JSMC

Journal of Satkhira Medical College

VOLUME 10 NUMBER 02 JULY 2023

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ISSN 2790-2501

BMDC Approved

Official Journal of
Satkhira Medical College Teachers Association

Journal of Satkhira Medical College

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VOLUME 10 **NUMBER 02** **JULY 2023**

JOURNAL of SATKHIRA MEDICAL COLLEGE

JSMC Volume 10 Number 02 July 2023

Official Journal of Satkhira Medical College Teachers Association

JSMC is published twice a year in the month of January and July

This journal is published by

Teachers Association of Satkhira Medical College, Satkhira, Bangladesh

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Date of Publication: July 2023

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EDITORIAL

Skipping Breakfast: a Matter Often Unaddressed

Professor Dr. Sunil Krishna Baul

Our body is a machine which needs a good start. Eating after a "pause" replenishes the supply of glucose to boost energy levels and alertness, while also providing other essential nutrients required for good health. The key to healthy life is combination of regular and healthy eating and regular exercise. Healthy eating doesn't really mean dieting. It means sensible eating that is balanced amount of food at right times, and that must include a good breakfast. It is suggested that, for a woman, if 1900 calories are recommended, then 760 calories should be eaten in breakfast. While, for a man, if 2100 calories are recommended, then 840 calories should be eaten during breakfast.

Breakfast is defined as the first meal of the day, within 2 hour of waking, typically eaten no later than 10 hours, which provides between 20 and 35% of total daily energy needs [1]. Breakfast skipping is the behavior that people do not consume breakfast regularly. The prevalence of breakfast skipping has increased progressively over the past decades [2]. There is increasing evidence that breakfast skipping is directly associated with excess weight gain and other adverse health outcomes, including insulin resistance and type 2 diabetes [1].

Breakfast is thought to be beneficial for cognitive and academic performance in school children. Breakfast has anecdotally been considered the most important meal of the day, although the basis for this is unclear [3]. Children and adolescents may be particularly sensitive to the nutritional effects of breakfast on brain activity and associated cognitive outcomes. Children have a higher brain glucose metabolism than do adults [4]. Moreover, the longer overnight fasting period because of higher sleep demands during childhood and adolescence can deplete glycogen stores overnight [5]. To maintain this higher metabolic rate, a continuous supply of energy derived from glucose is needed. Hence breakfast consumption may be vital to providing adequate energy for the morning.

Prospective studies suggest that adults who skip breakfast have increased risks of cardiovascular disease and cardiovascular mortality compared with adults who consume breakfast [6, 7]. Studies have shown higher fasting insulin, total cholesterol (TC), and low-density lipoprotein cholesterol (LDL-C) in children and adults who skip breakfast [8]. Randomized control trials (RCT) have subsequently demonstrated that breakfast skipping increases TC, LDL, and high-density lipoprotein cholesterol (HDL) [6]. However, most of the studies have small sample sizes, and no meta-analysis of RCTs has been conducted to assess the relationship between breakfast skipping and cardio-metabolic risk factors.

In spite of the importance of breakfast it is a matter of great thought that, a good number of children and adolescent skip breakfast. The reason behind this is multifactorial and busy urban life is an important factor. A lot has been researched, written and published about the nutritional transition in low and middle income settings [9]. This transition includes physical

activity shifting towards more sedentary lifestyles, and changing dietary habits. Such new dietary habits include an increased consumption of saturated fats, reduced fruit and vegetable intake, and reduced fiber intake. So, awareness should be built up on importance of regular taking of breakfast to increase quality of life and thereupon GDP of the country.

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Original Article

Correlation between Serum PSA Level & AMACR Expression in Prostatic Cancer

***Md. Shahriar Mamun[1], Professor Shah Md. Badruddoza[2], Professor S. M. Asafudullah[3], Gazi Abdus Sadique[4], Shantanu Biswas[5], Tanshina Afrin[6]**

Abstract

Introduction: Prostate cancer is the second most common cause of cancer and the sixth leading cause of cancer death among men worldwide. To diagnose prostate cancer, no specific single histological feature is sufficiently available. A positive diagnostic marker specific for prostatic adenocarcinoma may enhance the ability to detect small foci of cancer and reduce diagnostic difficulties. This study focuses on correlation between serum PSA level and AMACR (a proven biomarker) expression in prostate cancer. **Methodology:** Twenty one prostatic needle biopsies and 16 TURP specimens as cases and 37 TURP specimens as controls were included in this study. Serum PSA levels of patients were collected preoperatively. Specimens were processed routinely for H and E and IHC using FLEX monoclonal Rabbit anti-human AMACR. Histopathological and IHC results were analyzed. **Results:** Among the 37 cases 35 were diagnosed as prostatic adenocarcinoma and 2 were diagnosed as suspicious for malignancy histopathologically. AMACR was not expressed in any of the 37 benign controls. Among the 35 histopathologically diagnosed prostatic adenocarcinoma cases, 34 showed positive AMACR expression in various intensity and 01 showed negative AMACR expression. Among the 02 histopathologically diagnosed suspicious for malignancy cases, both showed strong AMACR expression. There was statistically significant difference in expression of AMACR between cases and controls, indicated by $p<0.05$. Correlation between serum PSA level and AMACR expression were observed. Among the 4 patients containing serum PSA level 4 to 10 ng/ml 2 cases showed expression of AMACR strongly, 1 case showed expression of AMACR moderately and 1 case showed negative expression of AMACR. Among the 33patients containing serum PSA level >10 ng/ml, 15 cases showed expression of AMACR strongly, 13 cases showed expression of AMACR moderately and 5 cases showed expression of AMACR mildly. **Conclusion:** AMACR can be used as a biomarker for prostatic carcinoma in addition to histopathological study and PSA level.

Keywords: Alpha Methyl Acyl Coenzyme A Racemase (AMACR), Prostate Specific Antigen (PSA), Prostatic cancer.

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Introduction

Prostate cancer is the most frequently diagnosed non-cutaneous malignancy in men, and the second leading cause of male cancer-related mortality in the United States [1]. It is responsible for 6.6% of all deaths in men over age of 55 years [2]. In South-East Asian region, the incidence and mortality due to prostatic cancer are 4.7% and 4% respectively [2]. In Bangladesh, the prevalence of prostate cancer is 2.3% in the last 5 years [3].

Prostate-specific antigen (PSA) blood test in addition to digital rectal examination (DRE), have traditionally been the preferred modalities to screen for prostate cancer. PSA has significant limitations because serum PSA is not specific to prostate cancer. One of the major limitations of PSA screening is that serum PSA can be elevated in patients with other common benign conditions, such as benign prostatic hyperplasia (BPH), prostatitis or other minor clinical procedures such as trans- rectal ultrasound [4]. PSA is organ specific but not cancer specific [5].

The diagnosis of prostate cancer is based on a combination of architectural, cytological and ancillary features rather than any single diagnostic feature. Accurate tissue diagnosis can be very challenging due to the presence of either a small focus of cancer or due to the presence of many benign mimickers of malignancy [6].

Now a days, there is widespread use of serum PSA as a mass screening test for prostate cancer. So, there has been an ever increasing number of prostate needle biopsies and the need to give an accurate diagnosis despite the limitations. Under diagnosis of a small focus of prostatic adenocarcinoma might delay early treatment and cause severe adverse consequences for patients [6]. Therefore, a prostate carcinoma specific marker could be of great importance and usefulness as an adjunct to facilitate critical diagnostic decisions with high sensitivity and specificity [1]. Recently, a positive marker for carcinoma prostate, alpha –methyl acyl-coenzyme A racemase (AMACR) has been reported to have sensitivity ranging from 82-100% [6].

AMACR is an enzyme that is consistently over expressed in prostate cancer epithelium; hence it becomes an ideal specific biomarker for cancer cells within the prostate gland [4]. More recently, a study conducted by Jain et al 2017, took total 50 cases including 37 cases of malignant lesions and 13 cases of benign lesions of prostate [5]. They found that AMACR was not expressed in any of the 13 cases of benign lesions and it was expressed in 33 of 37 malignant lesions [5]. Hence, evaluation of AMACR as new biomarker of prostatic adenocarcinoma is needed.

So, the study is designed to use AMACR as an immuno-histochemical biomarker and its contribution in diagnosis of prostate cancer especially in needle biopsy specimens. In addition, the sensitivity and specificity of AMACR for the detection of prostate cancer were also evaluated.

Methodology

This cross-sectional study was carried out in the department of pathology Rajshahi Medical College, Rajshahi, Bangladesh from March 2017 to February 2019. Approval for the research protocol was obtained from the Ethical Review Committee, Rajshahi Medical College, Rajshahi prior to the commencement of the study. Routine haematoxylin and eosin stains were done in department of Pathology, Rajshahi Medical College. The immuno-staining was done in department of Pathology, Bangabondu Sheikh Mujib Medical University (BSMMU). Transurethral resection of the prostate (TURP) and needle biopsy specimens of prostate that were histopathologically diag-

nosed as carcinoma or suspicious for malignancy were taken as case. Histopathologically diagnosed BPH patients were taken as control. Poorly fixed samples, inadequate biopsies and samples with marked inflammation were excluded.

In this study, 35 histopathologically diagnosed prostate cancer and 2 histopathologically diagnosed suspicious for malignancy were taken as cases. Subsequently age matched 37 patients with histopathologically diagnosed BPH were selected as control. Serum PSA levels of all patients were collected preoperatively. Tissue samples were obtained from TURP and needle biopsies. A pre-tested questionnaire used to collect data from cases and controls including complete history, physical examination, information on hematological and biochemical investigations.

The specimens were fixed in 10% formalin. Tissue processing and staining were done according to standard protocol followed at department of Pathology, Rajshahi Medical College. Sections were studied under light microscope and classified into benign, malignant and suspicious for malignancy. Carcinoma cases were histologically graded according to the Gleason scoring system and 2014 WHO/ISUP consensus conference criteria for grading of prostate cancer. Associated prostatic tissue changes such as tumor invasion, prostatitis and others were also analyzed.

Immunohistochemical staining was carried out using Dako Envision detection technique. Four micrometer thick sections of formalin fixed, paraffin-embedded tissues were used. The sections were deparaffized in hot air oven, dewaxed in Xyline and rehydrated in descending graded alcohol. Antigen was retrieved by placing the slides in preheated antigen retrieval solution. Blocking endogenous peroxidase and incubated with a rabbit monoclonal antibody AMACR (p504 S, clone no 13H4) in appropriate dilutions were done. Standard immunohistochemical method was applied for subsequent staining. Tumor cells were scored positive if there was golden brown cytoplasmic or membrane staining in the neoplastic cells. Negative diagnosis was made when no golden brown staining was noted.

Interpretation of Immunohistochemistry

Positive staining for AMACR pertained to dark diffuse or granular, cytoplasmic or luminal, but circumferential. The percentage of positivity were graded from 0+ to 3+ as follows-

0% cells (o+, negative)
1-10% cells (1+, mild)
11-50% cells (2+, moderate)
>51% cells (3+, strong)

The adjacent benign glands did not show any staining for AMACR.

Negative staining pertained to no staining or focal, weak non-circumferential fine granular staining.

Results

Thirty five histopathologically diagnosed prostate cancer and 2 histopathologically diagnosed suspicious for malignancy were taken as cases. Subsequently age matched 37 patients with BPH were selected as control. Patients (case) with age ranged from 55 to 87 years (mean age was 67.92±8.5 years) and control group with age ranged from 51 to 85 years (mean age was 64.76±9.67 years). The subjects were divided into 4 different age groups, up to 60 years, 61- 70 years, 71-80 years and 81- 90 years. The number and frequency of cases found in different age groups were 9 (24.3%), 19 (51.4%), 7 (18.9%) and 2 (5.4%) respectively (Table 1). 21 (56.8%) needle biopsies and 16 (43.2%) TURP specimens were included as case

and 37 (100%) TURP specimens were included as control (Table 2). Among the total 37 cases 35 (94.6%) were diagnosed as prostatic adenocarcinoma and 2 (5.4%) suspicious for malignancy histopathologically (Figure-I). The histopathologically diagnosed prostatic adenocarcinoma cases were graded according to the Gleason scoring system and 2014 WHO/ISUP consensus conference criteria for grading of prostate cancer. Out of 35 adenocarcinoma cases combined Gleason score 6, 7, 8, 9 and 10 were 2 (5.71%), 12 (34.29%), 9 (25.71%), 11 (31.43%) and 1 (2.86%) respectively (Table 2). According to 2014 WHO/ISUP consensus conference criteria for grading of prostatic cancer, grade group 1, grade group 2, grade group 3, grade group 4 and grade group 5 were 2 (5.7%), 3 (8.6%), 9 (25.7%), 9 (25.7%) and 12 (34.3%) respectively (Figure-II). Immunohistochemical staining were done in all the 37 cases and 37 controls of prostatic lesions and results were analysed. In histopathologically diagnosed prostatic adenocarcinoma cases it was expressed in 34 (97.14%) out of 35 cases in various intensity. Among the 2 histopathologically diagnosed suspicious for malignancy cases, all (100%) patients showed strongly positive AMACR expression. On the other hand, among the 37 benign controls, all (100%) patients showed negative AMACR expression (Table-4). There was statistically significant difference in expression of AMACR between cases and controls, indicated by $p<0.05$. Using standard formula for diagnostic accuracy calculation, the sensitivity, specificity and diagnostic accuracy of AMACR for prostatic carcinoma were 97.14%, 100% and 98.61% respectively.

Table 1: Distribution of the patients according to age group (n=74).

Age group (years)	**Case** Frequency n (%)	**Control** Frequency n (%)
≤60	9 (24.3)	17 (45.9)
61-70	19 (51.4)	11 (29.7)
71-80	7 (18.9)	6 (16.2)
81-90	2 (5.4)	3 (8.1)
Total	**37 (100)**	**37 (100)**

Case: Min = 55 Y, Max = 87 Y; Mean = 67.92 (±8.5)
Control: Min = 51 Y, Max = 85 Y; Mean = 64.76 (±9.67)

Table 2: Distribution of prostatic specimens in cases & controls (n =74).

Type of specimen	**Case** Frequency n (%)	**Control** Frequency n (%)	**Total**
Needle biopsy	21 (56.8)	0 (0)	21 (28.4%)
TURP	16 (43.2)	37 (100)	53 (71.6%)
Total	37 (100)	37 (100)	74 (100%)

Table 3: Frequency of combined Gleason score of histopathologically diagnosed prostatic adenocarcinoma cases (n=35).

Combined Gleason score	**Frequency** n (%)
6	2 (5.71)
7	12 (34.29)
8	9 (25.71)
9	11 (31.43)
10	1 (2.86)
Total	**35 (100)**

Table 4: Correlation of AMACR expression with cases and controls (n=74).

	Positive Frequency n (%)	**Negative** Frequency n (%)	**Total**	***p* value**
Case	36 (48.6)	1 (1.4)	37 (50%)	
Control	0 (0)	37 (50)	37 (50%)	<0.001
Total	36 (48.6)	38 (51.4)	74 (100%)	

Figure i: Pie chart showing histopathological diagnosis of the cases (n=37).

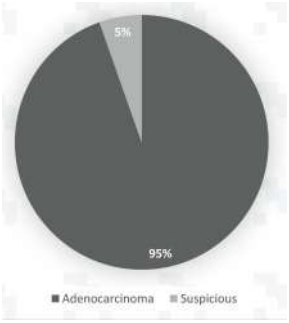

Figure ii: Distribution of the patients of histopathologically diagnosed prostatic adenocarcinoma according to 2014 WHO/ ISUP modified Gleason grade group (n = 35).

