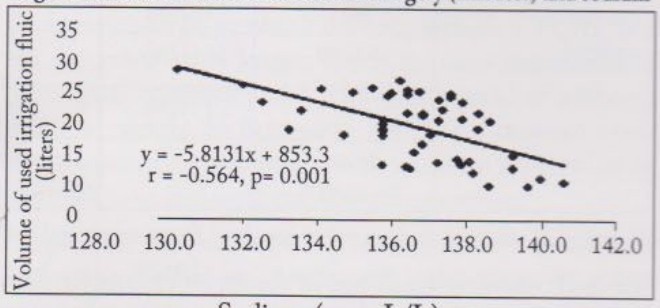


Fig I : Correlation between duration of surgery (minutes) and sodium



Sodium (mmoL/L)

Fig. II: Correlation between volume of used irrigation fluid and sodium

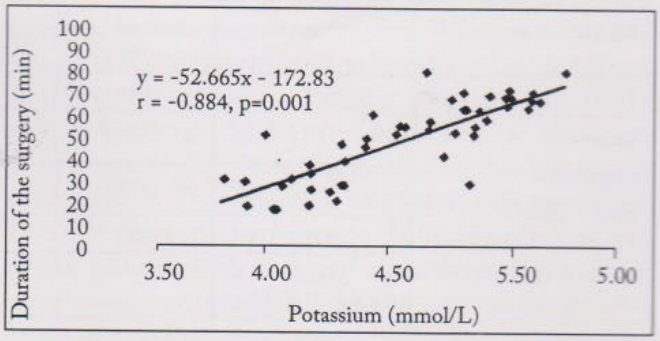


Fig III : Correlation between duration of surgery (minutes) and potassium

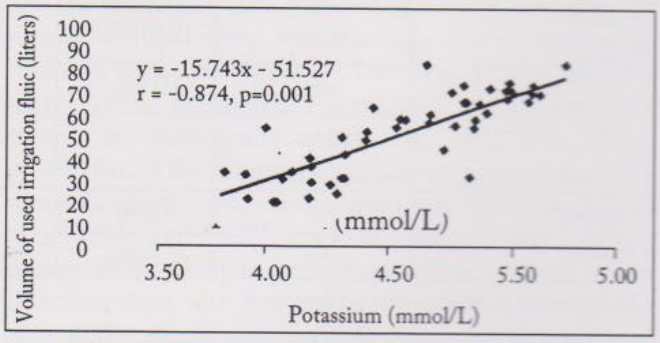


Fig. IV: Correlation between volume of used irrigation fluid and potassium.

Table II: Relation of electrolyte derangement with age, duration of surgery and size of prostate

Factors	values	Patients (n=50)	No electrolyte derangement (n=42)		Electrolyte derangement(n=8)		P value
		n(%)	n(%)		n(%)		
Age (years)	41 -60	16 (32%)	15	(93.8)	1	(6.3)	
	61 -80	29 (58%)	24	82.8	5	17.2	
	>80	5 (10%)	3	60.0	2	40.0	
	Mean age (±SD)		64.1(±9.5) years		73.8(±8.3) years		0.0105 s
Surgery Duration (min)	<60	23 (46%)	21	91.3	2	8.7	
	60	27 (54%)	21	77.8	6	22.2	
	Mean Duration (±S D)		58.2(±19.5) min		75.6(±13.9) min		0.020 s
Prostate size(gm)	5O	13 (26%)	13	100.0	0	0.0	
	51 -80	16 (32%)	13	81.75	3	18.75	
	>80	21 (42%)	16	76.2	5	23.8	
	Mean size (±SD)		69.6(±23.4) grams		90.5(±17.3) grams		0.021 s

P-value of all parameters were reached from unpaired t-test

Table II. showing mean age of deranged electrolyte group is 73.8(±8.3) years Whereas 64.1(±9.5) years in no electrolyte derangement group. Duration of surgery in deranged electrolyte group is 75.6(±13.9) minutes in comparison to 58.2(±19.5) minutes and size of prostate is 90.5(±17.3) grams in comparison to 69.6(±23.4) grams respectively. All values are statistically significant.

Table III: Relation of electrolyte of derangement with volume of irrigation fluid, volume of resected prostate and capsular breach

Factors	values	Patients (n=50)	No electrolyte derangement(n=42)		Electrolyte derangement(n=8)		P value
		n (%)	n (%)		n (%)		
Volume of irrigation fluid (liters)	15	17 (32%)	16	94.1	1	5.9	
	16 -25	29 (58%)	24	82.8	5	17.2	
	>25	4 (8%)	2	50.0	2	50.0	
	Mean volume (±SD)		17.6(±5.6) liters		22.5(±5.0) liters		0.031*
Volume of resected Prostate (grams)	<20	4 (8%)	4	100.0	0	0.0	
	21 -40	20 (40%)	18	90.0	2	10.0	
	41 -60	17 (34%)	13	76.5	4	23.5	
	>60	9 (18%)	7	77.8	2	22.2	
	Mean volume (±SD)		42.1(±15.0) grams		53.4(±11.4) grams		0.049 *
Capsular B reach	Yes	3 (6%)	1		2	66.7	0.014•
	No	47 (94%)	41	87.2	6	12.8	

* Unpaired t- test. •chi square test

Table III showing volume of used irrigation fluid in deranged electrolytes group is 2.5(±15.0) liters in comparison to 17.6 (±5.6) liters, Volume of resected prostate is 53.4(±11.4) grams in comparison to 42.1(±15.0) grams respectively. Out of 3 capsular perforations, 2 patients developed electrolyte imbalance. All the values are statistically significant.

Discussion

Transurethral resection of prostate is widely accepted method for treatment of benign enlargement of prostate. However different studies have showed various complications associated with the surgery including electrolyte imbalance and potential fatal TUR syndrome. During standard monopolar TURP, use of hypotonic irrigation fluid, opening of low pressure venous channels, bleeding and absorption of irrigation fluid is expected to give rise to certain changes in internal milieu and electrolyte balance; thus making it important to study the changes in various parameters. In this present study, it was observed that majority (58.0%) patients belonged to age 61-80 years. The mean age was found 65.6(±9.9) years with range from 48 to 86 years. In this study, it was observed that mean level of Na+ (sodium) at post-operative period 136.3(±1.9) mmol/L were significantly lower ($p<0.05$) compared with base line values 143.5(±1.1) mmol/L. Moorthy & Philip [6] showed preoperative serum Na+145.7±0.7 and postoperatively 140.5±1.1 mmol/L which was statistically significant (p±0.015)[6]. The amount of fluid absorbed via the prostatic veins is 20 ml/min. and can reach up to several liters . Gupta et al. stated that the uptake of 1 L of fluid within 1 hour corresponds to an acute decrease in the serum sodium concentration of 5-8 mmol/L.[7]

In this study, it was observed that mean level of K+ (Potassium) at post-operative 4.44(±0.33) mmol/L were significantly higher ($p<0.05$) compared with base line values 4.1(±0.24) mmol/L. Aziz and Ather found the mean preoperative potassium was 4.5±.0.46 mmol/L and post operative potassium was 4.3±0.49 mmol/L[2] . The osmolality of 1.5% glycine is 230 mOsm/L (hypotonic) as compared to serum osmolality of 290 mOsm/L. Absorption of significant amount of hypotonic solution leads to hypotonicity in plasma. Gupta et al. concluded that this marked hypotonicity in plasma may also result in intravascular hemolysis which leads to elevation of serum potassium level[7] . In this study, it was observed that mean amount of irrigation used was found 18.3(±5.9) liters with range from 8 to 29 liters. Aziz and Ather the mean volume of irrigant used were 12±10.87 liters[2].