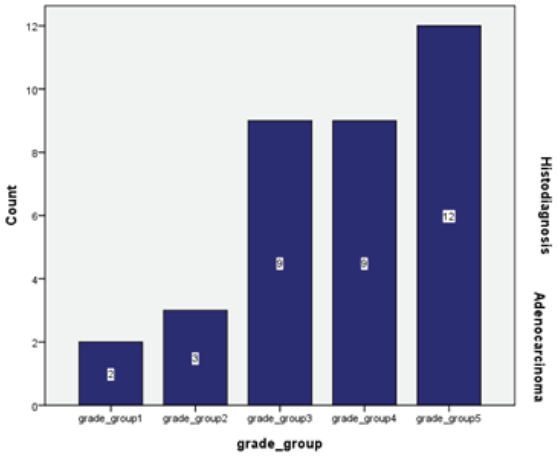

Table 5: Frequency of serum PSA levels of cases and controls (n=74).

Serum PSA Level (ng/ml)	Case Frequency n (%)	Control Frequency n (%)	*p* value
<4	0 (0)	21 (56.76)	<0.05
4 to 10	4 (10.8)	15 (40.54)	
>10	33 (89.2)	1 (2.7)	
Total	**37 (100)**	**37 (100)**	

Case: Min = 7.80 ng/ml, Max= 383 ng/ml; Mean = 140.30±81.75

Control: Min = 2.25 ng/ml, Max = 10.2 ng/dl; Mean = 4.56±2.05

Table 6: Correlation between serum PSA levels and AMACR expression among cases (n=37).

Serum PSA level (ng/ml)	AMACR expression				Total	*p* value
	Strongly positive (>50% cells)	Moderately positive (11-50% cells)	Mildly positive (1-10 % cells)	Negative (0% cells)		
4 - 10	2 (5.4%)	1 (2.7%)	0 (0%)	1 (2.7%)	4 (10.8%)	<0.05
>10	15 (40.5%)	13 (35.1%)	5 (13.5%)	0 (0%)	33 (89.2%)	
Total	17 (45.9%)	14 (37.8%)	5 (13.5%)	1 (2.7%)	37 (100%)	

Discussion

Prostate carcinoma is the 2nd most common form of cancer in men and the second leading cause of death. The advent of prostate-specific antigen screening has led to a significant increase both in the number of prostate needle biopsies performed and in the number of difficult biopsies with a small foci of adenocarcinoma and atypical glands suggestive but not diagnostic of adenocarcinoma. The diagnosis of prostate cancer is made by use of traditional histological parameters, including architecture, nuclear features and ancillary features (if necessary) rather than any single diagnostic feature. Tissue diagnosis of prostate cancer can be difficult due to the presence of either a small focus of cancer or due to the many benign mimickers of malignancy like adenosis, atrophy, partial atrophy, basal cell hyperplasia, clear cell hyperplasia, post atrophic hyperplasia, nephrogenic adenoma, mesonephric hyperplasia, radiation atypia, seminal vesicle

recent years basal cell markers and prostate biomarker Alpha-Methylacyl- CoA- Racemase (AMACR) have been used as adjuvant to morphology in diagnostically challenging cases with a very high sensitivity and specificity. This has increased the diagnostic accuracy of prostate cancer worldwide [6].

In this study, serum PSA levels of patients were collected preoperatively and immunohistochemical staining were done in all the 37 cases and 37 controls of prostatic lesions and results were analyzed. In histopathologically diagnosed prostatic adenocarcinoma cases it was expressed in 34 (97.14%) out of 35 cases in various intensity. Among the 2 histopathologically diagnosed suspicious for malignancy cases, all (100%) patients showed strongly positive AMACR expression. On the other hand, among the 37 benign controls, all (100%) patients showed negative AMACR expression. For accuracy of test to be calculated histopathologically confirmed carcinoma cases and histopathologically confirmed BPH controls were considered as gold standard. Confirmed prostatic carcinoma as evidenced by histopathological findings were 35 (94.6%) out of 37 patients (Figure ii). Among the 35 histopathologically confirmed carcinoma cases 34 cases showed positive AMACR expression at different intensity. On the other hand, all the 37 benign controls showed negative AMACR expression. AMACR expression of cases in relation to serum PSA level were observed. It is seen that among the 4 (10.8%) patients containing serum PSA level 4 to 10 ng/ml 2 (5.4%) cases showed expression of AMACR strongly, 1 (2.7%) case showed expression of AMACR moderately and 1 (2.7%) case showed negative expression of AMACR. Among the 33 (89.2%) patients containing serum PSA level >10 ng/ml, 15 (40.5%) cases showed expression of AMACR strongly, 13 (35.1%) cases showed expression of AMACR moderately and 5 (13.5%) cases showed expression of AMACR mildly. A statistically significant correlation was observed between serum PSA level and AMACR expression (Table 6). Using standard formula for diagnostic accuracy calculation, the sensitivity, specificity and diagnostic accuracy of AMACR for prostatic carcinoma were 97.14%, 100% and 98.61% respectively. These results are almost similar to Rubin, et al. (2002) [8] who demonstrated 97% sensitivity of AMACR in the detection of prostate cancer. Shrivastava, et al. (2019) [7] reported 100% sensitivity of AMACR in the detection of prostate cancer in their study. Difference in sensitivity of AMACR in different studies including absent staining in prostatic adenocarcinoma can be a result of using different antibodies as polyclonal anti-AMACR is 100% sensitive while the sensitivity of monoclonal anti-AMACR in detecting prostate cancer is only 94% [6].

This study found that AMACR is over expressed in prostatic adenocarcinoma in both needle biopsy and TURP specimens. A statistically significant correlation between serum PSA level and AMACR expression was also observed. However a diagnosis of benignancy should not be made based only on a negative AMACR staining as AMACR can sometimes be negative in adenocarcinoma [7]. Results of AMACR staining should be interpreted only in the context of strict morphologic correlation. Also it is better to combine AMACR with a negative marker of prostatic adenocarcinoma like a basal cell marker as the contrasting staining results for adencarcinoma (positive staining with AMACR and lack of staining with basal cell marker) will not only complement each other but will also increase the diagnostic confidence.

Conclusion

From the above study we can conclude that, AMACR can be used as a biomarker for prostatic carcinoma in addition to histopathological study and PSA level.

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Original Article

Estimation of Post-operative Outcome of Pediatric Extradural Hematoma

***Md. Hasanuzzaman[1], Kamalesh Saha[2], Md. Mohsin Ali Farazi[3], Dipankar Ghosh[4]**

Abstract

Introduction: Extradural hematoma (EDH), a neurosurgical emergency that demands prompt surgical intervention and that can save lives. Children with EDH present differently than adults and outcome would also be different. **Objective:** To estimate the post-operative outcome of EDH in pediatric patients. **Methods:** This study was carried out in the Department of Neurosurgery, Dhaka Medical College and Hospital, Dhaka from July 2017 to June 2019. Sixty children with extradural hematoma who underwent surgical intervention within 72 hours of trauma were included into the study. Data were recorded focusing demographic data, history, physical examination and radiological findings. The post-operative outcome was estimated by using Glasgow Outcome Scale (GOS) and Glasgow Outcome Scale Extended (GOS-E) at discharge and 1 month. **Results:** There were 44 (73.3%) male and 16 (26.7%) female patients; the ratio between them was 2.7:1. It was observed that, most of the patients had multiple clinical presentations. Mean admission GCS was 11.12±3.34 and mean pre-operative GCS was 10.38±3.69. GCS improved after operation which was statistically significant ($p<0.001$). During discharge 52 (86.6%) patients had favorable outcome and 8 (13.3%) patients had unfavorable outcome. At 1 month follow up the study showed that patients having favorable outcome was 54 (90%) and unfavorable outcome was 6 (10%). By doing GOS-E during discharge there were 8 (13.3%) and 52 (86.6%) who had unvavorable and bad outcome respectively while by doing GOS-E after 1 month of discharge there were 6 (10%) unfavorable and 54 (90%) favorable outcome. **Conclusion:** In conclusion we can say that, an increased risk of poor outcome occurs in patients who have lower preoperative GOS score and GOS & GOS-E can be considered as an important predictor of final outcome in pediatric extradural hematoma.

Keywords: Extradural Hematoma (EDH), Glasgow Outcome Scale (GOS), Glasgow Outcome Scale Extended (GOS-E), Pediatric patients..

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Introduction

Accumulation of blood in the potential space between dura and bone is called extradural hematoma [1]. About 85% of the epidural cases are caused by skull fracture with rupture of the middle meningeal artery or its branches and rest of the time ruptured venous sinuses, fractured diploic bone [1-3]. Extradural hematomas have three classical presentation. First, brief post-traumatic loss of consciousness. Second, a lucid interval for several hours. Third, obtundation, contralateral hemiparesis, ipsilateral pupillary dilatation [4, 5]. The commonest mechanism of injuries are an accident involving a road traffic accidents (RTA) and falls from height. Extradural hematoma of the temporal region is the most common site of supra-tentorial extradural bleeding; other

locations are considered atypical [6].

Traumatic extradural hematoma (EDH) is a neurosurgical emergency and timely surgical intervention is the gold standard for significant EDH [7]. Craniotomy/ craniectomy and evacuation of the hematoma is the treatment of choice [5]. The Brain Trauma Foundation (BTF) has recommended that any EDH greater than 30 ml should be surgically evacuated regardless of the patient's Glasgow Coma Scale (GCS) score [8-10].

The Glasgow Coma Scale (GCS) score on admission is one of the most important predictors of eventual prognosis, with the outcome being better when the initial GCS score is high [9]. The level of consciousness before surgery had been correlated with mortality rate of [9, 11] showed a trend of 2.1% for awake patients (GCS 13-15), 2.1% for obtunded patients (GCS 9-12), and 10.6% for comatose patients (GCS 3-8), the overall mortality rate was 14.9%. Wells et al. (2002) found no mortality for patients who are awake/conscious at the time of presentation in the hospital, 9% of mortality for obtunded patients and 20% of mortality for comatose patients [11]. However, the state of the patient before the trauma, the nature of the etiologic factors, the resources of the community, patient age, consciousness level, pupillary size, reaction to light, presence of midline shift on computed tomographic (CT) scan and clinical signs of uncal herniation, other factors, such as associated skull fractures, brain contusion, diffuse axonal injury (DAI), or extra cranial injury, may determine the outcome [9].

Children are not mini adults and they have different incidences, clinical manifestation of different conditions and also require a different approach to treatment. Regarding head injury, the pliability of immature newborn skull makes the brain more vulnerable to injury and also the immature brain appears to tolerate anoxia and hypoxia better than adults. The pediatric brain forms fewer edema fluids and can clear any edema more rapidly than the adult brain. Diffuse swelling of the brain may develop more readily in children because of the lack of CSF available for displacement.

It is known that that low GCS did not always accurately predict outcome in the absence of hypoxia and ischemia [12]. Though many authors have studied the EDHs in children, this study was carried out to estimate the post-operative outcome of EDH in children.

Methodology

We have done a prospective interventional study in the Department of Neurosurgery, Dhaka Medical College and Hospital, Dhaka, Bangladesh between the periods of July 2017 to June 2019. Sixty children (up to 18 years) with extradural hematoma attending in the department of Neurosurgery Dhaka Medical College Hospital were our study subjects. We included patients of both sexes with diagnosed case of traumatic EDH (with or without skull fracture) who underwent surgical intervention within 72 hours of injury. Clinically insignificant and non-traumatic EDH with diffuse axonal injury, subdural hematoma or brain contusion and EDH with poly trauma causes were excluded from our study.

After taking written consent from the patient's parents we took history focusing demographic data, history, physical examination and radiological findings. The post-operative Outcome estimation were done after surgical intervention by using GOS and GOS-E scale at discharge and after one month. The Glasgow Outcome Scale Extended (GOS-E) is an expanded version of the scale. It subdivides the upper three categories [13]. In GOS scale 'favorable outcome'

Glasgow Outcome Scale (GOS)		Glasgow Outcome Scale Extended (GOS-E)		Interpretation
Score	**Finding**	**Score**	**Finding**	
1	Dead	1	Dead	Dead
2	Vegetative state	2	Vegetative state	Absence of awareness of self and environment
3	Severe disability	3	Lower severe disability	Needs full assistance in ADL (Activities of Daily Living)
4	Moderate disability	4	Upper severe disability	Needs partial assistance in ADL
		5	Lower moderate disability	Independent, but can't resume work/-school or all previous social activities
5	Good recovery	6	Upper moderate disability	Some disability exist, but can partly resume work or previous activities
		7	Lower good recovery	Minor physical or mental deficits that affects day life
		8	Upper good recovery	Full recovery or minor symptoms that do not affect day life

was defined as GOS score 4-5 and 'unfavorable outcome' was defined as GOS score 1-3 [14, 15]. In case of GOS-E favorable outcome is defined as GOS-E score (5-8), and unfavorable outcome is defined as GOS-E score (1-4) [13].

Results

We did a prospective study with 60 patients admitted in Department of Neurosurgery of Dhaka Medical College Hospital, Dhaka, Bangladesh between the periods of July 2017 to June 2019. The study identified that EDH is more frequent among children of 7-12 years 30 (50%) (Figure 1). There were 44 (73.3%) male and 16 (26.7%) female patients; the ratio between them was 2.7:1 (Figure 2). It was observed that, most of the patients had multiple clinical presentations (Table 1). Majority patients presented with vomiting 50 (83.3%) and altered consciousness/ loss of consciousness 73.3%. GCS was assessed during admission and pre-operatively (on OT table). Mean admission GCS was 11.12±3.34 and mean pre-operative GCS was 10.38±3.69 (Table 2). GCS was improved after operation (Table 3). The mean GCS was 11.52±3.47 in the 1st POD, 12.79±3.17 on 3rd POD and 13.47±3.05 during discharge. GCS was improved after operation which was statistically significant ($p<0.001$) (Table 4). Table 5 shows that during discharge 52 (86.6%) patients had favorable outcome and 8 (13.3%) patients had unfavorable outcome. At 1 month follow up the study shows that favorable outcome was 54 (90%) and unfavorable outcome was 6 (10%). Table 6 shows that, by doing GOS-E during discharge 8 (13.3%) had unfavorable and 52 (86.6%) patients had favorable outcome while by doing GOS-E after 1 month of discharge there were 6 (10%) unfavorable and 54 (90%) favorable outcome.

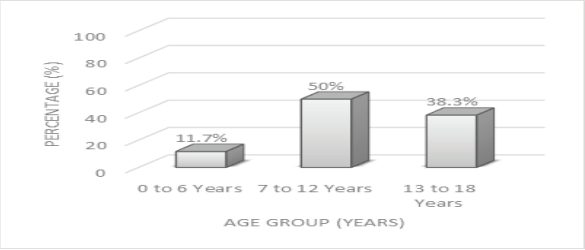

Figure 1: Age distribution of the study subjects (n=60).

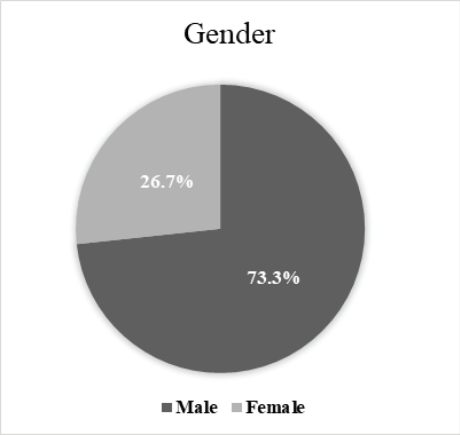

Figure 2: Sex distribution of the study subjects (n=60).