Patients who are undergoing TURP are often elderly and suffer from lung, kidney and endocrine disorders. Occasionally these patients become dehydrated and have a lack of essential electrolytes like sodium, calcium and potassium, when using a diuretic with a limited consumption of fluids[8] . In this series, it was observed that mean age was found 64.1 (± 9.5) years in no electrolyte derangement and 73.8(±8.3) years in electrolyte derangement group. The difference was statistically significant ($p<0.05$) between two groups. These findings were comparable with study of Aziz and Ather where patients with deranged electrolytes were older. Due to more rigid vasculature in elderly, which allows for persistent opening of venous channels[2] . In this study, it was observed that mean size of the prostate gland was found 69.6(±23.4) grams in no electrolyte derangement and 90.5(±17.3) grams in electrolyte derangement groups. The difference was statistically significant ($p<0.05$) between two groups. None of the 13 patients with <50 gm prostate demonstrated significant electrolyte imbalance. 16 patients with 51-80 gm prostate showed 3 (18.75%) cases electrolyte imbalance. 21 patients with >80 gm prostate showed 5 (23.8%) cases of derangement. On statistical analysis, the difference was significant ($p<0.05$). According to Srougi & Antunes, large prostates do not preclude a TURP, but the procedure takes longer, which increases the incidence of Surgical complications[9] . However instead of adopting limits of weight to determine the choice between open and transurethral techniques, it seems more appropriate to establish time limits for the surgical procedure.

A specialist who excises 0.5 g/min of prostate should not undertake TURP on glands with more than 40.g. but another surgeon who removes 1.0 to 1.5 g/min may deal efficiently with prostates up to 100 to 120 g. Generally speaking, TURP should be limited to 90 minutes at the most or if possible to 60 minutes. In this present study, 2(8.7%) out of 23 patients of <60 minutes group, developed electrolyte derangement. Whereas 6 (22.2%) out of 27 patients of >60 minutes group developed electrolyte derangement. Patients mean duration of the surgery was found 58.2(±19.5) minutes in no electrolyte derangement and 75.6(±13.9) minutes in electrolyte derangement. The difference was statistically significant ($p<0.05$) between two groups. In study of Aziz and Ather, patients with deranged electrolytes had a longer mean resection time (42.5 ±20.04 min versus 28.34 ± 14.64 min)[2]. Petrusheva et al. found mean postoperative S. Na+ 138.11 mmol/L where preoperative level was 139.96 mmol/L when resection time was less than 60 minutes.(8) But when resection time was more than 60 minutes, mean postoperative Na+ was 135.59 mmol/L where mean preoperative level was 140.80 mmol/L, which is statistically significant ($p<0.05$). Mean postoperative K+ in less than 60 minutes group was 3.45 mmol/L where preoperative mean was 4.18 mmol/L. It was 4.74 and 4.27 mmol/L respectively during postoperative and preoperative period in patients where resection time was more than 60 minutes, it was also statistically significant ($p<0.05$). Aziz and Ather stated in their study that increased resection time correlated with degree of electrolyte derangement[2]. Provided that

the irrigation fluid column was kept at a constant height, a constant volume of fluid obtained per minute during resection. However the amount of fluid absorption not only depends on the duration of exposure of the exposed venous sinuses to the irrigating fluid but also upon the number of prostatic venous sinuses opened and hydrostatic pressure at prostatic bed. Madsen and Naber demonstrated that hydrostatic pressure at the prostatic bed is an important factor determining fluid absorption during TURP[5]. This hydrostatic pressure depends upon the height of irrigating fluid column and pressure inside bladder during surgery.

For our study, we fixed the irrigation fluid column height so that other determinants can be assessed. In order to limit the likelihood of a serious electrolyte derangement, it is advocated that resection times should be limited to 1 hour. In this current study, 1 (5.9%) out of 17 patients with <15 litres, 5 (17.2%) out of 29 with 16-25 litres and 2 (50%) out of 4 patients with >25 litres irrigation fluid used, developed electrolyte derangement. Mean volume of used irrigation fluid was found 17.6(±5.6) liters in no electrolyte derangement and 22.5(±5.0) liters in electrolyte derangement group. The difference was statistically significant ($p<0.05$) between two groups. In the study of Aziz and Ather, Volume of irrigant used (23.55±15.20 L) were also significantly higher in patients with deranged electrolytes than the other group (12.81±7.57 L) ($p = 0.001$)[2]. In this current study it was observed that no electrolyte derangement occurred in cases where volume of resected prostate was less than 20 gm. 2 (10%) cases were found to have the problem out of 20 cases where resected prostate was 21-40 gm. It was 4 (23.5%) out of 17 and 2(2.22%) out of 9 cases in 41-60 gm group and more than 60 gram group respectively. Mean volume of resected prostate was found 42.1(±15.0) grams in no electrolyte derangement and 53.4(±11.4) grams in electrolyte derangement. The difference was statistically significant ($p<0.05$) between two groups. Aziz and Ather found in their study that, the mean weight of tissue resected were 15.33±9.74 grams in no electrolyte derangement group and 41.59±34.45 grams in electrolyte derangement group[2]. Petrusheva et al showed that patients with mean resected tissue 74.57 gm manifested decreased sodium level from mean preoperative sodium level of 140.80 mmol/L to mean postoperative level 135.59 mmol/L and increased potassium level from mean preoperative value of 4.27 to mean postoperative level 4.74 mmol/L[8].

On the other hand, mean resected volume 41.47 gm group manifested mean Na+ level 139.96 and 138.11 mmol/L in preoperative and postoperative period respectively. Mean K+ level change in this group was 4.18 to 4.35 mmol/L from preoperative to post operative period. Oclke et al in EAU guideline suggested open surgery or transurethral holmium laser enucleation for men with prostates more than 80 gm to avoid serious electrolyte derangement like TUR syndrome[10]. TURP is considered the standard procedure for men with prostate 30-80 gm. In this study, it was observed that there were 3 capsular perforations during TURP out of 50 cases, 2(66.7%) patients developed electrolyte derangement. The difference was statistically significant ($p<0.05$) between two groups. This result is supported by salmela et al. who conducted a study to evaluate fluid absorption following capsule perforation in TURP[11]. They showed that Prostatic capsule perforation leads to both intravascular and periprostatic absorption of significant amount of irrigating fluid.

Conclusion

Electrolyte derangement after TURP is not an uncommon phenomenon. Normal decrease in serum sodium at TURP is 5-8 mEq/L. Hyponatremia occurs commonly in patients undergoing TURP as manifested by a frequency of 16% in our series, but clinical TUR syndrome was not observed. Though decrease in S. Na+ and increase S. K+ observed in significant portion of the patients but none of them reached the level of hyperkalemia. Only 8(16%) reached level of hyponatremia. Pathophysiological mechanism consists of pharmacological and volume effects of irrigation fluid and body fluid changes, so it is difficult to avoid occurrence of such complications. Electrolyte monitoring should be considered in patients having risk factors for increased fluid absorption. The need for monitoring electrolytes following TURP should be individualized, taking into account the weight of resected tissue, volume of irrigation used, resection time, increasing age, intra-operative events like capsular perforation and co-morbidities. Low normal values of serum sodium should alert the surgeon to the possibility of postoperative electrolyte derangement.

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ORIGINAL ARTICLE

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Association of Glycated Hemoglobin and Insulin Resistance in Type 2 Diabetes

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Abstract

Type 2 Diabetes mellitus is a multifactorial disease characterized by insulin resistance and impaired insulin secretion. Initially before overt hyperglycemia, insulin resistance leads to increased insulin secretion to maintain euglycemia. DM is diagnosed by hyperglycemia as per diagnostic criteria of FBG or 2HPP or OGTT settings. HbA1c was used for monitoring control by therapeutic intervention, now established as a diagnostic test for DM. Hyperglycemia is not a constant event and undergoes day to day variation depending on pharmacological and non-pharmacological interventions. Insulin resistance precedes insulin secretory defect. This study was done to see the association of HbA1c with insulin resistance (IR) in T2DM. For this purpose 65 newly diagnosed T2DM patients and 65 age and sex matched healthy controls of 35 to 65 years of age were selected. FBG, fasting serum insulin and HbA1c were estimated. HOMA-IR was calculated. Student's 't' test, Mann-Whitney U test, Pearson's and Spearman's correlation analysis were performed as appropriate. FPG and HbA1c and HOMA-IR were significantly raised in diabetic subjects. IR was observed in majority of diabetic subjects. There was significant positive correlation of HbA1c with FPG and HOMA-IR. Significant positive correlation of FPG and HOMA-IR also observed in diabetic study subjects. As FPG may undergo day to variation and HbA1c consistently reflects glycemic status over weeks, association of HbA1c with IR in diabetic patients is implicative of usefulness of its estimation in all newly detected T2DM patients as a reflection of IR.

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Introduction

Diabetes mellitus (DM) is a leading cause of morbidity and mortality due to acute metabolic emergencies and various chronic micro and macro vascular complications. Type 2 diabetes mellitus (T2DM) is about 90-95% of all diabetes.[1] It is a multifactorial disease characterized by resistance to the action of insulin as well as impaired insulin secretion. It has been observed that in early stage of the disease, IR leads to elevated insulin secretion in order to maintain normal blood glucose level. This initial hyperinsulinaemia euglycaemia state gradually progresses to a state where cells are unable to compensate adequately and blood glucose increases producing hyperglycemia.[2]

Most studies support the view that insulin resistance (IR) precedes an insulin secretory defect.[3] Weight reduction and or pharmacological treatment for hyperglycemia may improve IR but is seldom restored to normal.1 Though euglycemic hyperinsulinemic glucose clamp procedure is the gold standard to detect IR, it is difficult to perform in daily clinical practice. Therefore, homeostasis model assessment for insulin resistance (HOMA IR) and quantitative insulin sensitivity check index (QUICKI) are frequently used which correlates well with the gold standard method.[4,5]

This study was aimed to see association between HbA1c and IR in type 2 diabetes mellitus patient in our population. Insulin resistance was determined by HOMA-IR. Both plasma basal insulin and plasma glucose values are used. In Bangladesh, a meta-analysis showed that the prevalence of diabetes among adults had increased substantially, from 4% in 1995 to 2000 and 5% in 2001 to 2005 to 9% in 2006 to 2010.[6] In one study the prevalence of DM in rural population of Bangladesh was found to be 5.63%.[7] Bhowmik et al[8] found that the prevalence of IFG, IGT, IGF+IGT and T2DM in an urbanizing rural population were 3.4%, 4.0%, 1.2% and 7.9% respectively.. In Bangladesh, the overall age-adjusted prevalence of diabetes and prediabetes was 9.7% and 22.4%, respectively. Among urban residents, the age-adjusted prevalence of diabetes was 15.2% compared with 8.3% among rural residents.[9]

The relative contribution of insulin resistance and secretory defect varies from individual to individual but most studies support the view that insulin resistance (IR) precedes an insulin secretory defect.3 The etiology of type 2 diabetes mellitus appears to involve complex interactions between environmental and genetic factors. Presumably, the disease develops when a diabetogenic lifestyle (i.e. excessive caloric intake, inadequate caloric expenditure, obesity) is superimposed on a susceptible genotype.[10]

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The level of body mass index (BMI) that increases risk for diabetes varies with different racial groups. For example, persons of Asian ancestry are at increased risk for diabetes at lower levels of overweight compared with persons of European ancestry.[11] By the time the hyperglycemia is detected, nearly all type 2 diabetic patients exhibit both defective insulin secretion and insulin resistance. Hyperglycemia impairs the cell response to glucose and promotes insulin resistance. Circulating lipids can also adversely affect glucose metabolism increased free fatty acid levels accelerate hepatic gluconeogenesis, inhibit muscle glucose metabolism, and impair pancreatic cell function. As is the case with glucotoxicity, the reversal of lipotoxicity can rapidly improve metabolic control and facilitate favorable therapeutic outcomes.[12]

Physical activity is another important determinant of insulin sensitivity. Inactivity is associated with down regulation of insulin-sensitive kinases and may promote accumulation of FFAs within skeletal muscle. Sedentary people are therefore more insulin-resistant than active people with the same degree of obesity. Moreover, physical activity allows non-insulin-dependent glucose uptake into muscle, reducing the 'demand' on the pancreatic cells to produce insulin.[2]

Materials and methods

This cross sectional observational study, conducted in the Department of Biochemistry, Sylhet MAG Osmani Medical College, Sylhet from January 2016 to December 2017. Total 65 participants with newly diagnosed type 2 DM and 65 age & sex matched healthy control were enrolled in the study. T2DM diagnosed according to American Diabetes Association criteria. Exclusion criteria were patients diagnosed as other type of diabetes mellitus, patients taking insulin or oral anti diabetic agents, presented with any acute condition. Ethical clearance was obtained from Ethical Committee of SOMC. Informed written consent was taken from each study subject. Relevant histories were taken, physical examinations were done and anthropometric measurements were recorded. Data were collected in a preformed data collection sheet. BMI was calculated using the formula, BMI=Weight in Kg /Height in M2. Five ml fasting venous blood sample was collected from each study subject for estimation of FBG, fasting Insulin and HbA1c. FPG was estimated by Glucose oxidase peroxidase method by a semi auto analyzer. HbA1c was assayed by immunoflourescence assay on NGSP certified quantitative immunoassay analyzer Getein 1100. Serum fasting insulin was assayed by quantitative ELISA method with Elisa reader. All the laboratory procedures were carried out in the Department of Biochemistry, Sylhet MAG Osmani Medical College, Sylhet. Homeostasis model assessment of insulin resistance (HOMA-IR) was used for the measurement of insulin resistance and was calculated as follows:

HOMA-IR = [fasting insulin (μU/mL) x fasting glucose (mg/dL)]/405.