Table 1: Distribution of the study subjects by pre-operative clinical presentation (n=60).

Clinical presentation	Frequency n (%)
Altered conciousness/ loss of conciousness	44 (73.3)
Vomiting	50 (83.3)
Headache	37 (61.6)
Convulsion	2 (3.3)
Lucid interval	12 (20)

Table 3: Distribution of the study populations by post-operative GCS (n=60).

GCS		Frequency n (%)	Mean ± SD
1st POD	3-8	9 (15)	11.52±3.47
	9-13	23 (38.3)	
	14-15	28 (46.6)	
	Total	60 (100)	
3rd POD	3-8	3 (5)	12.79±3.17
	9-13	18 (30)	
	14-15	37 (61.6)	
	Total	60 (100)	
During discharge	3-8	1 (1.6)	13.47±3.05
	9-13	6 (10)	
	14-15	51 (85)	
	Total	60 (100)	

Table 4: Comparison of preoperative and post-operative GCS (n=60).

Preoperative GCS (n=60) Mean ± SD	Postoperative GCS (n=60) Mean ± SD	*p* value
10.38 ± 3.69	13.47 ± 3.05	0.001

Student's paired t-test was done to find the level of significance.

Table 2: Distribution of the study populations by admission and preoperative GCS (n=60).

GCS	3-8 n (%)	9-13 n (%)	14-15 n (%)	Mean ± SD
Admission GCS	10 (16.6)	24 (40)	26 (43.3)	11.12±3.34
Preoperative GCS	12 (20)	23 (38.3)	25 (41.6)	10.38±3.69

Discussion

Extradural hematoma (EDH) in children is a potentially life-threatening complication resulting from head injuries. Though EDH in children is an acute neurosurgical emergency and potentially life threatening condition, it can be managed with excellent outcomes as a consequence of access to modern imaging modalities to neurosurgical and ICU treatment [16].

The study identified that EDH is more frequent among children of 7-12 years 30 (50%) (Figure 1). These data is correlated with other reported series of EDH in children [17-19]. There were 44 (73.3%) male and 16 (26.7%) female patients; the ratio was 2.7:1 (Figure 2). It is similar to other reported series of EDH in children [18, 20, 21]. It was reflecting the natural tendency of male to expose to outside world.

We observed that most of the patients had multiple clinical presentation (Table 1). Vomiting 83.3% as the commonest presenting feature followed by altered conciousness/ loss of consciousness 73.3% similar to other studies [17, 18, 20] observed features of altered sensorium (61%), headache/vomiting (56%), seizure (13%). The classically described "lucid

Table 5: Estimation of postoperative outcome after surgical intervention by using GOS (Glasgow Outcome Scale) at discharge and 1 month (n=60).

GOS Score		Frequency n (%)	Interpretation	Outcome n (%)
During discharge	1	2 (3.3)	Unfavorable GOS	8 (13.3)
	2	1 (1.6)		
	3	5 (8.3)		
	4	18 (30)	Favorable GOS	52 (86.6)
	5	34 (56.6)		
At 1 month Followup	1	2 (3.3)	Unfavorable GOS	6 (10)
	2	1 (1.6)		
	3	3 (5)		
	4	8 (13.3)	Favorable GOS	54 (90)
	5	46 (76.6)		

Table 6: Estimation of postoperative outcome after surgical intervention by using GOS-E (Glasgow Outcome Scale Extended) at discharge and 1 month (n=60).

GOS-E Score		Frequency n (%)	Interpretaton	Outcome n (%)
During discharge	1	2 (3.3)	Unfavorable GOS	8 (13.3)
	2	1 (1.6)		
	3	5 (8.3)		
	4	0 (0)	Favorable GOS	52 (86.6)
	5	13 (21.6)		
	6	5 (8.3)		
	7	21 (35)		
	8	13 (21.6)		
At 1 month of discharge	1	2 (3.3)	Unfavorable GOS	6 (10)
	2	1 (1.6)		
	3	2 (3.3)		
	4	1 (1.6)		
	5	5 (8.3)	Favorable GOS	54 (90)
	6	3 (5)		
	7	11 (18.33)		
	8	35 (58.33)		

interval" was observed in 12 (20%) cases in our study. But it is contradictory to Hanci et al. 1994 and Ersahin et al. 1993 [18, 22].

Most of the patients presented to us with Glasgow coma scale (GCS socre) in between 14 and 15. GCS on admission ranged 14 to 15 in 26 (43.3%) cases, 9 to13 in 24 (40%) cases, and 3–8 in 10 (16.6%) cases. Preoperatively, GCS 14-15 were found in 25 (41.6%) of cases, GCS 9-13 were found in 23 (38.3%) of cases and GCS 3-8 were found in 12(20%) of cases (Table 2). Mean admission GCS was 11.12±3.34 and mean pre-operative GCS was 10.38±3.69. Gerlach et al. (2009) [23] observed 61.5% patients within GCS 13-15, 15.4% within GCS 8-12 and 23% within GCS 3-8. In another study Khan et al. (2013) [15] observed presenting GCS in 50% cases within 14-15, 33.3% within 9-13 and, 16.7% within 3-8 which are almost consistent with the current study.

This study showed GCS score is an important predictor of outcome which is statically significant (P <.001) (Table 4). In our series progressive unfavorable outcome was found more with preoperative poor GCS score. Other authors also observed this finding [24, 25].

In the present series favorable outcome is 90% and unfavorable outcome is 10% as revealed by GCS and GCS-E (Table 5 & 6). The mortality rate is 2 (3.3%) in our study which is lower than Khaled Chowdhury et al. 2011, found (8%) and Satapathy et al. 2016 (11.64%) [24, 25]. Narasimhan et al. 2019 also found good outcome in 34 (97%) cases and mortality in 3% cases [12].

Conclusion

From the above study we could conclude that, an increased risk of poor outcome occurs in patients who have lower preoperative GCS score and GCS and GCS-E can be considered as an important predictor of outcome in pediatric extradural hematoma.

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Original Article

Outcome of Covid-19 Patients Admitted in Covid-19 Dedicated ICU: Our Experience

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Abstract:

Background: Covid-19 a novel and highly contagious virus affecting more than 180 countries. All age and ethnic groups are affected. Majority of infected patient develop mild to moderate symptoms with full recovery. Few are asymptomatic and about 5% patient develop severe symptoms who need hospital care. Mortality and morbidity increase with increasing age and associated co-morbidity. **Methods:** It is a retrospective descriptive Cohort study carried out in covid-19 dedicated ICU in two tertiary hospitals of Khulna, Bangladesh. From July 2021 to December 2021, 581 covid-19 positive patients with severe symptoms admitted in ICU of these two hospitals were included in the study. Aims and objectives of the study were to find out the outcome and the relation of outcome with different co-morbidities. **Results:** Total 581 covid-19 positive patients were admitted in ICU, 329 were male and 252 were female. Among 581 patient's death occur in 406 patients. Death rate was > 89% in 71 years and above age group. About 45% of the dead patients had ≥3 pre-existing co-morbidity with 82% death rate. Death rate was 64-67% when pre-existing co-morbidity was two. Mortality was 50% if only diabetes was the co-morbidity in ICU patients. **Conclusion:** Fatality of covid-19 infected patients increases with increasing age and pre-existing co-morbidity. Elderly patients with multiple co-morbidities should take all necessary precautions to prevent such infection.

Keywords: Outcome of Covid-19 patients, ICU

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Introduction

COVID-19 is caused by infection with severe acute respiratory syndrome Corona virus-2 (SARS-CoV-2), a novel and highly contagious virus that mostly spreads through respiratory droplets and first identified in Wuhan, China [1]. It was first detected in Bangladesh on 8th March 2020 and WHO declared COVID-19 disease as a pandemic on 11th March 2020 [2]. Epidemiological studies had shown that some COVID-19 infections are asymptomatic while most cause mild to moderate illness with respiratory and flu like symptoms including fever, chills, cough and sore throat [3, 4]. However, a significant number of patients with COVID-19 develops critical illness and requires intensive care with mechanical ventilation and extracorporeal membrane oxygenation [5, 6].

The risk of death from covid-19 strongly depends on age and previous health conditions. Older patients and those with chronic pre-existing co-morbidities such as diabetes, hypertension, cardiovascular diseases, hypothyroidism, obesity, and pulmonary diseases are more prone to critical and fatal outcome [7]. Under the guidance of WHO, good number of vaccines are available globally. Bangladesh is also trying to complete the vaccination program successfully to reduce the incidence of covid-19 attack. Patients with severe symptoms were unable to be admitted in the hospital during the first wave of covid-19 pandemic due to inadequate manpower, equipment, and hospital facilities with ICU bed. However, with the improvement of facilities, most of the severely affected patients during second wave were admitted in ICU. In short time, numerous studies were conducted in many countries, evaluating the risk factors of severity and morbidity of the disease.

Still the relationship between outcome and comorbidities is not fully established due to lack of adequate follow up for time constrain. In our short-term study in covid-19 dedicated ICU during 2nd wave of Covid pandemic, we aimed to find out the outcome of the ICU patients in relation to age and co-morbidities.

Methods

This retrospective descriptive type of cohort study was carried out in dedicated Covid-19 ICU (temporary declared) of Shahid Sheikh Abu Naser Specialized Hospital (SSANSH) and Khulna Medical College Hospital of Khulna city of Bangladesh. Total 581 Covid-19 positive patients were admitted in the period from July 2021 to December 2021 during the second wave of Covid-19 pandemic. All the patients were referred from different hospital of Khulna with case note and investigation reports. After getting administrative permissions all the data regarding co-morbidity, severity of clinical condition, relevant investigation findings were recorded. We gave emphasis to all co-morbid conditions specially hypertension, diabetes, lung diseases, hypothyroidism and immunosuppressive condition of the patient by taking all previous and recent investigation documents and also performing new investigations. We recorded the outcome of all admitted patients. The study data were summarized for analysis. Different age groups having co-morbidity singly or in combination were analyzed using different statistical test and formula.

Results

Total 581 patients were admitted in the Covid-19 dedicated ICU in Khulna Medical College Hospital and Shahid Sheikh Abu Naser Specialized Hospital Khulna from 1st July to 31 December 2021 during the second wave of covid-19 pandemic. All the patients were Covid-19 positive with significant findings of pneumonia in chest X-ray and CT scan. All patients needed ICU support and most of them required ventilation with or without endotracheal intubation. Among 581 patients 329 were male and 252 female. Sex distribution and comparison of deceased is summarized in table-2. Our data analysis reveals that out of 581 patients death occur in 406 patient and 175 survived who were discharged from hospital or referred to other hospital for management of some complications and for rehabilitations.

We analyzed different age-related outcome that has been shown in table 1 and 2.

We analyzed different pre-existing co-morbidity singly and in combination and compared with death rate and that has been shown in table 3 & 4.

Table 1: Outcome in different age group (total number n = 581, Total death = 406, Recovery = 175).

Age group	Frequency n (%)	Death n (%)	Recovery n (%)	Comment
31-40 years	42 (7.2)	7 (14)	35 (86)	Increase in age is related to increase in number of comorbidity and gradual increase in number of deaths
41-50 years	49 (8.4)	7 (16)	42 (84)	
51-60 years	112 (19.2)	84 (75)	28 (25)	
61-70 years	182 (31.3)	133 (73.07)	49 (26.93)	
71 and above	196 (33.7)	175 (89.2)	21 (10.8)	

Table 1 shows that increase in age is related to increase in number of comorbidity and gradual increase in number of deaths death rate was below 20% in age group of 30-50 years and sharply increased after 50 years.

Table 2: Sex related outcome in Covid-19 dedicated ICU (Total n = 581).

Sex	Number of patients	Death n (%)
Male	329	230 (69.87)
Female	252	176 (70.2)

Table-4: Pre-existing co-morbidities and number of patients (n = 581).

Comorbidity	Frequency n (%)
Diabetes	476 (81.9)
Hypertension with or without cardiovascular complications	364 (62.6)
Hypothyroid	455 (78.3)
Obesity	365 (62.8)
Others: Electrolyte imbalance, Anemia, jaundice etc.	35 (6)

Table 3: Bivariate and multivariate analysis of death, associated with co-morbidities (n = 581).

Co-morbidity (Combined group)	Frequency n (%)	Death n (%)	Recovery n (%)	Bivariate Analysis in death rate
Diabetes + Hypertension + Hypothyroidism + Obesity	280 (48.1)	231 (82.9)	49 (17.5)	<0.001
Diabetes + Hypothyroidism	84 (14.4)	56 (66.6)	28 (33.3)	<0.01
Diabetes + Hypertension	98 (16.8)	63 (64.2)	35 (35.8)	<0.01
Hypertension + Hypothyroidism	42 (7.2)	21 (50)	21 (50)	<0.01

About 45% patient revealed more than three pre-existing co-morbidity that is diabetes, hypertension, hypothyroidism, and overweight or obesity and mortality was more than 82% irrespective of sex. Number of co-morbidities increases with the increase of age. When there was two pre-existing co-morbidity, fatality was near about 64-67% and when only diabetes death rate was 50%. A significant number of patients also reveal hypothyroidism and most of them were at subclinical level and detected during routine investigation after admission in ICU. Known hypothyroid patient those who was under treatment before admission was few in number. So, it was difficult to find out the outcome of covid-19 patient in ICU with subclinical and clinical hypothyroidism under treatment as single co-morbidity.

Discussion

Confirmed and reported cases of Covid-19 have wide range of symptoms. Patients with severe pneumonia and pre-coexisting morbidity may develop difficulty in breathing and frequently require ICU support. Our study was with the patient of Covid-19 dedicated ICU in Khulna, Bangladesh. Irrespective of age and sex overall death rate was 69.87%. Death rate among male was 69.8% and female 70.2%. The elderly people with pre-existing co-morbidity like diabetes, cardiovascular or lung diseases are not only at a higher risk of developing severe illness but also reveal an increased death rate.

Multiple co-morbidities are associated with progression of severity of illness with specially the cardiovascular co-morbid condition [8]. In our study when there was associated four and more than four comorbid condition like diabetes, hypertension, cardiovascular diseases and hypothyroidism death rate was more than 82% (Table 3), patient with type-2 diabetes were also more likely to have increased severity of covid-19 [9]. A meta-analysis has shown that those with poorer blood glucose control had an all-around increased mortality rate than those with better glucose control [10]. Our study revealed about 50% death rate rises when diabetes was the pre-existing co-morbidity. Those who had had diabetes and hypertension mortality was 64.2% and association of diabetes and hypothyroidism revealed death rate 50% (Table 3).

Chronic pulmonary diseases have also associated with poor disease outcome. A meta-analysis of multiple studies in China found that there were four-fold increases in mortality in patients with pre-existing COPD of covid-19 positive patient [11]. Some study about Covid-19 revealed respiratory distress associated with prothrombin coagulopathy and dispersed micro thrombin in pulmonary vasculature [12, 13]. But the use of antithrombotic drugs yet not fully established and need further study. Common co-morbidities such as diabetes, cardiovascular diseases and hypertension were observed to be the more significant risk factors when compared to other underlying diseases [13]. Our study also revealed more mortality and morbidity when ICU covid-19 patients had diabetes, hypertension and heart diseases.

Conclusion

Our study reveals elderly patients with co-morbidities have more grievous outcome compared with young patients without any co-morbidity. Therefore, patient with co-morbidities should take all necessary precautions to avoid getting infected with covid-19. Furthermore, global cooperation and campaign for awareness are of prime importance to reduce incidence and mortality by covid-19.