Participants were considered as insulin resistant when HOMA-IR 2.6.[13] Low HOMA-IR values indicate high insulin sensitivity, whereas high HOMA-IR values indicate low insulin sensitivity (insulin resistance). For normally distributed data the results were expressed as mean ± standard deviation and t-test was used to compare the measured parameter. Pearson's coefficient was used to identify any correlation between parameters. Non-parametric data expressed as median values and were compared using Mann-Whitney U test. Spearman's coefficient was used to identify any correlation between parameters.

Results

There were 38 (58.5%) male and 27 (41.5%) female in the diabetic group; whereas 40 (61.5%) male and 25 (38.5%) female in the non-diabetic group. Baseline characteristics like age, BMI, FPG, HbA1c are presented in TableI. The age, sex and BMI of the participants of diabetic group and non-diabetic group did not show any statistically significant difference. The FPG and HbA1c were significantly higher in diabetic group compared to non-diabetic group.

Table I : Comparison of baseline characters in study population

Parameters	Diabetic (n=65)	Non-diabetic (n=65)	p-value
Age (Years)	46.88 ± 8.48	45.35 ± 7.61	p=0.283
BMI (Kg/M)^2	25.02 ± 3.89	25.24 ± 5.48	p=0.788
FPG (mg/dl)	177.49 ± 77.27	88.98 ± 13.47	p<0.001
HbA1c (%)	9.05 ± 2.09	5.61 ± 0.43	p<0.001

Unpaired 't' test were employed to find out the level of significance.

The median fasting insulin level in diabetic participants did not differ significantly from that of non-diabetic groups. But homeostatic model assessment (HOMA) level in diabetic group was higher compared to that of non-diabetic group (table-II).

Table II: Fasting plasma Insulin and HOMA-IR of participants

Parameters	Diabetic (median & range)	Control (median & range)	p-value
Insulin	8.29 (0.1-37.3)	7.76 (0.22 -23.7)	0.51
HOMA-IR	3.14 (0.05–15.2)	1.76 (0.05–4.89)	<0.001

Most of the participants (63%) in T2DM group exhibit insulin resistance while majority (78.%) of NGT categorized as insulin non resistance on the basis of HOMA-IR level indicator. 37% in T2DM group were not IR and 22% in NGT group are ultimately found to be insulin resistant (Table III). The Insulin resistance in diabetic study group was significantly higher compared to non-diabetic group (2=21.413; p<0.001).

Table-III: Frequency distribution of IR in diabetics and controls(n=130)

HOMAIR	HBA1c (<5.7)	HBA1c (5.7–6.4)	HBA1c (>6.4)
HOMA>2.6	22%	20%	63%
HOMA<2.6	78%	80%	37%

Table-IV: Correlation HbA1c with HOMA-IR and FPG in diabetic study subjects

Correlation Parameters	r-value	P-value
HBA1c Vs HOMA-IR	0.358	<0.001*
HBA1c Vs FPG	0.8	<0.001 **

Spearman's correlation; **Pearson's correlation

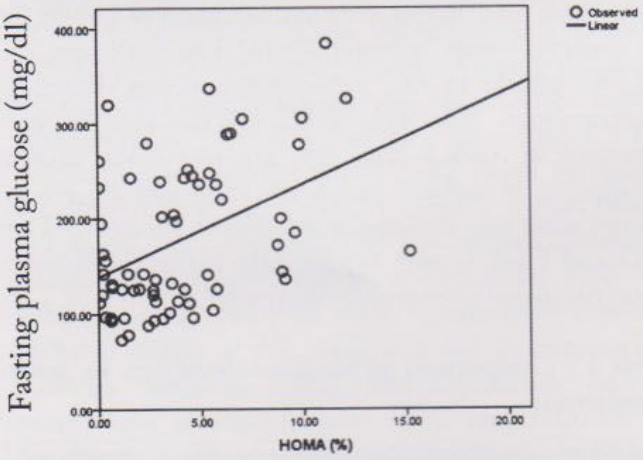

Figure I. Correlation between FPG and HOMA-IR in T2DM(n=65)

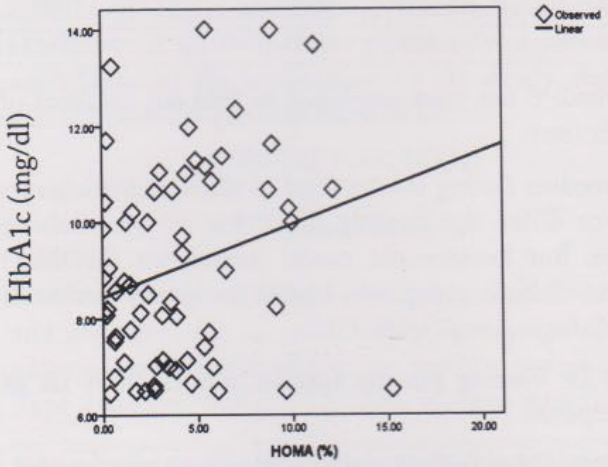

Figure II. Correlation between HbA1c and HOMA-IR in type-2 diabetic patients (n=65)

There were significant positive correlation of HbA1c with FPG and HOMA-IR; HOMA with FPG and Fasting insulin with HOMA(Table-IV, Fig 1,2)

Discussion

This study was conducted on newly detected T2DM patients before receiving any lifestyle modification or pharmacological intervention. So this study may give an idea about average age of first presentation of T2DM patients in our population. At the present study the mean age of the participants was 46.88 ± 8.48 (range, 35-67) years in diabetic group. It was almost similar to the study of Masood et al.[14] where they found that the mean age of type 2 DM was 46.55 ± 9.67 years. Similar mean age of type 2 DM was reported in another recently published study performed on Bangladeshi population by Ferdous et al.[15] where they found that the mean age of type 2 DM was 47 ± 7.52 years. In contrast, higher mean age 55.6 ± 10.4 years in diabetic patients in the study by Arpaci et al.[16] might be due to inclusion of both newly detected and previously diagnosed diabetic patients.

In the present study all diabetic subjects were newly diagnosed. In this study 58.5% of diabetic patients were male and 41.5% female in the diabetic group; whereas 61.5%) male and 38.5% female in the non-diabetic group. The sex of the participants between study groups did not show any statistically significant difference. This result correlated with Mishra et al.[17] that 60% of diabetic patients were male and 40% were female. In contrast to these results Masood et al.[8] reported that 33.3% of diabetic patients were male and 66.7% of diabetic patients were female. The mean BMI 25.02 ± 3.89 versus 25.24 ± 5.48, was almost similar to the study of Ferdous et al.[15] where the mean BMI of type 2 DM was 25 ± 2.72. Mean fasting insulin level in our study 9.34 ± 7.40 μIU/mL versus 8.07 ± 5.56 μIU/mL did not differ significantly between diabetic and non-diabetic groups. This result was similar to another study on Bangladeshi population by Ferdous et al.[15] HOMA-IR value was 3.98 ± 3.41 versus 1.80 ± 1.20; (p<0.001) was significantly higher in diabetic group compared to non-diabetic group. In this study insulin resistance was present in 40 (61.5%) participants and absent in 25 (38.5%) participants in the diabetic group; whereas insulin resistance was present in 14 (21.5%) participants and absent in 51 (78.5%) participants in the non-diabetic group. The insulin resistance of the participants in diabetic group was significantly higher compared to non-diabetic group (p<0.001).

Our study correlate well with the study performed in indian population by Chutia and Lynrah,[18] where they found that 68.4% of diabetic patients had insulin

resistance according to HOMA-IR. Another study[19] in Brazilian population showed 59.2% of diabetic patients had insulin resistance. However Kumari, found that 86% of diabetic subjects having insulin resistance which is much higher than the findings obtained from the present study. This finding support the insulin resistance as a major trigger factor for type 2 DM in our population and therefore, measures and intervention to reduce insulin resistance in early stage of type 2 DM should not be ignored. But other factors like insulin secretory failure also play in major role of type 2 DM pathogenesis.

One recent study recorded both insulin secretory dysfunction and insulin resistance present in Bangladeshi type 2 diabetic patients.[20] This study showed that there was a significant positive correlation between fasting plasma glucose and HOMA in type-2 diabetic patients ($r=0.432$; $p<0.001$). This result was concordant with the study of Ferdous et al.[18] where they found a significant correlation between serum fasting glucose and HOMA-IR level ($r=0.545$; $p<0.001$). This result was different from the study of Chutia and Lynrah,[5] that there was no significant correlation between serum fasting glucose and HOMA-IR level ($r = 0.252$; $P > 0.05$). This study showed that there was a significant positive correlation between HbA1c and HOMA-IR in type-2 diabetic patients ($r=0.246$; $p=0.049$). Therefore it may be assumed that higher HbA1c may indicate higher insulin resistance in newly diagnosed type 2 diabetes mellitus patient. There was also positive correlation between serum fasting insulin level and HOMA-IR ($r= 0.842$; $p < 0.001$) which means that serum fasting insulin level increases with increase in insulin resistance. It may be concluded from this study that raised HbA1c is associated with insulin resistance in type 2 Diabetes Mellitus.

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ORIGINAL ARTICLE

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Association of Glycated Hemoglobin and Insulin Resistance in Type 2 Diabetes

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Abstract

Type 2 Diabetes mellitus is a multifactorial disease characterized by insulin resistance and impaired insulin secretion. Initially before overt hyperglycemia, insulin resistance leads to increased insulin secretion to maintain euglycemia. DM is diagnosed by hyperglycemia as per diagnostic criteria of FBG or 2HPP or OGTT settings. HbA1c was used for monitoring control by therapeutic intervention, now established as a diagnostic test for DM. Hyperglycemia is not a constant event and undergoes day to day variation depending on pharmacological and non-pharmacological interventions. Insulin resistance precedes insulin secretory defect. This study was done to see the association of HbA1c with insulin resistance (IR) in T2DM. For this purpose 65 newly diagnosed T2DM patients and 65 age and sex matched healthy controls of 35 to 65 years of age were selected. FBG, fasting serum insulin and HbA1c were estimated. HOMA-IR was calculated. Student's 't' test, Mann-Whitney U test, Pearson's and Spearman's correlation analysis were performed as appropriate. FPG and HbA1c and HOMA-IR were significantly raised in diabetic subjects. IR was observed in majority of diabetic subjects. There was significant positive correlation of HbA1c with FPG and HOMA-IR. Significant positive correlation of FPG and HOMA-IR also observed in diabetic study subjects. As FPG may undergo day to variation and HbA1c consistently reflects glycemic status over weeks, association of HbA1c with IR in diabetic patients is implicative of usefulness of its estimation in all newly detected T2DM patients as a reflection of IR.

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Introduction

Diabetes mellitus (DM) is a leading cause of morbidity and mortality due to acute metabolic emergencies and various chronic micro and macro vascular complications. Type 2 diabetes mellitus (T2DM) is about 90-95% of all diabetes.[1] It is a multifactorial disease characterized by resistance to the action of insulin as well as impaired insulin secretion. It has been observed that in early stage of the disease, IR leads to elevated insulin secretion in order to maintain normal blood glucose level. This initial hyperinsulinaemia euglycaemia state gradually progresses to a state where cells are unable to compensate adequately and blood glucose increases producing hyperglycemia.[2]

Most studies support the view that insulin resistance (IR) precedes an insulin secretory defect.[3] Weight reduction and or pharmacological treatment for hyperglycemia may improve IR but is seldom restored to normal.1 Though euglycemic hyperinsulinemic glucose clamp procedure is the gold standard to detect IR, it is difficult to perform in daily clinical practice. Therefore, homeostasis model assessment for insulin resistance (HOMA IR) and quantitative insulin sensitivity check index (QUICKI) are frequently used which correlates well with the gold standard method.[4,5]

This study was aimed to see association between HbA1c and IR in type 2 diabetes mellitus patient in our population. Insulin resistance was determined by HOMA-IR. Both plasma basal insulin and plasma glucose values are used. In Bangladesh, a meta-analysis showed that the prevalence of diabetes among adults had increased substantially, from 4% in 1995 to 2000 and 5% in 2001 to 2005 to 9% in 2006 to 2010.[6] In one study the prevalence of DM in rural population of Bangladesh was found to be 5.63%.[7] Bhowmik et al[8] found that the prevalence of IFG, IGT, IGF+IGT and T2DM in an urbanizing rural population were 3.4%, 4.0%, 1.2% and 7.9% respectively.. In Bangladesh, the overall age-adjusted prevalence of diabetes and prediabetes was 9.7% and 22.4%, respectively. Among urban residents, the age-adjusted prevalence of diabetes was 15.2% compared with 8.3% among rural residents.[9]

The relative contribution of insulin resistance and secretory defect varies from individual to individual but most studies support the view that insulin resistance (IR) precedes an insulin secretory defect.3 The etiology of type 2 diabetes mellitus appears to involve complex interactions between environmental and genetic factors. Presumably, the disease develops when a diabetogenic lifestyle (i.e. excessive caloric intake, inadequate caloric expenditure, obesity) is superimposed on a susceptible genotype.[10]