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Original Article

Perianal Complaints and Operations: a Profile of 152 Cases from a Secondary Level Hospital

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Abstract

Introduction: Perianal problems are one of the major surgical problems worlwide. Non-operative and operative treatment can be done according to clinical grading. In this study we evaluated perianal complaints and outcome in our settings. **Objectives:** To assess the perianal complains and signs and to relate those against the performed operations. **Methods:** A number of 152 patients with different perianal complains were assessed with other clinical findings. The operations were analyzed with these findings to have a better idea of these cases. **Results:** The patients were 37.64 ±9.48 years on average, minimum age was 19 and maximum was 60 years. Around 95% of them had constipation and anal stenosis, nearly 80% had per rectal bleeding, about half of them had skin tag, and a small percentage of them had diabetes (4.6%) and hypertension (7.2%). The most frequent operation performed was left lateral internal sphincterotomy (55%) and haemorrhoidectomy (33%), manual anal dilatation (7%) and fistulectomy (5%) were among the least frequent. All the operated patients except fistulectomy were aged more than 35 years on average, while the fistulectomy patients were a bit younger (34 years). All the symptoms and signs were significantly related with the operations performed (all $p<0.001$), but the two comorbidities were not related. **Conclusion:** Our study revealed that constipation, per rectal bleeding, skin tag, and anal stenosis are indicative of haemorrhoids and anal fissure which are becoming evident at older age, whereas per rectal discharge is indicative of fistula, which affects the patients at a relatively younger age.

Keywords: Perianal Complaints

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Introduction

Perianal diseases are one of the most common presenting ailments in an outpatient department like hemorrhoids, fissures, fistula, or abscesses that affect the anal region [1, 2]. These diseases present with symptoms like pain, per rectal bleeding, per rectal discharge and pruritus ani, and constipation. Clinical diagnosis is made by visual inspection, per rectal examination, an anoscope, and a proctoscope. Fistulogram, an x-ray of a fistula after a contrast medium has been injected may be taken.

There is scarce data on the overall incidences of perianal diseases in Bangladesh. Most researches become specific disease-centric [1, 3] and do not do justice to the magnitude at which perianal diseases affect the population as a whole.

The research model was an observational, cross-sectional study with simple random sampling from the patient who presented to us at Pongu and General Hospital Khulna. This design is suited best to understand the clinical

spectrum of the patients with perianal diseaes as data can be collected for the whole population over a curtain period of time as stipulated with little expenses. The use of simple random sampling helped eliminate bias.

Methods

Source of data collection: Patients presenting to us at Pongu and General Hospital, Khulna with perianal symptoms over a two years were enrolled in the study. Method of Collection of Data: All participants were informed about the aims and objectives of the study and were requested to sign an informed consent prior to inclusion in the study. Inclusion Criteria: Only female patients presenting with perianal symptoms (pain, bleeding per rectum, discharge per rectum) usually with a history of constipation. Exclusion Criteria: Patients presenting as an emergency basis and patients who had already been surgically or conservatively managed.

Results

Table 1 provides the preoperative features of the patients. The age of the patients was 37.64 ±9.48 years, with a minimum of 19 and a maximum of 60 years, all of them had history of pain. Almost 97% of them had constipation, nearly four quintiles (77%) had per rectal bleeding, 94% had anal stenosis, around half of them had skin tag and a small proportion 5% of them were suffering from diabetes and 7% from hypertension.

Table 1: Features of the patients (n=152).

Variables	Frequency Mean ± SD/ n (%)
Age (years)	37.64 ± 9.48
SBP (mmHg)	115.2 ± 12.0
DBP (mmHg)	74.47 ± 8.3
Constipation	147 (96.7)
Per rectal bleeding	117 (77.0)
Per rectal discharge	6 (3.9)
Skin tag	75 (49.3)
Anal stenosis	144 (94.7)
Diabetes Mellitus	7 (4.6)
Hypertension	11 (7.2)

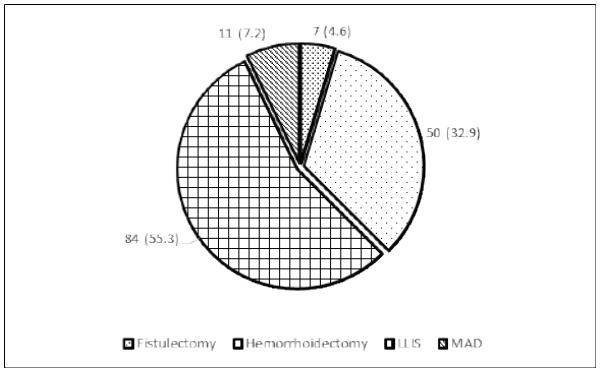
Table 2: Relation of Age with operation (n=152).

Type of Operation (number)	Age (Y) Mean±SD	Range of Age (Min-Max)	*p* value
Fistulectomy (7)	33.86±5.9	28-42	
Hemorrhoidectomy (50)	39.48±10.1	20-60	
LLIS (84)	36.49±8.9	19-55	0.16
MAD (11)	40.45±11.6	22-58	
Total (152)	37.64±9.5	19-60	

Table 3: Relationship of comorbidities with type of operation (n=152).

Comorbidities	Fistulectomy (n=7)	Hemorrhoidectomy (n=50)	LLIS (n=84)	MAD (n=11)	*p* value
Diabetes	0 (0)	2 (4)	4 (4.8)	1 (9.1)	0.83
Hypertension	1 (14.3)	3 (6)	6 (7.1)	1 (9.1)	0.88
Constipation	3 (42.9)	50 (100)	84 (100)	10 (90.9)	<0.001
Per rectal bleeding	3 (42.9)	27 (54)	82 (97.6)	5 (45.5)	<0.001
Per rectal discharge	4 (57.1)	0 (0)	1 (1.2)	1 (9.1)	<0.001
Skin tag	0 (0)	16 (32)	57 (67.9)	2 (18.2)	<0.001
Anal stenosis	2 (28.6)	48 (96)	84 (100)	10 (90.9)	<0.001

Figure 1: Pie chart of different operations done during the study period (n=152).



We categorized the operations into four major types. LLIS constituted the highest proportion of the performed operations (55%). Next to follow was hemorrhoidectomy (33%), MAD (7%) and fistulectomy (5%), which is depicted in Figure 1.

We checked the age of the patients according to operation types. MAD and hemorrhoidectomy patients were oldest with an average age of around 40 years followed by LLIS whose average age was around 36 years. Table 2 also shows that the fistula patients were the youngest amongst the groups with an average age of nearly 34 years. Though we could observe the small relation of age with different operation types, it was not significant.

When we assessed different clinical findings with operation types (Table 3), we found that the symptoms and signs had highly significant relationship with the types of operations ($p<0.001$), while the two comorbidities such as diabetes and hypertension had no such relation with such types.

Discussion

The most common presenting symptoms are constipation (about 95%) followed by per rectal bleeding (77%) anal stenosis, skin tag, per rectal discharge succeeded in order. Among 152 patients all were female. The patients were 37.64± 9.48 years on average, the minimum age was 19 and the maximum was 60 years. A small percentage of them had diabetes (4.6%) and hypertension (7.2%).

The most frequent operation performed has left lateral internal sphincterotomy (55%) and hemorrhoidectomy (33%), manual anal dilatation (7%), and fistulectomy (5%) were among the least frequent. All the operated patients except the fistulectomy were aged more than 35 years on an average, while the fistulectomy patients were a bit younger (34 years).

All the symptoms and signs were significantly related to the operation performed (all $p<0.001$), but the two comorbidities were not related.

Conclusion

Our study revealed that constipation, per rectal bleeding, skin tag, and anal stenosis were indicative of hemorrhoid and anal fissure which becoming evident in older age, whereas per rectal discharge is indicative of fistula which affects the patient at a relatively younger age.

Many times the omission of a rectal examination has been cause of regret. So many anorectal disorders are wrongly diagnosed and treated. Before starting treatment of anorectal disorder all doctors should remind that “if you don't put your finger in it, you put your foot in it”.

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Original Article

Association of C-reactive Protein in Preeclampsia

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Abstract

Background: Preeclampsia is a multi-systemic disorder that complicate about 7-10 percent of human pregnancies. Worldwide this syndrome contributes high maternal and perinatal mortality and morbidity. C-reactive protein, a marker of tissue damage and inflammation, is elevated in serum in overt preeclampsia. It is used as an objective and sensitive index of overall inflammatory activities in the body. **Objective:** To find out the association of C-reactive protein in preeclampsia and its relation with severity of preeclampsia. **Methods:** This was a Case-Control study. Total 66 pregnant women, among them 33 preeclampsia (case) and 33 normal term pregnant women (control) were admitted in Department of Obstetrics and Gynecology, Sir Salimullah Medical College and Mitford Hospital, Dhaka, Bangladesh during the study period. Samples were selected according to inclusion and exclusion criteria. Estimation of serum C-reactive protein was done by Nyco Card Reader II method in both groups. **Results:** C-reactive protein concentration (mg/L) was found significantly higher ($p<0.001$) in case group (17.93±10.5) than control group (7.45±1.80). C-reactive protein was >6mg/L in 29(87.9%) in case group and 9 (27.3%) in control group and C-reactive protein values showed significant positive correlation with systolic and diastolic blood pressure ($p<0.001$) in case group. C-reactive protein concentration was found significantly higher ($p<0.001$) in severe preeclampsia group than mild pre-eclampsia group. **Conclusion:** It can apparently be concluded from this study that increased maternal serum C-reactive protein level might be a strong risk factor for preeclampsia, although the precise role of C-reactive protein in this regard whether causal or consequential, is yet to be determined. Finding of this study might be helpful for formulating a guideline for management of pregnant women with preeclampsia.

Keywords: C-reactive protein, preeclampsia.

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Introduction

Preeclampsia is one of the most common medical complication during pregnancy. It records one of the top five causes of maternal death in the world [1]. It is a hypertensive disorder of pregnancy characterized by generalized inflammatory state and endothelial dysfunction resulting in disseminated microangiopathic disease with vasospasm and hypercoagulation. It is a serious complication of the second half of pregnancy. This disease is a leading cause of fetal growth restriction, infant morbidity and mortality [2].

Preeclamsia is defined as, the rise of blood pressure equal to or above 140/90mm Hg in the presence of proteinuria developed after 20 weeks of gestational age in a previously

normotensive and non proteinuric women [3].

Preeclamsia can result in eclampsia when convulsion develops or manifests as hemolysis, elevated liver enzymes and low platelet count (HELLP) syndrome. Eclampsia and HELLP syndrome are associated with severe complications such as cerebral hemorrhage, renal insufficiency, lung oedema and liver hemorrhage [4].

Incidence of preeclaempsia is about 7-10 percent throughout the world [5]. Worldwide incidence of preeclampsia is still high in spite of the significant improvement of the mother and child care over the last decades. Incidence of preeclampsia has been difficult to establish owing to its diverse definition and classification systems. Due to lack of proper antenatal checkup, poverty, ignorance and illiteracy, the incidence is higher in developing countries. In India, the incidence as recorded from hospital statistics varies widely from 5 to 15% percent [3]. Both the incidence & prevalence of preeclampsia and eclampsia is higher in our country. In Sir Salimullah Medical College & Mitford Hospital, 290 preeclamtic patients were admitted among 13404 obstetric patients in 2012.

A maternal mortality of 15 percent still occurs with modern obstetric services [6]. Women who receive no prenatal care are 12 times as likely to die from preeclamptic complication as women who do receive prenatal care [7].

Preeclamsia accounts for 80-84 percent of low birth weight babies. These low birth weight babies are now the major groups of newborn being cared in the neonatal intensive care units worldwide. The expenses of savings these newborn babies lives are immense, which is a economic burden to many countries especially developing countries [8].

Preeclampsia is a disease, difficult to study because it is present far in advance of the appearance of clinical signs and symptoms. Further it is multi-systemic and without a single biochemical marker. Over recent years, there has been increasing interest for the detection of pregnancy disorders before the symptoms actually occur [5].

Endothelial dysfunction is accompanied by elevated levels of inflammatory markers which have ben shown to be much higher in women with preeclampsia than those of normal pregnancy [1].

C-reactive protein, as an acute phase reactant, belongs to the pentraxin family of calcium dependent ligand binding plasma protein. It is produced by hepatocytes in response to injury, inflammation, infections and malignant neoplasia. It has short half-life, which is constant under all condition of health and disease [9].

Recent studies have been suggested that increased level of CRP are associated with an abnormal systemic endothelial vascular reactivity [10].

CRP is used mainly as a marker of inflammation. Apart from liver failure, there are few known factors that interfered with CRP production. Measuring and charting of CRP values can prove useful in early determining of disease, disease progress or effectiveness of treatments [11].

Since maternal health and pregnancy outcome is drastically affected by hypertensive disorders of pregnancy so early detection and timely intervention to minimize the harm should be our utmost attention and interest.

Methods

This Case-Control study was conducted in the Department of Obstetrics and Gynaecology in collaboration with the Department of clinical pathology of Sir Salimullah Medical College & Mitford Hospital, Dhaka during the period of January 2013 to December 2013. A total of 66 patients were included in the study. Among them 33 were clinically diagnosed preeclampsia women grouped as Cases and another 33 were age, parity and BMI matched term pregnant women as Controls. Consecutive sampling technique was used.

Inclusion criteria: Age - 24-35 years, gestational age - 28-40 weeks, term pregnant patients as matched controls.

Exclusion criteria: Patients with Preexisting hypertension, renal diseases- such as glomerulonephritis, nephrotic syndrome, diabetes mellitus, thyroid dysfunction, Pyrexia.

Variables: Age, Parity, Gestational age, Serum C-Reactive protein, Blood pressure, Proteinuria.

Operational Definitions

Preeclampsia: preeclampsia is a multisystem disorder of unknown etiology characterzed by development of hypertension to the extent of 140/90 mmHg or more with proteinuria after 20 weeks in a previously normotensive and non-proteinuric women.

Mild preeclampsia: This includes cases of sustained rise of blood preessure of more than 140/90 mmHg but less than 160 mmHg systolic or 110 mmHg diastolic and proteinuria $<2^{+}$.

Severe preeclampsia: A persistent systolic blood pressure of >160 mmHg or diastolic blood pressure >110 mmHg and proteinuria $>3^{+}$.

Proteinuria: Defined as presence of total protein in 24 hours urine of more than 0.3 gram or > 2 + (1.0 gram/ L) on at least two random clean- catch urine samples tested 4 hours apart in the absence of urinary tract infection.

Term pregnancy: Pregnancy is considered at term when gestation has lasted 37 completed weeks to 40 weeks of gestational age.

CRP positive status: Serum CRP was considered positive when CRP concentration found 6mg/L or above (Nycocard Reader II method).

Ethical consideration: The research protocol was approved by the institutional ethical review committee of Sir Salimullah Medical College Mitford Hospital, Dhaka. Keeping compliance with Helsinki Declaration for medical research involving human subject 1964, patient was informed verbally about the study, the underlying hypothesis and right for the participant to withdraw from the project at any time, any reason.

Data processing and analysis

The data were screened and checked for any missing value and discrepancy and compiled. All data were recorded in tabulated form and the result was expressed as mean±SD. SPSS software was used to analyze the data. Unpaired t- test, chi-square test and Pearson's correlation test were used to see the level of significance. 95% confidence limit ($p < 0.05$) was taken as level of significance.

Discussion

In this Case-Control study, the serum C-reactive protein concentration have measured in preeclamptic women (case) and normotensive term pregnant women (control) to evaluate the association of C-reactive protein level in preeclamptic women.