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The level of body mass index (BMI) that increases risk for diabetes varies with different racial groups. For example, persons of Asian ancestry are at increased risk for diabetes at lower levels of overweight compared with persons of European ancestry.[11] By the time the hyperglycemia is detected, nearly all type 2 diabetic patients exhibit both defective insulin secretion and insulin resistance. Hyperglycemia impairs the cell response to glucose and promotes insulin resistance. Circulating lipids can also adversely affect glucose metabolism increased free fatty acid levels accelerate hepatic gluconeogenesis, inhibit muscle glucose metabolism, and impair pancreatic cell function. As is the case with glucotoxicity, the reversal of lipotoxicity can rapidly improve metabolic control and facilitate favorable therapeutic outcomes.[12]

Physical activity is another important determinant of insulin sensitivity. Inactivity is associated with down regulation of insulin-sensitive kinases and may promote accumulation of FFAs within skeletal muscle. Sedentary people are therefore more insulin-resistant than active people with the same degree of obesity. Moreover, physical activity allows non-insulin-dependent glucose uptake into muscle, reducing the 'demand' on the pancreatic cells to produce insulin.[2]

Materials and methods

This cross sectional observational study, conducted in the Department of Biochemistry, Sylhet MAG Osmani Medical College, Sylhet from January 2016 to December 2017. Total 65 participants with newly diagnosed type 2 DM and 65 age & sex matched healthy control were enrolled in the study. T2DM diagnosed according to American Diabetes Association criteria. Exclusion criteria were patients diagnosed as other type of diabetes mellitus, patients taking insulin or oral anti diabetic agents, presented with any acute condition. Ethical clearance was obtained from Ethical Committee of SOMC. Informed written consent was taken from each study subject. Relevant histories were taken, physical examinations were done and anthropometric measurements were recorded. Data were collected in a preformed data collection sheet. BMI was calculated using the formula, BMI=Weight in Kg /Height in M2. Five ml fasting venous blood sample was collected from each study subject for estimation of FBG, fasting Insulin and HbA1c. FPG was estimated by Glucose oxidase peroxidase method by a semi auto analyzer. HbA1c was assayed by immunoflourescence assay on NGSP certified quantitative immunoassay analyzer Getein 1100. Serum fasting insulin was assayed by quantitative ELISA method with Elisa reader. All the laboratory procedures were carried out in the Department of Biochemistry, Sylhet MAG Osmani Medical College, Sylhet. Homeostasis model assessment of insulin resistance (HOMA-IR) was used for the measurement of insulin resistance and was calculated as follows:

HOMA-IR = [fasting insulin (μU/mL) x fasting glucose (mg/dL)]/405.

Participants were considered as insulin resistant when HOMA-IR 2.6.[13] Low HOMA-IR values indicate high insulin sensitivity, whereas high HOMA-IR values indicate low insulin sensitivity (insulin resistance). For normally distributed data the results were expressed as mean ± standard deviation and t-test was used to compare the measured parameter. Pearson's coefficient was used to identify any correlation between parameters. Non-parametric data expressed as median values and were compared using Mann-Whitney U test. Spearman's coefficient was used to identify any correlation between parameters.

Results

There were 38 (58.5%) male and 27 (41.5%) female in the diabetic group; whereas 40 (61.5%) male and 25 (38.5%) female in the non-diabetic group. Baseline characteristics like age, BMI, FPG, HbA1c are presented in TableI. The age, sex and BMI of the participants of diabetic group and non-diabetic group did not show any statistically significant difference. The FPG and HbA1c were significantly higher in diabetic group compared to non-diabetic group.

Table I : Comparison of baseline characters in study population

Parameters	Diabetic (n=65)	Non-diabetic (n=65)	p-value
Age (Years)	46.88 ± 8.48	45.35 ± 7.61	p=0.283
BMI (Kg/M)^2	25.02 ± 3.89	25.24 ± 5.48	p=0.788
FPG (mg/dl)	177.49 ± 77.27	88.98 ± 13.47	p<0.001
HbA1c (%)	9.05 ± 2.09	5.61 ± 0.43	p<0.001

Unpaired 't' test were employed to find out the level of significance.

The median fasting insulin level in diabetic participants did not differ significantly from that of non-diabetic groups. But homeostatic model assessment (HOMA) level in diabetic group was higher compared to that of non-diabetic group (table-II).

Table II: Fasting plasma Insulin and HOMA-IR of participants

Parameters	Diabetic (median & range)	Control (median & range)	p-value
Insulin	8.29 (0.1-37.3)	7.76 (0.22 -23.7)	0.51
HOMA-IR	3.14 (0.05–15.2)	1.76 (0.05–4.89)	<0.001

Most of the participants (63%) in T2DM group exhibit insulin resistance while majority (78.%) of NGT categorized as insulin non resistance on the basis of HOMA-IR level indicator. 37% in T2DM group were not IR and 22% in NGT group are ultimately found to be insulin resistant (Table III). The Insulin resistance in diabetic study group was significantly higher compared to non-diabetic group (2=21.413; p<0.001).

Table-III: Frequency distribution of IR in diabetics and controls(n=130)

HOMAIR	HBA1c (<5.7)	HBA1c (5.7–6.4)	HBA1c (>6.4)
HOMA>2.6	22%	20%	63%
HOMA<2.6	78%	80%	37%

Table-IV: Correlation HbA1c with HOMA-IR and FPG in diabetic study subjects

Correlation Parameters	r-value	P-value
HBA1c Vs HOMA-IR	0.358	<0.001*
HBA1c Vs FPG	0.8	<0.001 **

Spearman's correlation; **Pearson's correlation

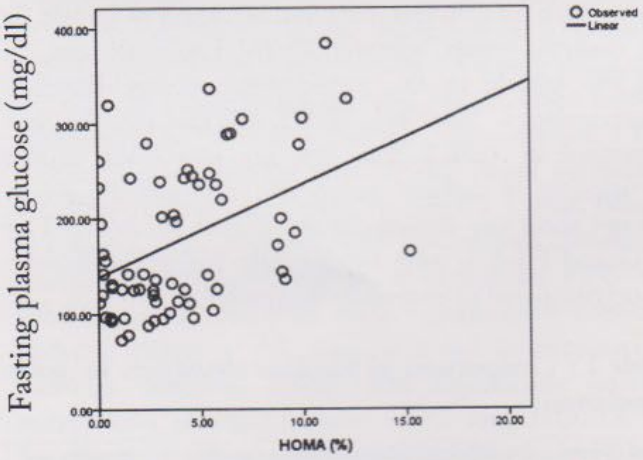

Figure I. Correlation between FPG and HOMA-IR in T2DM(n=65)

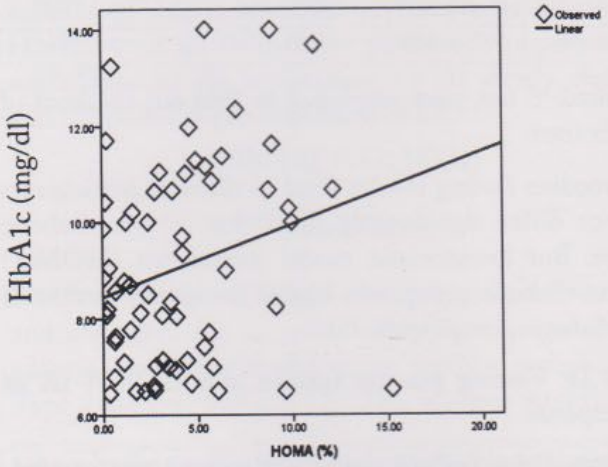

Figure II. Correlation between HbA1c and HOMA-IR in type-2 diabetic patients (n=65)