Results

Table 1: Baseline characteristics of the study subjects (n=66).

Variable	Case (n=33)	Control (n=33)	*p* value
Age (years)	26.76±3.37	26.70±2.85	0.876
Gestational age (wk)	37.36±2.57	39.12±0.93	<0.001
Gravida			
Primi	16 (48.5%)	12 (36.4%)	0.319
Multi	17 (51.5%)	21 (63.6%)	
Antenatal care			
Regular	14 (42.4%)	17 (51.5%)	0.115
Irregular	19 ((57.6%)	16 (48.5%)	
H/O preeclampsia			
Present	9 (52.9%)	1 (4.7%)	0.006
Absent	8 (47.0%)	20 (95.2%)	

Data were analysed using Unpaired t-test and Chi-square test. p<0.05 is statistically significant.

Table I shows no significant difference regarding age, gravida, antenatal care (p>0.05). Significant difference of gestational age and history of preeclampsia between two groups (p<0.05).

Table 2: Comparison of physical examination findings in the study subjects (n=66).

Variable	Case (n=33) Mean±SD (Range)	Control (n=33) Mean±SD (Range)	*p* value
BMI (kg/m²)	23.37±1.47 (20-26)	21.81±1.45 (18-24)	<0.001
SBP (mmHg)	148.33±13.41 (140-170)	108±7.14 (100-120)	<0.001
DBP (mmHg)	106.67±6.99 (100-120)	69.67±5.26 (60-80	<0.001

Data were analysed using Unpaired t-Test and were presented as mean±SD. p<0.05 is statistically significant.

Table 2 shows significant difference between the case and control groups regarding BMI, Systolic blood pressure and Diastolic blood pressure respectively.

Table 3: Serum C-reactive protein status in the study subjects (n=66).

CRP status	Case (n=33)	Control (n=33)	*p* value
(>6 mg/L)	29 (87.9%)	9 (27.3%)	<0.001
(<6 mg/L)	4 (12.1%)	24 (72.7%)	
Total	33 (100.0%)	33 (100.0%)	
Mean±SD	17.93+10.05	7.45+1.80	<0.001
Range	(6-48)	(6-15)	

Chi-square test was done to analyze the data. p<0.05 is statistically significant.

Table 3 shows that Serum C-reactive protein level was found >6mg/L in 29 (87.9%) women in case group and only 9 (27.3%) women in the control group respectively. Serum C-reactive protein level was found <6 mg/L in majority (72.7%) of the control group. The mean serum C-reactive protein concentrations with its range in the study subjects when concentrations were >6mg/L; which in case & control were 17.93+10.05 (6-48) mg/L and 7.45+1.80 mg/L (6-15) respectively and serum C-reactive protein concentrations were higher in case group than control group.

Table 4: Serum C-reactive protein status in the study subjects when concentration were >6mg/L.

CRP status	Mild preeclampsia n=24	Severe preeclampsia n=9	*p* value
(>6 mg/L)	20 (83.4%)	9 (0.0%)	<0.001
(<6 mg/L)	4 (16.7%)	0 (0.0%)	
Mean±SD	12.92±5.7	27.78±17.37	
Range	(3-25)	(6-48)	

Data were analysed using Unpaired t-Test and were presented as mean±SD. p<0.05 is statistically significant.

Table 4 shows that mean serum C-reactive protein concentrations level were higher in the severe preeclampsia group than those in the mild preeclampsia group.

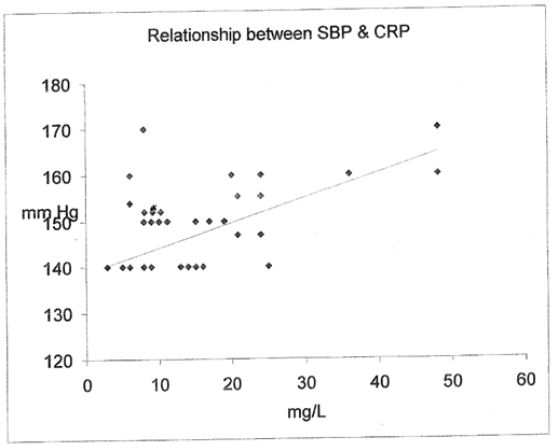

Figure 1: Relationship between C-reactive protein and systolic blood pressure.

Figure 1 shows relationship between C-reactive protein and systolic blood pressure in the preeclampsia patient (n=33). SBP shows positive relationship with CRP, that is, with increasing CRP, SBP also increased significantly (r = 0.622. p = <0.001)

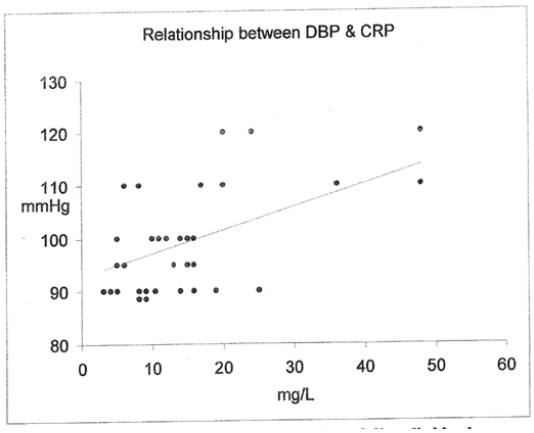

Figure 2: Relationship between C-reactive protein and diastolic blood pressure.

Figure 2 shows relationship between C-reactive protein and diastolic blood pressure in the preeclampsia patient (n=33). DBP shows positive relationship with CRP, that is, with increasing CRP, DBP also increased significantly (r=0.546, p=<0.001).

In this study mean age of case group was 26.76±3.37 years. Most subjects in both group were within range of 24-29 years of age and Muslims. Wolf et al. [12] reported mean age was 29.5 years, Chunfang et al. [13] in a prospective study analyzed 566 patients and reported that 70% patient in case group and 72.5% patients in control group were between 20-34 years of age. All these studies showed that there was no statistically significant difference between the age groups. These are nearly consistent with this study.

Many studies suggested that past obstetric history of preeclampsia was associated with increased risk of subsequent pregnancy [10, 14, 15]. Same phenomenon observed in this study where about 9 (52.9%) cases found to have previous history of preeclampsia. Hilary et al. [14] investigated whether women with previous preeclampsia destined to have recurrent preeclampsia would have elevated or rising C-reactive protein concentrations. They postulated that potential usefulness of C-reactive protein as a predictor of recurrence of preeclampsia is limited.

The present study revealed the mean serum C-reactive protein concentration was 7.45±1.80 mg/L (range of 6-15 mg/L) in control group. Mean serum C-reactive protein concentration found in case group was 17.93±10.05mg/L (range of 6-48 mg/L). This study showed mean serum C-reactive protein concentration in preeclampsia cases significantly high in comparison to control (P < 0.001). Same phenomenon observed in many other studies around the world [2, 4, 16-18].

Considering preeclampsia sub types of this study, serum C-reactive protein concentration in severe preeclampsia group found significantly higher (p<0.001) than that of mild preeclampsia. This is harmonious with some other studies done abroad [2, 5, 12, 18, 19].

In this study, it was found that C-reactive protein levels were significantly higher

(p<0.001) in preeclampsia women and positively correlated to the degree of blood pressure elevation. This results are similar to results in studies by Teran et al. [15], Belo et al. [17], Kumru et al. [4] and Ustan et al. [16]. Another prospective, case-control study results shown that elevated C-reactive protein level (>4.9 mg/L) associated with 2.5 fold increase risk of preeclampsia in lean women [20].

In Present study, serum C-reactive protein was found within the range of 6-15 mg/L in 45.4% of cases and 27.2% of controls. About 72.7% control and only 12.1% of cases are found <6mg/L. Serum C-reactive protein concentration was found to be maximum in severe preeclampsia group (48 mg/L) and lowest in control group (03mg/L).

The results of present study are not in agreement with those of Kristen et al. [21] who reported in their cross-sectional study, that maternal serum C-reactive protein is not elevated with preeclamptic women when compared with normal term pregnant women but increased when compared to non-pregnant women.

Probable explanation of disagreement may be attribute to several factors such as variable demographic characteristics of patients under study, wide variability of serum C-reactive protein in infection, inflammation, tissue damage and malignant neoplasia in general population & variation in prevalence of subclinical infections of women under studies etc.

In fact, the pathophysiology of preeclampsia is still unknown and precise role of C-reactive protein in this regard is still cloudy. One school of thought proposes that overt or occult inflammation as the cause of preeclampsia and raised serum C-reactive protein to be simply the marker of inflammation as a component of acute phase reactant. Another school of thought tends to incriminate the raised serum C-reactive protein level may be a marker to predict the severity of preeclampsia. Both the thoughts are expected to help in promising the diagnostic and prognostic potentials.

Conclusion

The study concludes that serum C-reactive protein level was found to be significantly higher in preeclamptic patients. It signifies strong association of C-reactive protein with preeclampsia in our Bangladeshi women. Higher the severity of preeclampsia, serum C-reactive protein tends to be higher.

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Original Article

Spirometric Lung Function Outcome of Post-COVID-19 Patients in a Tertiary Hospital at Three Months Following Discharge

***Md. Ahad Murshid[1], Professor AKM Mosharraf Hossain[2], Professor Mohammed Atiqur Rahman[3], Shamim Ahmed[4], Samprity Islam[5], Rajashish Chakrabortty[6]**

Abstract

Methodology: This was a cross sectional study from October 2020 to September 2021 where lung function was assessed by spirometry in 40 (24 severe and 16 non-severe) post-COVID-19 patients at three months following hospital discharge. It was done by convenient sampling in post-COVID follow-up clinic at department of Respiratory Medicine, Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh. **Results:** Among 40 subjects, 17 (42.5%) had restrictive abnormality, 1 (2.5%) had obstructive airway abnormality and 22 (55%) had normal spirometry. Restrictive abnormality was found in 54.2% of severe cases whereas it was in 25% of non-severe cases. Mean forced vital capacity (FVC) among 40 subjects was 2.6±0.6 liters (80±16% predicted). FVC in severe cases was 76±18.4% predicted and in non-severe subjects it was 86.1±9.2% predicted. This difference was significant (p=0.05). **Conclusion:** Significant proportion of subjects developed characteristic restrictive lung parenchymal abnormality at a transition from subacute phase to chronic phase of post-COVID-19 which may or may not persist in similar extent with time.

Keywords: Spirometry, lung function, post-COVID-19

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Introduction

Moderate to critical and few mild COVID-19 patients with co-morbidities need hospitalization [1]. COVID-19 has three phases- acute phase (first 3 weeks), post-acute phase (3rd-12th weeks) and chronic post-COVID-19 phase (beyond 12th weeks) [2]. Similarities in pathogenesis and spectrum of lung damage between COVID-19 and SARS emerged in 2003 have been reported [3]. Approximately 20% of SARS patients had impaired pulmonary function beyond eight weeks [4]. SARS patients had reduced exercise capacity beyond one year [5]. These evidences raised possibility of adverse pulmonary consequence in COVID-19. Approximately 25.4% post-COVID-19 patients had abnormal pulmonary function at three months following hospital discharge [6]. Restrictive lung defect was in 50% of post-COVID-19 patients [7]. Another study showed 42% post-COVID-19 patients had impaired lung function after three months of hospital discharge [8]. Only 6.4% post-COVID-19 patients had restrictive defect in another study

[9]. Such conflicting results necessitated more studies. The objective of this study was to assess the chronic impact of COVID-19 on lung function by spirometry at three months following hospital discharge.

Methods

This cross sectional study was done from October 2020 to September 2021. Study population were post-COVID-19 patients of post-COVID follow-up clinic on an out-patient basis at department of Respiratory Medicine, BSMMU. Inclusion criteria were age 18-80 years, h/o RT-PCR confirmed COVID-19 treated in BSMMU three months (90±15 days) before. Exclusion criteria were known COPD, bronchial asthma, DPLD, bronchiectasis, pulmonary tuberculosis, lung resection, neuropathy, myopathy, ankylosing spondylitis, kypho-scoliosis, systemic sclerosis, acute coronary syndrome, active haemoptysis, arrhythmia, heart failure. Sample size was 40 in a total including non-severe and severe cases. Convenient sampling was done. Number of enrolled subjects was 55. With informed written consent enrolled patients were subjected to pulmonary function test. First 40 subjects were taken as sample who completed spirometry in available centers including BSMMU. A questionnaire with coding response was used for collecting data. Data of previous COVID-19 illness were collected from discharge note. Data were kept confidential and used only for this study. Statistical analysis was done using SPSS-22. Data were normally distributed. Quantitative data were analyzed by 'unpaired t-test'. Categorical data were analyzed by chi-squared test. Value of p≤0.05 was statistically significant.

Results

Mean age of the total of 40 participants was 51.5±10.1 years (range 27-69 years). Among 40 participants, 24 of them has had severe COVID-19 and 16 participants has had non-severe COVID-19. Mean interval between hospital discharge and pulmonary function test was 86.9±7.2 days (range 77-103 days). In spirometry among all participants, 17 subjects were found with restrictive lung abnormality [defined as FEV1/FVC ratio >70% and forced vital capacity (FVC) <80% predicted], 1 subject was found with obstructive airway abnormality [defined as FEV1/FVC <70% and forced expiratory volume in 1st second (FEV1) <80% predicted] and remaining 22 subjects had normal spirometry (FEV1/FVC ratio >70%, FVC >80% predicted). Figure-1 shows the proportions of different patterns of spirometric lung function outcomes among all 40 cases. Frequency of restrictive lung defect in 24 severe cases was 13 (54.2%) whereas frequency of restrictive abnormality in 16 non-severe cases was 4 (25%). Table-I shows the demographic and clinical characteristics and pulmonary function test results of the study participants. Mean forced vital capacity (FVC) in all participants was 2.6±0.6 liters (80±16% predicted). Forced vital capacity was significantly lower in severe cases than non-severe cases (76.0±18.4% vs 86.1±9.2 % predicted, p=0.05).

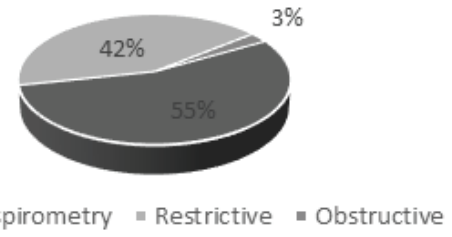

Figure 1 : Pie chart showing proportion of spirometric diagnosis in study subjects.

Table 1: Demographic and clinical characteristics and pulmonary function test results of the post-COVID-19 participants (n=40).