There were significant positive correlation of HbA1c with FPG and HOMA-IR; HOMA with FPG and Fasting insulin with HOMA(Table-IV, Fig 1,2)

Discussion

This study was conducted on newly detected T2DM patients before receiving any lifestyle modification or pharmacological intervention. So this study may give an idea about average age of first presentation of T2DM patients in our population. At the present study the mean age of the participants was 46.88 ± 8.48 (range, 35-67) years in diabetic group. It was almost similar to the study of Masood et al.[14] where they found that the mean age of type 2 DM was 46.55 ± 9.67 years. Similar mean age of type 2 DM was reported in another recently published study performed on Bangladeshi population by Ferdous et al.[15] where they found that the mean age of type 2 DM was 47 ± 7.52 years. In contrast, higher mean age 55.6 ± 10.4 years in diabetic patients in the study by Arpaci et al.[16] might be due to inclusion of both newly detected and previously diagnosed diabetic patients.

In the present study all diabetic subjects were newly diagnosed. In this study 58.5% of diabetic patients were male and 41.5% female in the diabetic group; whereas 61.5%) male and 38.5% female in the non-diabetic group. The sex of the participants between study groups did not show any statistically significant difference. This result correlated with Mishra et al.[17] that 60% of diabetic patients were male and 40% were female. In contrast to these results Masood et al.[8] reported that 33.3% of diabetic patients were male and 66.7% of diabetic patients were female. The mean BMI 25.02 ± 3.89 versus 25.24 ± 5.48, was almost similar to the study of Ferdous et al.[15] where the mean BMI of type 2 DM was 25 ± 2.72. Mean fasting insulin level in our study 9.34 ± 7.40 μIU/mL versus 8.07 ± 5.56 μIU/mL did not differ significantly between diabetic and non-diabetic groups. This result was similar to another study on Bangladeshi population by Ferdous et al.[15] HOMA-IR value was 3.98 ± 3.41 versus 1.80 ± 1.20; (p<0.001) was significantly higher in diabetic group compared to non-diabetic group. In this study insulin resistance was present in 40 (61.5%) participants and absent in 25 (38.5%) participants in the diabetic group; whereas insulin resistance was present in 14 (21.5%) participants and absent in 51 (78.5%) participants in the non-diabetic group. The insulin resistance of the participants in diabetic group was significantly higher compared to non-diabetic group (p<0.001).

Our study correlate well with the study performed in indian population by Chutia and Lynrah,[18] where they found that 68.4% of diabetic patients had insulin

resistance according to HOMA-IR. Another study[19] in Brazilian population showed 59.2% of diabetic patients had insulin resistance. However Kumari, found that 86% of diabetic subjects having insulin resistance which is much higher than the findings obtained from the present study. This finding support the insulin resistance as a major trigger factor for type 2 DM in our population and therefore, measures and intervention to reduce insulin resistance in early stage of type 2 DM should not be ignored. But other factors like insulin secretory failure also play in major role of type 2 DM pathogenesis.

One recent study recorded both insulin secretory dysfunction and insulin resistance present in Bangladeshi type 2 diabetic patients.[20] This study showed that there was a significant positive correlation between fasting plasma glucose and HOMA in type-2 diabetic patients ($r=0.432$; $p<0.001$). This result was concordant with the study of Ferdous et al.[18] where they found a significant correlation between serum fasting glucose and HOMA-IR level ($r=0.545$; $p<0.001$). This result was different from the study of Chutia and Lynrah,[5] that there was no significant correlation between serum fasting glucose and HOMA-IR level ($r = 0.252$; $P > 0.05$). This study showed that there was a significant positive correlation between HbA1c and HOMA-IR in type-2 diabetic patients ($r=0.246$; $p=0.049$). Therefore it may be assumed that higher HbA1c may indicate higher insulin resistance in newly diagnosed type 2 diabetes mellitus patient. There was also positive correlation between serum fasting insulin level and HOMA-IR ($r= 0.842$; $p < 0.001$) which means that serum fasting insulin level increases with increase in insulin resistance. It may be concluded from this study that raised HbA1c is associated with insulin resistance in type 2 Diabetes Mellitus.

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Inguinal torsion of an undescended testis in a child.

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Abstract

We report the case of four years old boy with torsion of undescended testis, within the inguinal canal, which is a very rare entity. The boy was referred to hospital with a chief complaint of sudden severe pain in the right lower abdomen along with inguinal region and inguinal swelling for last 3 days. Pain is continuous and gradually increasing it intensity. Physical examination found no palpable testis in the right scrotum and a painful mass of 4.0 x 3.0 centimeters in the right groin. Doppler ultrasonography revealed it without flow signals in the inguinal canal. Immediate surgical explorations confirmed a 720 degree clockwise rotation of right testis, with dark surface, edematous, filled with blood, blackish in color and necrosed, detorsion was done and hot mop compression given but testicular viability not regained and was removed by orchidectomy. Left testes found normal and orchidopexy were performed. Careful physical examination and early surgical intervention may thus be strongly recommended in cases of suspected testicular torsion with cryptorchidism.

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Introduction

Undescended testis, or cryptorchidism, occurs when one or both testes are not located in the scrotum. This condition is present at birth at a frequency of ~2-8%[1-3]. The incidence of cryptorchidism both in children older than 1 year of age and in adults is 0.81%, and nearly 20-23% of undescended testes are located intra abdominally.[2,3] Congenital undescended testis can be caused by any anomaly of the anatomical processes or of the hormonal control required for normal testicular descent.

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Cryptorchidism results in an abnormal testicular temperature, which causes the progressive derangement of gonadal physiology and biochemistry. Undescended testes carry increased risks of infertility, and testicular cancer, development and are nearly always associated with hernias[1-4].

Meanwhile, cryptorchidism is associated with a greater risk of injury, and a 10 -times greater risk of torsion compared with normally descended testes2-4. Testicular torsion is an emergency vascular event in which the spermatic cord becomes twisted on its axis, thereby impeding blood flow to and from the testes. This condition can result in ischemic injury and possible loss of the testis if not recognized in a timely manner. Given that testicular torsion is a potentially reversible condition when diagnosed and treated early, emphasis should be placed on the prompt evaluation of children who present with acute scrotum or with inguinal or abdominal pain.[2,3,5]

Unfortunately, however, because torsion of undescended testes is relatively rare, parents or physicians may not be aware. Thus, the diagnosis is mostly delayed with the price of testicular loss. To our knowledge, only a few cases of torsion within the inguinal canal have been reported previously. Here, we describe a case of torsion of an undescended testis in a child, with the goals of aiding the recognition of this entity by physicians and encourage earlier referrals of pediatric patients who present with testicular torsion within the inguinal canal.

Case Report

According to the statement of the patient he was alright 3 days back then he developed sudden severe pain in the right inguinal region along with swelling in right inguinal region. Pain is continuous and gradually increasing its intensity. The pain aggravated with movement. The pain is associated with low grade fever and vomiting 2 times at very beginning of pain. Parents also complaints about absence of right testis in the right hemi-scrotum since birth and also feeling of a lump in the right inguinal region later on diagnosed as a case of right sided undecided palpable testis in tertiary care hospital and advised for correction but due to economic instability they ignore it.

He has history of trauma 3 days back. His bowel and bladder habit normal. On inspection right inguinal region is swollen measuring about 5cm x 4 cm in size, overlying skin is reddened, no visible cough impulse, engorged vessels and visible peristalsis are found. Scrotal rugousity is normal , median raphae is slightly displaced towards right side in midline.

On palpation right inguinal region revealed severely tendered and elevated local temperature with a palpable mass measuring 4x3 cm in the inguinal canal, firm in consistency, less mobile. Right hemiscrotum is empty ,there is no testis palpable (Figure 1). The left testis is normal in shape and on position. Abdomen is soft in consistency, no organomegally is revealed. Bowel sound present. Ultrasonography revealed that the right testis found in right sided inguinal region with diffusely edematous, enlarged, and lacking Doppler signals. ,the features compatible with torsion right inguinal testis.

A transverse incision given over right inguinal region and inguinal canal was explored and The right testes was found enlarged, filled with blood , blackish in color, necrosed with torsion of the cord of right testes (Figure II). Detorsion was done and hot mop compression given but testicular viability not regained and was removed by orchidectomy. Left testes found normal and orchidopexy was performed. Post-Operative Day were uneventfull.

Figure I: Clinical appearances of Inguinal torsion of right sided UDT.

Figure II: Peroperative compromised right sided undescended inguinal testis.

Discussion

Testicular torsion is a true urological emergency that must be differentiated from other complaints of testicular pain because delayed diagnosis and treatment can result in loss of the affected testis. The salvage -rate for testicular torsion ranges from 40- 60%, depending on whether prompt surgical intervention occurs[3,6]. The maldescended testis can be classified as abdominal, inguinal or subinguinal if found along the usual path of descent. In particular, torsion within the inguinal canal is rare, although 74-77% of undescended testes are found in this region. Torsion of the spermatic cord in cryptorchidism is also rarely reported and usually occurs in patients suffering from spastic neuromuscular diseases or cerebral palsy[6-8]. The incidence of cryptorchidism in full-term infants is 3.2%, and most cases of undescended testes resolve spontaneously, with the incidence of cryptorchidism decreasing to approximately 1.1% at 1 year of age[6-8].

Therefore, testicular torsion is more likely to occur in pre-term infants, who have a relatively higher incidence of cryptorchidism. The warm inguinal region of the lower abdomen and debris in the abdomen can inhibit migration of an undescended testis and cause testicular torsion via incomplete closure of the procesus vaginalis[6-8] .The most serious complications of cryptorchidism are a high infertility rate and a high incidence of testicular cancer.[2-4,-6-8] The occurrence of cryptorchidism may be related to a relatively greater testicular width compared with the width of its mesentery; this hypothesis also possibly explains the reported association of cryptorchidism with testicular tumors.[7,8]

Early surgical intervention in cryptorchidism is currently aimed at decreasing the rate of infertility and situating the testis in a position that allows better access for earlier detection of testicular cancer[2-4]. Torsion of undescended testes often occurs in children who are approximately 1 year old; however, in the case reported here, the patient was 4 years old and had not previously been referred to a pediatric surgeon for cryptorchidism. The use of Doppler ultrasonography to detect inguinal testicular torsion has been well documented, and has dramatically influenced the choice of treatment in acute scrotum.

However, the accuracy of Doppler ultrasonography can vary subjectively. Ultrasonography usually reveals that the testis is diffusely edematous, enlarged, and lacking Doppler signals. The case described here emphasizes the necessity of appropriate abdominal, inguinal and genitourinary examinations of patients presenting with groin pain, and especially those who are unable to communicate well with their physician.[6-8]

Torsion of undescended testes can be difficult to diagnose because it can mimic other emergencies, such as incarcerated hernia. Immediate surgical exploration is the treatment for testicular torsion. However, following detorsion, the surgeon must decide whether to attempt to mobilize the testis and perform scrotal orchidopexy or to postpone this definitive surgical treatment.[7,8]

Previous study suggested that duration of the symptoms may play an important role in the choice of surgery. The study of 8 children treated for testicular torsion in the inguinal canal, Pogorelic[4]. demonstrated that the mean duration of symptoms, at the time of surgery, was 6 hours in an orchidopexy group and 50 hours in the orchidectomy group. In our case, the symptoms last for more than 72 hours, the affected testis was compromised and orchidectomy done.

Conclusion

Testicular torsion within the inguinal canal is a rare phenomenon that should be suspected, diagnosed and treated without delay. This case report should raise awareness among physicians of torsion of undescended testes in patients with groin or abdominal pain, and reveal the importance of performing a full genitourinary examination and Doppler ultrasonography check. With improved recognition of cryptorchidism and earlier surgical intervention, the occurrence of testicular loss could be largely prevented.

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Acknowledgments

All acknowledgments including financial supports should be mentioned under the heading 'Acknowledgments' and not as a footnote on the first page or in the text.

References

Number references consecutively in the order in which they are first mentioned in the text. Identify references in text, tables, and legends by Arabic numerals (1, 2, 3....). Follow the form of references used in the Index Medicus, including the style of abbreviations. Try to avoid using abstracts as references: 'unpublished observations' and 'personal communication' may be inserted in the text.

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Following are few examples of references:

1. Standard Journal Article: (List all authors when six or less; when seven or more, list only first three and add *et al*). Akhter A, Haque R, Kholil M, Sultana Z, Fakir MAH. Effects of Oral Garlic on Testicular Microarchitecture of Adult Rat. Osmani Med Teachers Assoc J 2002; 1(1): 1-3.

2. Corporate Author in Journal: Committee for Computer Application in Clinical Microbiology. Bacterial Antimicrobial Susceptibility Pattern, 1988. J Infect Dis Antimicrob Agents 1991; 8: 25-39.

3. Letter to Editor: Yagupsky P, MA Menegu. Intraluminal colonization as a source of catheter-related infection. Antimicrob Agents Chemother 1989; 33: 2025. (Letter)

4. Corporate Author in Book: World Health Organization. On being in charge: a guide to management in primary health care, 2nd ed. England: World Health Organization 1992.

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

7. Formally published abstracts: Geesy GG, Costerton JW. Bacterial population adherent to submerged surfaces in a pristine mountain stream. Abstracts of the Annual Meeting of the American Society for Microbiology 1977: 235.

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13. Online version of print books: Scientist JQ. 4 October 1998, Posting date. Culturing methods, 750-800 In: Gavier (ed). Practical procedures for Laboratory, 5th ed. [Online.] DEF Publishing Co. Boston, Mass Http://cbxiou.pgr. (last accessed October 10, 1998).

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