Variables	Total (n=40)	Non-severe (n=16)	Severe (n=16)	*p* value
Age (years)				
18-50	18 (45%)	11	7	0.52
51-70	22 (55%)	5	17	
Sex				
Men	29 (72.5%)	12	17	0.004[s]
Women	11 (27.5%)	4	7	
Body mass index (Kg/m²)				
<25 (non-obese)	22 (55%)	12	10	0.34
>25 (obese)	18 (45%)	4	14	
Smoking				
Smoker	7 (17.5%)	3	4	0.001[s]
Non-smoker	33 (82.5%)	13	20	
Spirometry				
FEV1 (liter)	2.2±0.5	2.4±0.4	2.1±0.6	0.05
FEV1 (% predicted)	85.6±17.6	89.4±12.6	83.1±20.2	0.27
FVC (liter)	2.6±0.6	2.9±0.5	2.5±0.7	0.06[s]
FVC (% predicted)	80.0±16.0	86.1±9.2	76.0±18.4	0.05
FEV1/FVC ratio	0.8±0.0	0.84±0	0.86±0	0.56
PEFR (liter/min)	6.0±1.8	6.6±1.6	5.6±1.9	0.10
PEFR (% predicted)	89.5±25.7	94.2±13.1	86.4±31.4	0.35

FEV1= Forced Expiratory Volume in 1st second, FVC= Forced Vital Capacity, PEF= Peak Expiratory Flow Rate
S=Significant

Discussion

COVID-19 pneumonia progresses through fibrotic changes which can develop parenchymal restrictive ventilatory abnormality [10-11]. In this study, the characteristic spirometric abnormality was restrictive lung defect. This result was similar with results from most of other current studies in post-COVID-19 patients. It was noted that one participant was found with obstructive airway but he had h/o smoking which could be a possible explanation of such finding. Restrictive abnormality was more common in severe COVID-19. In most of the cases restrictive lung defect was mild (FVC 60%-80% predicted). During the initial period of COVID-19 pandemic we had paucity of information about long term pulmonary consequence of COVID-19 after recovery from acute illness. But in some previous studies in SARS epidemic, it was experienced that most of the patients recovered completely and small proportion of severe cases had developed residual lung fibrosis and impaired parenchymal ventilatory function beyond one year. The present study was done in post-COVID-19 patients at a transitional period from subacute to chronic phase of post-COVID-19. During this period, in a significant proportion cases there is a transition of ongoing pathological changes of fibrotic process to established fibrosis but not in all patients. So the present study cannot make a conclusion that whether the proportion of abnormal findings will persist or not in similar extent.

The strength of this study was that, the major pulmonary function was assessed in both severe and non-severe post-COVID-19 patients. All of them were from same COVID-19 center having standardized treatment protocol. There were few limitations. The sample size was small. There was lack of baseline data of pulmonary function before COVID-19 illness. So the results could not be compared with function of healthy lung before of their COVID-19 illness.

Conclusion

This study gave alarming picture on pulmonary consequence in post-COVID-19 patients that should be addressed with a high index of suspicion. Long term follow-up of post-COVID-19 patients will be crucial for their better outcome. Pulmonary rehabilitation should be considered in the management to hasten recovery.

Ethical Issue

The protocol was approved with ethical clearance by Institutional Review Board of Bangabandhu Sheikh Mujib Medical University (BSMMU); number- BSMMU/2020/11546, date-30/12/2020. Minor change in title was approved later bearing the same number and date (Registration no- 3316).

Conflict of interest

Authors declare no conflict of interest.

Author contribution

The first author (Dr. Md. Ahad Murshid) conceptualized the study, designed the research methods, completed data acquisition, data analysis and manuscript writing. Professor Dr. AKM Mosharraf Hossain was the guide of this research. Professor Dr. Mohammed Atiqur Rahman gave the final approval. Professor Dr. AKM Mosharraf Hossain, Professor Dr. Mohammed Atiqur Rahman, Dr. Shamim Ahmed, Dr. Samprity Islam and Dr. Rajashish Chakrabortty gave instructions and reviewed throughout the study.

Acknowledgement

The authors are grateful to the residents and nurses of department of Respiratory Medicine, BSMMU and the participants of this study.

Funding support

Thesis grant from BSMMU.

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Original Article

Effect of Fentanyl as an Adjuvant to Local Anesthetics in USG Guided Supraclavicular Brachial Plexus Block at Tertiary Care Hospital in Bangladesh

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Abstract

Background: Ultrasound (USG) guided supraclavicular brachial plexus block is of increasing importance in upper limb surgeries as it provides excellent pain control, reduced side effects and decreased post anesthesia care unit stay. **Aim of the Study:** The primary objectives of this study are to determine whether adding fentanyl to a supraclavicular brachial plexus block improves the success rate, block time, and duration and quality of postoperative analgesia. **Methods:** This case-control study was carried out in the Department of Anesthesiology at Shaheed Sheikh Abu Naser Specialized Hospital, Khulna, Bangladesh, in collaboration with the Orthopedic Department from June 2021 to July 2022. A total of 60 adult patients of either sex with ASA I & ASA II scheduled for upper limb surgeries under USG-guided Supraclavicular Brachial Plexus Block were randomly assigned to two groups (30 patients in each group). Patients in the control group received a mixture of 2 ml Normal Saline with 18 ml 0.5% Bupivacaine, & 10 ml 2% Lignocaine and the study group received a mixture of 2 ml (100 mcg) injection of Fentanyl with 18 ml 0.5% Bupivacaine, & 10 ml 2% Lignocaine. **Results:** The mean onset of sensory & motor block was 4±2.15 min and 7±2.50 min in the Fentanyl group and 5±2.05 min and 9±2.75 min in control group. The duration of analgesia in Fentanyl group was 10±2.68 hours and in control group was 5±1.70 hours. **Conclusion:** Fentanyl as an Adjuvant to Local Anesthetics there is significant increase in the onset and duration of sensory and motor block. The analgesic effects, post-operative visual analgesic scale (VAS) and ensure analgesia are also adequate and long if Fentanyl is used as an adjuvant to local anesthetics.

Keywords: Fentanyl, Adjuvant, Supraclavicular, Brachial and Plexus Block.

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Introduction

The techniques of regional anesthesia have become very popular as they provide several advantages compared to general anesthesia and systemic analgesia. They provide excellent pain control, decreased complications, and reduced post-anesthesia care unit stay [1]. Regional anesthesia provides more patient safety and better outcomes.

USG-guided regional anesthesia has become more popular because it provides clinicians with real-time images, which are helpful for better identification of the anatomical structure, safe needle placement, and reducing the amount of local anesthetic solution due to adequate local-anesthetic spread and reducing the rate of complications [2]. Upper limb surgeries are commonly done using peripheral blocks such as the supraclavicular brachial plexus block, which provide effective anesthesia [3]. Seeking adequate adjuvants to the regional nerve block is still under research with medications that increase the time of analgesia but with lesser side effects [4].

Currently available local anesthetics can provide analgesia for a limited period of time. Lignocaine is an effective local anesthetic of the amide group with a rapid onset of action and last 60-90 minutes. Bupivacaine is a local anesthetic of the amide group four times more potent than lignocaine, slower onset and has a significantly longer duration of action but not more than 4-8 hrs. It has been suggested for a long time that peripheral nerves possess opioid receptors, which has tempted clinicians to add narcotics to local anesthetics to prolong these solutions' anesthetic and analgesic effects. Adding fentanyl and opioid α2 agonist to local anesthetic improves the onset and duration of sensory and motor block, prolongation the duration of analgesia and decreases requirements of intraoperative & postoperative analgesic requirements. Postoperatively visual analogue scale & rescue analgesia results indicate adequate postoperative analgesia.

This research aims to study the safety and efficacy of opioids such as fentanyl when added to local anesthetics in USG-guided supraclavicular nerve block regarding the onset of sensory and motor block & duration of postoperative analgesia.

Methodology

This was a case-control study conducted at the Department of Anesthesiology, Shaheed Sheikh Abu Naser Specialized Hospital, Khulna, Bangladesh, from June 2021 to July 2022. Patients were randomly selected by two groups by card sampling method. A total of 60 patients were enrolled and analyzed in this study into two groups. The study had 2 groups with randomly selected patients by card sampling method. All patients of both sexes aged 18-60 years, ASA Class I & Class II undergoing routine operation scheduled for upper limb surgery under supraclavicular brachial plexus block were enrolled in this study. Patients were excluded if they had circulatory instability, coagulopathy, known hypersensitivity, history of liver & neural diseases. The sample size was 30 in each group. A box was prepared to contain 60 cards (C-card and F-card with equal numbers). Randomization of the sample was done by asking the patient to draw one card blindly from the box. The patient who drew a card marked F were allocated to group F and a card marked C were assigned to group C. After selecting the patient entry of the name of the patients in the case record form and initial pulse, NIBP (Noninvasive Blood Pressure), RR (Respiratory rate), SPO_2 (Saturation of peripheral oxygen) were monitored and were recorded as the baseline value. Local anesthetic dispersion at the time of injection was seen by the ultrasound. After the block is given, RR (Respiratory rate), NIBP (Noninvasive Blood Pressure), and SPO_2 were recorded and then first 30 minutes at 5 minutes' intervals

then 15 minutes intervals up to the end of the surgery. The onset of sensory block was assessed every minute by a pinprick test in different areas innervated by radial, ulna, median, and musculocutaneous nerves. The onset of motor block was assessed every minute by a modified Bromage scale compared to the opposite limb by asking the patient to raise their hand or move their fingers. The onset of sensory block was considered when the patient experienced a dull sensation to pinprick along the dermatomal areas of any of the previously mentioned nerves. Complete loss of sensation to pinprick considered complete. Sensory block was considered sensory block was graded as follows.

The sensory block was graded as follows:

- Grade 0: Sharp pain felt.
- Grade 1: Analgesia and dull sensation felt.
- Grade 2: When patients felt no sensation.

Motor block was graded by Modified Bromage scale:

- Bromage 0: The subject is able to move the hip, knee and ankle and is able to lift his leg against gravity.
- Bromage 1: The subject is unable to lift his leg against gravity but is able to flex his knee and ankle.
- Bromage 2: The subject is unable to flex his hip and knee, but is able to flex his ankle.
- Bromage 3: The subject is unable to flex his hip, knee and ankle, but is able to move his toes.
- Bromage 4: Complete paralysis.

Any incidence of nausea, vomiting, dryness of mouth, pruritus, hypotension, bradycardia, a sign of local anesthetic toxicity, hematoma or pneumothorax was assessed by YES/NO. If any side effects were detected clinically per & post-operative period, then it was managed according to need. Post-operative analgesia was assessed by interviewing the patient according to the Visual Analogue Scale (VAS) in the post-operative ward for the first 24 hours. The time for the first rescue of analgesia & total amount of rescue analgesic medication given over the first 24 hours when the VAS scale is 4 or more were also recorded. Rescue analgesic medication (Pethidine 1ml/kg/BW) was given. The sociodemographic variables studied were age, sex, and weight. The preoperative variables were BP, SPO_2, and Respiratory rate. The Outcome variables were the assessment of sensory & motor block, adjuvant required, duration of analgesia, and side effects monitored as well as per-operative hemodynamic stability by recording pulse, NIBP, SPO_2 & RR. Post-operative variables on analgesic demand by VAS to determine analgesic demand. A structured case record form was developed containing all the variables of interest. Proper permission was taken by the ethical committee. The collected data was compiled, checked, & edited. All data were presented in a suitable table or graph according to their affinity. A description of each table and graph was given to understand them clearly. All statistical analysis was performed using the statistical package for social science (SPSS) program. Continuous parameters were expressed as mean±SD and categorical parameters as frequency and percentage. Comparisons between groups (continuous parameters) were made by Student's t-test. Categorical parameters compared by Chi-Square test. The significance of the results as determined by a 95.0% confidence interval and a value of $P<0.05$ was considered to be statistically significant.

Results

In this case-control study, a total of 60 patients were enrolled and analyzed into two groups. Most (30%) of the patients were from the age range 36-45 in group F, and 10 (33.33%) patients were from age 26-35 and 36-45 in group C (Table 1). Table 1 also shows the

gender distribution of the study population. In group F, 20 (66.67%) patients were male and 10 (33.33%) patients were female. In the control group, 16 (53.33%) patients were male, and 14 (46.67%) were female. Figure 1 shows the ASA report of the study population. The mean onset of sensory & motor block was 4±2.15 min and 7±2.50 min in Group F and 5±2.05 min and 9±2.75 min in Group C (Table 3). The duration of analgesia in Group F was 10±2.68 hours and in Group C was 5±1.70 hours (Table 4).

Table 1: Age & sex distribution of the study subjects (n = 60).

Characteristics		Group F (n = 30) n (%)	Group C (n = 30) n (%)
Age range (Year)	18-25	5 (16.6)	4 (13.3)
	26-35	5 (16.6)	10 (33.3)
	36-45	9 (30)	10 (33.3)
	46-55	8 (26.6)	4 (13.3)
	56-60	3 (10)	2 (6.6)
Sex	Male	20 (66.6)	16 (53.3)
	Female	10 (33.3)	14 (46.6)

Table 2: Preoperative variables of the study population (n = 60).

Variables		Group F (n = 30) n (%)	Group C (n = 30) n (%)
Pulse (b/min)	60-70	5 (16.6)	2 (6.6)
	>70	25 (83.3)	28 (93.3)
BP (mmHg)	100-110	10 (33.3)	11 (36.6)
	120-140	20 (66.6)	19 (63.3)
Respiratory rate (br/min)	12-14	28 (93.3)	24 (80)
	15-18	2 (6.6)	6 (20)
SPO_2	97%	28 (93.3)	27 (90)
	98%	2 (6.6)	3 (10)

Table 3: Distribution of onset of sensory and motor block (n = 60).

Variables	Group F (n = 30) Mean ± SD	Group C (n = 30) Mean ± SD	*p* value
Onset of sensory block (Min)	4 ± 2.1	5 ± 2.05	<0.05
Onset of motor block (Min)	7 ± 2.5	9 ± 2.75	<0.05

Table 4: Duration of analgesia between the study group (n = 60).

Variables	Group F (n = 30) Mean ± SD	Group C (n = 30) Mean ± SD	*p* value
Duration of analgesia (Hours)	10 ± 2.7	5 ± 1.7	0.001

Table 5: VAS at 1st to 24th hour (n = 60).

Time (Hour)	Group F (n = 30) VSA scale	Group C (n = 30) VSA scale	*p* value
1st	0-1	0-1	0.01
3rd	1-2	1-3	0.03
5th	3	5	<0.05
7th	5	1	<0.05
9th	1	2-3	0.03
11th	2-3	5	<0.05
13th	5	2-3	<0.05
15th	1	4	<0.05
24th	3	5	<0.05

Table 6: Postoperative monitoring and side effects (n = 60).

Variables		Group F (n = 30) n (%)	Group C (n = 30) n (%)
Monitors	Hypotension	6 (20)	8 (26.6)
	Bradycardia	4 (13.3)	6 (20)
Side effects	Nausea/Vomiting	1 (3.3)	3 (10)
	Pneumothorax	0 (0)	0 (0)
	Hematoma	0 (0)	1 (3.3)
	Pruritus	0 (0)	0 (0)

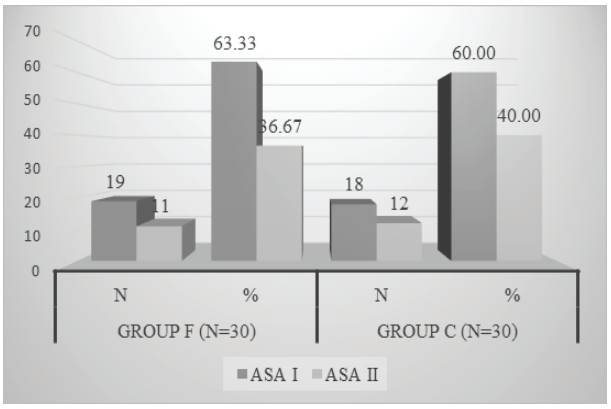

Figure 1: ASA report of the study population.

Discussion

In our study, we aimed to evaluate the efficacy and safety of fentanyl when added to bupivacaine and lignocaine in USG-guided supraclavicular block during upper limb surgery. The Supraclavicular brachial plexus block provides dense anesthesia for the upper arm, elbow, forearm, and hand.

Hadzic et al. (2004) compared general anesthesia and infraclavicular blockage in ambulatory hand surgeries and found that the analgesic score was better with infraclavicular blockage in which additional analgesia was less needed and side effects were fewer [5]. Successful USG-guided supraclavicular brachial plexus block can be learned faster than nerve stimulator-guided supraclavicular brachial plexus block [6]. The USG-guided supraclavicular block is more rapidly performed and has a higher success rate where visualization of LA spread is used as the endpoint for injection rather than neurostimulation [7, 8].

In the current study, failure was not observed due to the advantage of ultrasound. Today, many regional anesthetics are combined with general anesthesia. Patients with blocks have less analgesia in post-anesthesia care unit they also appear to use fewer antiemetic drugs. The patient that recovers block has statistically significantly shorter post-anesthesia care until stays.

Fentanyl mediates its effect by acting directly on primary afferent tissues (dorsal; horns), which have been found to contain opioid binding sites and account for the analgesic effect of fentanyl. It has been added to local anesthetics for some time, with different results [9]. In a study, Sanjida Hasan et al. (2018) used fentanyl 2 ml (100 µg) in 38 ml of 0.5% bupivacaine and lignocaine (Total volume 40 ml) in the supraclavicular approach, and they achieved the onset sensory and motor block 7.60±3.71 min and 9.23±5.11 min respectively [10]. The results nearly matched the present study, but we used a 30ml mixture of fentanyl 2 ml (100 µg) in 28 ml of 0.5% bupivacaine and lignocaine (Total volume 30 ml). This is consistent with the study done by Gandhi et al. (2012) who studied the use of dexmedetomidine along with bupivacaine for brachial plexus block in which the onset of sensory [11].

The motor block was not shortened in the group with dexmedetomidine as compared to the control group. Concerning the duration, there was a statistically significant difference between the two groups in the sensory and motor block duration. This difference was higher in the fentanyl group with a prolonged action duration than in the control group. Sensory and motor block duration were also significantly prolonged in the study done by Biswas et al. (2014) who studied the effect of adding 1 ml (100µg) dexmedetomidine to 35ml of levobupivacaine 0.5% [12]. In the study by Valenzano et al. (2011), the authors concluded that adding fentanyl to bupivacaine in the brachial plexus block caused a statistically significant increase in the duration of the sensory block than the control group [13]. This result could not be so different from our results, as our study aimed mainly to compare the fentanyl group and the control group. Also, there was no difference in the required for the onset of complete motor block, which was the same as our results.

The current study evaluated postoperatively

the time for the first request of analgesia in which there was a significant difference between the increased duration of analgesia in the fentanyl group and the least duration of analgesia in the control group. The rescue analgesia given over the first 24h was the least in the fentanyl group. In the present study, the baseline characteristics were within the expected value, which supports the Jarbo et al. (2005) study [14]. In this study, it was observed that pre-operative mean pulse rate, systolic blood pressure, diastolic blood pressure, SPO_2, and respiratory rate changes at different times were almost similar between the two groups, and no significant ($p>0.05$) mean difference was found. The study revealed that adding fentanyl causes a significantly early onset of anesthesia and a longer duration of analgesia without any side effects [15].

Conclusion & Recommendations

From the above study it could be concluded that, Fentanyl as an Adjuvant to Local Anesthetics, there is significant increase in the onset and duration of sensory and motor block. The analgesic effects, post-operative visual analgesic scale (VAS) and ensure analgesia are also adequate and long if Fentanyl is used as an adjuvant to local anesthetics.

Limitations of the study: Every hospital-based study has some limitations and the present study undertaken is no exception to this fact. Therefore, the results of the present study may not be representative of the whole of the country or the world at large. The number of patients included in the present study was less in comparison to other studies. Because the trial was short, it was difficult to remark on complications and mortality.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee.

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Original Article

Outcome of Operative or Non-operative Treatment of Acute Intestinal Obstruction within or after 72 Hours of Admission in a District Level Hospital: a Prospective Study

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Abstract

Introduction: Acute intestinal obstruction is one of the commonest surgical emergencies. Early diagnosis and their management accordingly is the purpose of this study. **Objectives:** This prospective study is carried out to find out the outcome of acute intestinal obstruction treatment within 72 hours and after 72 hours, pattern of degree of electrolytes disturbance and cause of acute intestinal obstruction who attending in a district level hospital. **Methods:** This study was carried out in Surgery unit, 250 Bedded Hospital, Jashore, from September 2019 to September 2020. All cases above 18 years age, represented with pain and distended abdomen meeting the enrollment criteria were consecutively selected and were allocated into the groups based on acute cases. **Results:** In this study, among the admitted 50 patients most common cause was obstructed external inguinal hernia (25%), adhesive band (22%), volvulus (20%), gastrointestinal tumor (14%) and intussusceptions (5%). Male female ratio was 4:1. Seventy eight (39%), patients treated with surgery. Among them 33 patients within 72 hours, 24 patients recovered smoothly and 07 patients developed relatively less complications and electrolytes imbalance. Six patients treated with surgery after 72 hours and developed relatively serious complications and electrolytes imbalance and length of hospital stay was more and later took repeated hospital admission. Twenty two (11%) patients treated conservatively which faced increases mortality, repeated hospital admission and electrolytes disturbance. The mortality was 8%. **Conclusion:** Patients treated with surgery within 72 hours gives smooth recovery, less hospital stay, decrease repeated hospital admission, less complications and electrolytes disturbance. There was significant relationship between degree of dehydration, duration of presentation and time of surgery.

Keywords: Acute intestinal obstruction, electrolytes imbalance, dehydration, post-operative complications.

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Introduction

Acute intestinal obstruction is one of the commonest surgical emergencies encountered in surgical practice [1]. It occurs in all age groups from neonate to old age in both sexes all over the world. The cause may vary in different ages and from country to country and even region in same country [2]. Acute intestinal obstruction may be defined as the interference with the normal progression of intestinal contents [3]. Causes of mechanical bowel obstruction seem to vary from one country to another and

the incidence of various etiological factors appear to alter from year to year. Previously obstructed external hernia was the most common cause, but now a days adhesive bands are claimed as the commonest cause of intestinal obstruction in developed countries [4].

In our country the patients with acute intestinal obstruction are admitted to hospital late than that of developed countries and the interval between onset of disease and the time of admission to hospital varies from several hours to several days. During this time the patient remains untreated or maltreated by quacks, kabiraj etc [5]. Due to late presentation, majority of the patients are found severely dehydrated with hypovolemic shock. In addition, there is delay in surgery and improper fluid and electrolyte resuscitation. So there is still a high mortality due to intestinal obstruction in our country. The patients with acute intestinal obstruction presents with colicky abdominal pain, vomiting, distention and constipation. Some patients are found extremely dehydrated, some are found in shock.

Success in the treatment of acute intestinal obstruction depends largely upon early diagnosis, skillful management, and an appreciation of the importance of treating the pathologic effects of the obstruction just as much as the cause itself. The early recognition and speedy relief of strangulated obstruction helps to reduce the mortality. Exclusion of the presence of strangulation gives us the chance for safe non operative management of selected patients. Ali N. (2005) demonstrated that the toxic factor in mechanical obstruction was actually the loss of fluid and electrolyte from the body by vomiting and by sequestering in the obstructed bowel [6].

Adequate management of these patients demands a thorough knowledge of changes in fluid and electrolyte balance, which is related to duration of symptoms, degree of dehydration and severity of vomiting and level of the obstruction. Correction of fluid and electrolyte imbalance is one of the mainstays of treatment of acute intestinal obstruction. Estimation of serum electrolytes is essential for a guideline of what type of fluid and electrolyte is to be administered.

Methods

This prospective observational study was carried out in Surgery unit of 250 Bedded District Hospital, Jashore, from September 2019 to September 2020. All cases presented with pain and distended abdomen, meeting the enrollment criteria were selected and were allocated into the groups based on acute cases. Sample size was 50. Our inclusion criteria were all adult patients with pain & distended abdomen of either sex who came for treatment in the mentioned hospital. Exclusion criteria were acute intestinal obstruction with CRF, AMI, age >80 years, cirrhosis of liver, COPD. All the relevant information like age, sex, socioeconomic condition, drug history, clinical presentation, routine investigations and serum electrolyte were collected and recorded in a predesigned data sheet for each patient for evaluation. Depending upon the clinical findings some patients had to go for immediate surgery. Rest of the patients were treated conservatively. Laparotomy confirmed the exact pathological lesion in most cases and also the presence or absence of strangulation. All the cases were treated accordingly. Post-operatively, patients were managed properly and monitored for recovery and complications.

Results

The information recorded on 50 cases with acute intestinal obstruction were analyzed manually and presented here in tabulated form.

Table 1: Distribution of patients by age (n=50).

Age (years)	Frequency n (%)
11-20	4 (8)
21-30	9 (18)
31-40	13 (26)
41-50	9 (18)
51-60	8 (16)
61-70	7 (14)
Total	50 (100)

Table 1 showing the age incidence of acute intestinal obstruction. Highest incidence was observed in the age group 21-50 years (62%).

Table 2: Distribution of patients by sex (n=50).

Sex	Frequency n (%)
Male	40 (80)
Female	10 (20)

Table 2 showing sex incidence, male 40 and female 10, the number of male patients was higher than female patients with a ratio of 4:1.

Table 3: Distribution of the patients according to treatment provided (n=50).

Type of treatment	Frequency n (%)
Operative	39 (78)
Conservative	11 (22)

Table 3 shows that the cases of acute intestinal obstruction were treated surgically in 78% cases and conservatively in 22% cases.

Table 4: Incidence of strangulation in operated cases (n=39).

Type of obstruction	Frequency n (%)
Non-strangulation	39 (78)
Strangulation of the gut	11 (22)

Table 4 shows that out of 39 diagnosed cases, 24 cases (60%) were simple obstruction (non-strangulation) and 15 cases (40%) were strangulated.

Table 5: Comparison of length of hospital stay who had conservative treatment, surgery within 72 hours and surgery after 72 hours (n=50).

Length of hospital stay (Days)	Conservative treatment (n=11)	Surgery within 72 hours (n=33)	Surgery after 72 hours (n=6)
1-6	6	12	0
7-12	3	16	01
13-45	2	5	5

Table 5 shows the different length of hospital stay among 50 patients.

Table 6: Mortality in relation to treatment (n=50).

Type of treatment	Number of death
Conservative treatment (n=11)	
Undermined cause	02
Sigmoid volvulus	01
Surgery within 72 hours (n=33)	
Resection and anastomosis of sigmoid volvulus	01
Surgery after 72 hours (n=06)	0

Table 6 shows that the patients who underwent surgical operation had a mortality rate of 3%. Patients having conservative management had a mortality rate 27%, these patients were severely dehydrated with features of toxicity or at the end stage of disease.

Table 7: Electrolytes status of patients (n=50).

Electrolyte	Normal level (mmol/L)	Frequency n (%)	< Normal level (mmol/L)	Frequency n (%)
Na^+	134-144	28 (56)	<132	22 (44)
K^+	3.5-5.3	39 (78)	<3.5	11 (22)
Cl-	95-105	31 (62)	<95	19 (38)
HCO_3^-	22-26	33 (66)	<22	17 (34)

Table 7 shows that sodium level was within physiological limit in 56% of cases and below physiological limit in 44% cases. Potassium level was normal in 78% of cases. Hypokalaemia was present in 22% of cases. Chloride level was normal in 62% cases and was bellow physiological limit in 38% cases. PCO2 value was normal in 66% cases and below normal in 34% cases.

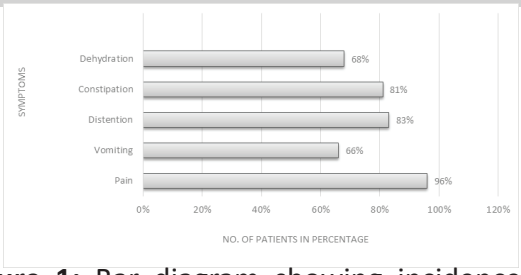

Figure 1: Bar diagram showing incidence of major symptoms (n=50).

The bar diagram shows that the patients had pain in 96% cases. The next frequent symptoms were distension (83%), constipation (81%), dehydration (687%) and vomiting (66%).

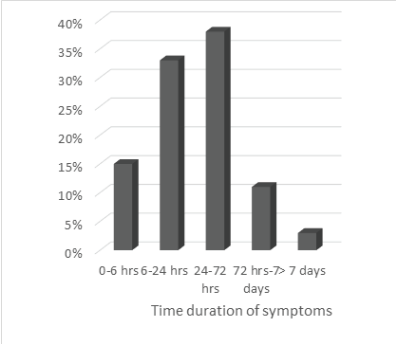

Figure 2: Bar diagram showing duration of symptoms (n=50).

The Bar diagram shows that duration of symptoms within 1-3 days (71%), quick within 6 hours only 15%, late reported >7 days 3%.

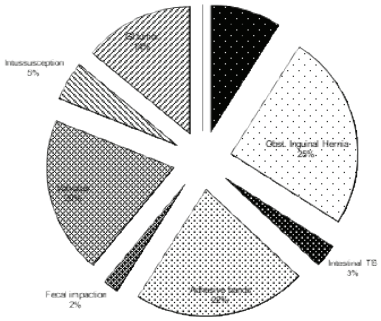

Figure 2: Pie chart showing the relative frequency of the underlying causes (n=50).

Pie chart shows that obstructed inguinal hernia 26% was the maximum incidence, Adhesive bands 22%, Volvulus 20%, GI tumor 14%, Intussusception 5%, Intestinal TB 3%, Fecal impaction 2%, and others 9%.

Discussion

In this study, the incidence of age is evenly distributed among the adult, expecting low incidence in above 60 years group (14%). In the studies of developed countries, the incidence is much higher in above 60 years group due to increase in life expectancy of general population and as gastrointestinal tumor is increasing in incidence as a cause of mechanical intestinal obstruction. Gastrointestinal tumor is common in older age group [7]. In this study male and female ratio is 4:1. The ratio between male and female patients of acute intestinal obstruction varies in different studies. Studies of this subcontinent also show male predominance [8].

Fifty years ago obstructed hernia was the most common cause of acute intestinal obstruction in UK and accounted for 50% of cases, adhesion accounting for 7% only [9]. In western studies, obstructed hernia is decreasing in incidence and volvulus is virtually uncommon, whereas gastrointestinal tumor is increasing in number as a cause of intestinal obstruction [7]. In the present study, most common cause was obstructed external inguinal hernia (26%). Next common is adhesive band (22%). Third place is occupied by the volvulus (20%) and next common was gastrointestinal tumor (14%) and intussusceptions (05%). The other causes were of low incidence. The above result is consistent with most studies of this subcontinent [8, 10]. There were 5 cases whose cause was undetermined as they were treated by conservative means only. In the majority of studies the undetected cases are excluded [11].

Two cases of obstructed inguinal hernia were reduced by taxis and underwent elective herniorrhaphy later on. 11 cases were operated upon. In 8 cases the obstruction was simple and hernial content reduced and herniorrhaphy done. In 3 cases, strangulation of intestine was found. In one case, intestine was found

viable and reduction and heniorrhaphy was done and in other 02 cases, resection and anastomosis of the gut were done followed by herniorrhaphy. In this study, only two patients were treated conservatively. The higher incidence of conservative approach was supported by other studies [12, 13].

In this study, volvulus was found in 20% cases. This is the third most common cause of acute intestinal obstruction in this study. This is consistent with most of Indian and African studies [7-9, 14]. In this study, out of 10 cases, 8 cases were due to pelvic colon volvulus and 2 cases were due to small intestinal volvulus. In 5 cases, etiology were undermined where diagnosis of acute intestinal obstruction was established by clinical and radiological means, but obstruction relieved by conservative treatment.

In our study, strangulation was found in 15 (40%) cases. The causes of strangulation were obstructed inguinal hernia in 4, adhesive band in 5, sigmoid volvulus in 5 and intussusception in 1. The incidence of strangulation is below 10% in western studies [8, 15]. There is a relationship between duration of symptoms and incidence of strangulation [11].

In this study, conservative treatment was employed in 22%, which is consistent with the study of this subcontinent [16]. The higher number of conservative treatment increases the mortality and is due to patient's refusal for operative treatment and poor general condition. Out of 39 postoperative patients, 13 patients (32%) developed postoperative complications and remaining 26 patients (68%) recovered smoothly. Most common postoperative complication was wound infection found in 06(15%) cases. Then respiratory tract infection 3 (8%) cases, burst abdomen 3 (7%) cases and fecal fistula found in 1(2%) cases.

Within 24 hours, operation was done on 14 patients and wound infection found in 2 (14%) patients. Within 24-48 hours, operation was done on 12 patients and among them wound infection 1(8%), respiratory tract infection 1 (8%) cases found. Within 48-72 hours, operation was done on 7 patients and among them wound infection 2 (28%), respiratory tract infection 1 (14%) cases found. After 72 hours, operation was done on 6 patients and complications occurred on each patient. So, within 72 hours operation was done on 33 patients and complications found in only 7 patients which were less severe like wound infection 5 cases and respiratory tract infection 2 cases. But after 72 hours operations was done on 6 patients and complications occurred on each patients which is relatively more severe like burst abdomen in 3 patients, fecal fistula in 1 patient, wound infection 1 and respiratory tract infection 1 patient found. One patient with intussusception (treated by resection/ anastomosis) suffered from ileal fistula. One patient with adhesive band and two patients with strangulated sigmoid volvulus suffered from burst abdomen. Among the 6 cases of wound infection 4 cases were in strangulated and 02 cases non strangulated obstruction.

In this study, mortality was 8% (4 cases). The mortality is low in western studies [1, 17]. Although only 50 cases are inadequate for determining the incidence of mortality. The electrolytes status found in this study shows that Na^+, K^+, Cl^-, and PCO_2 all were low in a good number cases. Na^+ was within physiological limit in 56% cases (n=28), below physiological limit in 44% cases (n=22). K^+ level was normal in 78% cases (n=39) and below normal 22% cases (n=11). Cl^- level was normal in 62% cases (n=31) and low in 38% cases (n=19). PCO_2 value was normal in 66% cases (n=33) and low in 34% (n=17) cases. In no case, electrolyte level was above the normal limit. Here it is seen that K^+ is less changed. It is due to shift of intracellular K^+ into the extracellular compartment to maintain this important ion

within physiological limit. This study also shows that there is definitive biochemical change in moderate degree if dehydration coexists and if the duration of symptom is more than 1 day. This result is consistent with other study of electrolyte status in patients with gastroenteritis and pyloric stenosis [18-20].

Limitation of the study

The sample size was relatively small and long term follow-up of the treatment procedure could not be assessed.

Conclusion

Acute intestinal obstruction is one of the commonest surgical emergencies prevalent in all age groups. Preventable deaths from acute intestinal obstruction can be avoided by early diagnosis, adequate preoperative preparation, proper operative procedure and postoperative care.

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Original Article

Risk Factors for Acute Childhood Poisoning: A Case Control Study

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Abstract

Background: Poisoning is a common preventable cause of mortality, morbidity, and permanent disability in children. Most of the poisoning in children less than 5 years of age is accidental. **Objective:** To find out the risk factors of different types of poisoning in children. **Methodology:** This Case control study included total 100 children admitted in Department of Pediatrics, Dhaka Medical College Hospital, Dhaka, from July 2016 to December 2016. Out of 100, 50 poisoning children aged up to 5 years was consider as group I (case) and rest 50 children other than poisoning matched by age, sex and presence of same toxic agents found in the case group in their house was consider as group II (control) admitted in Pediatric unit of same hospital. **Results:** In this research the difference of mother's education, father's occupation and child's primary care giver were statistically significant ($p<0.05$) between two groups. The majority (44.0%) of patients had kerosene poisoning, followed by medicine 13 (26%), insecticides 6 (12%) and household products 9 (18%). The difference of storage of poisonous agents and height of storage were statistically significant ($p<0.05$). **Conclusion:** Accidental poisoning is high among the 2- 3 years of age group, most of the accidents occur in the afternoon & in summer. Kerosene is the most common agent involved in childhood poisoning. Mother´s education, father´s occupation, mode of storage of poisonous agents & height of storage were significantly associated with poisoning. Mortality is 8% which is due to kerosene & insecticide poisoning.

Keywords: Acute childhood poisoning.

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Introduction

Acute poisoning is a common medical emergency in pediatrics. Children are more prone for accidental poisoning because of curiosity, spontaneous activity, innocence, mouthing of objects, negativism, and imitation of adults. Childhood poisoning is a major problem for health authorities and is responsible for serious morbidity and mortality [1]. Poisoning is the fourth leading cause of death after road traffic accident, burns and drowning [2]. Worldwide, children under five years of age account for about 15% of unintentional poisoning related deaths [3]. In Bangladesh, almost 6,000 children are accidentally poisoned each year, almost 16 per day [4]. The non-fatal poisoning rate in Bangladesh in children aged 0-17 years was 9.7/100,000. The highest rate (24.7/100,000) was in infants followed by among children aged 1-4 years (21.6/100,000). The rates decreased in the older age groups [4].Of the more than 2 million human poisoning exposures reported annually to the National Poison Data Systems of the American Association of Poison Control Centers, approximately 50% occur in children younger than 6 years old.

A population-based study that analyzed national health survey of Pakistan estimated 4.3% unintentional poisoning among children under five years of age [5].

A poison has been defined as a substance which when introduced into or absorbed by living organisms, causes injury or death. Thus, a variety of substances may act as poison including medicines [6]. The young child with his or her exploratory curiosity is highly vulnerable to accidental poisoning. This is further contributed by the ignorance and casual approach of the caregivers making their environment unsafe and unprotected [7, 8]. All cases of poisoning that result from accidental use of toxic agents by children due to ignorance or curiosity are known as accidental or unintentional poisoning [9].

The pattern of poisoning varies from country to country and in different regions of the same country [10]. There are differences based on age, sex, types of toxic agents and the outcomes of the poisoning incidents [11]. Unsafe storage of medicines and household chemicals, low parental education, low socioeconomic status, larger family size ≥4 children and history of previous poisoning are the key factors reported earlier [12].

The incidence of poisoning tends to be higher among children from lower socioeconomic classes of society due to poor storage facility and parental negligence [13]. Poisoning is usually common during the summer season [14]. Kerosene was found to be the most common ingredient (69.9%) [15].

While various risk factors have been associated with accidental poisoning in children, the relationships are becoming increasingly relevant to health care policy and decision making in designing strategies for its prevention.

Materials and Methods

This case control study included a total of 100 children admitted in Department of Pediatrics, Dhaka Medical College Hospital, Dhaka, from July 2016 to December 2016. Out of 100, 50 poisoning children aged up to 5 years was consider as group I (case) and rest 50 children other than poisoning matched by age, sex and presence of same toxic agents found in the case group in their house was consider as group II (control) admitted in Pediatric unit of same hospital.

Inclusion and exclusion criteria of cases (Group I):

Inclusion criteria:

- Subjects with poisoning brought alive to pediatric department.
- Patients aged up to 5 years with established diagnosis of acute poisoning.

Exclusion criteria:

- Patient with food poisoning, snake bite, dog bite, insect sting.
- Patients with chronic poisoning like arsenic & lead poisoning.
- Non-accidental poisoning i.e., suspected suicidal or homicidal poisoning.
- Attendants refused to give consent to participate in this study.

Inclusion criteria of control (Group II):

Children admitted in Pediatric unit of same hospital for another reasons, matched by age, sex and presence of same toxic agents found in the case group in their house.

Discussion

Accidental childhood poisoning is an important pediatric emergency worldwide. The frequency and pattern of poisoning vary from place to place. This case control study was carried out with an aim to find out the risk factors of various poisoning in children.

Studies from Greece [12] and Pakistan [18] identified factors associated with unintentional poisoning among children less than 5 years of age. Budhathoki have shown in their series that age of most (61.5%) of the patients with

Resutls

Table 1: Distribution of the patients according to age (n=100).

Age (Years)	Group-I (n=50) n (%)	Group-II (n=50) n (%)	*p* value
<1	1 (2)	1 (2)	
1-2	6 (12)	5 (10)	
2-3	23 (46)	22 (44)	
3-4	14 (28)	16 (32)	0.742^{ns}
4- 5	6 (12)	6 (12)	
Mean± SD	3.36±0.92	3.42±0.9	
Range	1, 5	1, 5	

Table 1 shows that almost half (46%) patients belonged to age 2-3 years in group I and 22 (44.%) in group II. The mean age was 3.36± 0.92 years in group I and 3.42±0.9 years in group II.

Table 3: Seasonal distribution of case & control (n= 100).

Season of the year	Group-I (n=50) n (%)	Group-II (n=50) n (%)	*p* value
July - Sep	30 (60)	30 (60)	
Oct – Dec	20 (40)	20 (40)	1^{ns}

Table 3 shows that almost two thirds (60.0%) of patients were hospitalized in July to Sep in group I and 30 (60%) in group II.

Table 4: Potential risk factors for accidental poisoning (n= 100).

Potential risk factors	Group-I (n=50) n (%)	Group-II (n=50) n (%)	*p* value
Storage of poisonous agents			
Box, cabinet or box in a cabinet	21 (42)	37 (74)	0.001^{s}
Other Specified	29 (58)	13 (26)	
Height of storage			
Ground level	34 (68)	17 (34)	0.001^{s}
Upper level	16 (32)	33 (66)	

Table 4 shows that the difference of storage of poisonous agents and height of storage were statistically significant between two groups.

Table 2: Distribution of the study subjects according to parents & family status (n= 100).

Parents information	Group-I (n=50) n (%)	Group-II (n=50) n (%)	*p* value
Father's education			
Illiterate	8 (16)	3 (6)	
Primary	16 (32)	12 (24)	
Secondary	12 (24)	25 (50)	0.066^{ns}
> Secondary	13 (26)	10 (20)	
Others	1 (2)	0 (0)	
Mother's education			
Illiterate	9 (18)	3 (6)	
Primary	22 (44)	21 (42)	0.007^{s}
Secondary	12 (24)	25 (50)	
> Secondary	7 (14)	1 (2)	
Father's occupation			
Service	21 (42)	16 (32)	
Business	3 (6)	15 (30)	
Laborer	10 (20)	9 (18)	0.033^{s}
Agriculture	11 (22)	8 (16)	
Others	5 (10)	2 (4)	
Mother's occupation			
Housewife	38 (76)	44 (88)	0.118^{ns}
Working	12 (24)	6 (12)	
Child´s primary caregiver			
Parents	33 (66)	44 (88)	
Grandparents/ Relatives	12 (24)	6 (12)	0.014^{s}
Housemaid	5 (10)	0 (0)	
Area of living			
Urban	17 (34)	14 (28)	
Rural	18 (36)	26 (52)	0.254^{ns}
Slum	15 (30)	10 (20)	

Table 2 shows that the difference of mother's education, father's occupation and child's primary caregiver were statistically significant (p<0.05) between two groups.

poisoning belonged to 0 to 5 years which is comparable with the current study [17].

This study shows that illeteracy was uncommon in parents.

Table 5: Mode of storage of kerosene in group I (n=22).

In case of kerosene poisoning	Frequency n (%)
Soft drink bottle	15 (68.2)
Others	7 (31.8)
Total	22 (100)

Table 5 shows that kerosene was stored in soft drink bottles in almost two third (68.2%) patients and 7 (31.8%) in others.

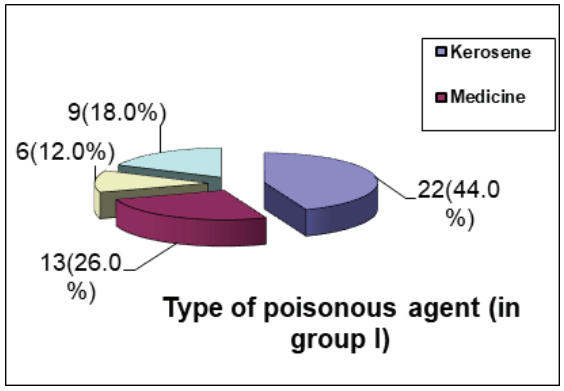

Figure 1: Pie chart showing type of poisonous agents.

Hjern mentioned in their study that young age (< 24 years), low education of the mother are significant risk factors for childhood poisoning. Other factors might influence the difference. Gilbride observed that 73.2% poisoning patients came from urban and 26.8% from rural area [19]. This corresponds with the present study.

Kerosene is said to be one of the agents for childhood poisoning in our country. In Bangladesh and other developing countries, most of the cases of kerosene poisoning are accidental due to its extensive use in cooking and lighting among people belonging to the lower socio-economic groups and its inappropriate storage in soft drink/beer bottles.

Edelu found that kerosene was by far the most common agent responsible for accidental childhood poisoning (nearly 70.0%). Other household agents ingested included bleach, soaps, glue, hydrogen peroxide and disinfectant while the medications ingested were paracetamol, antibiotics, anticonvulsants, and antipsychotic (haloperidol) drugs [16]. Kerosene is a near blue fluid and most of the time, is stored in similar containers as water in homes, where potable water is also a scarce commodity. The present study finding is like many studies in Nigeria [20] & Pakistan [21].

Organophosphates in the form of pesticides and insecticides as well as medications such as paracetamol, antibiotics and antiepileptic drugs, household agents such as bleach, soap, disinfectants as well as cosmetics were among the agents of poisoning in children from our study. In our country, there are no functional regulatory policies for secured packaging of dangerous household chemicals, use of child-proof container for prescription drugs. Furthermore, the easy access to medications which are easily purchased over the counter makes them readily available in homes.

Poisoning from medications can happen for a variety of reasons including intentional overdose, inadvertently taking an extra dose, dispensing, or measuring errors etc. Poisoning events involving pesticides account for about 4.0% of all poisonings and result in approximately 15 deaths per year or 0.02% of all pesticide poisoning events reported [15].

In this present study we found that the mode & height of storage of poisonous substances was not appropriate. Kerosene poisoning was the most common & usually occurred during the summer season. It was possibly due to easy availability of kerosene and during the summer months thirsty children took these substances which were sometimes kept in the discarded container of soft drinks and mineral water bottles etc [14]. According to National poisoning guideline (2007) danger of kerosene poisoning increases by storing it in wrong way.

Conclusion

Accidental poisoning is high among the 2- 3 years of age group. Most of the accidents occur in the afternoon & in summer. Kerosene is the most common agent involved in childhood poisoning. Mother´s education, father´s occupation, mode of storage of poisonous agents & height of storage were significantly associated with poisoning. Mortality is 8% which is due to kerosene & insecticide poisoning.

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Original Article

Efficacy of Non-stress Test Alone versus Biophysical Profile in the Management of High Risk Pregnancy

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Abstract

Introduction/ Background: Management of high risk pregnancy is a challenge for obstetricians. Accurate differentiation of the normal fetus from the compromised one has a profound effect on planning prenatal care and on the timing and indication for intervention. The objective clinical method for the detection of the fetus at risk in uterus begin only a few decades ago. Accurate and reliable result may help in the management of high risk pregnancy. **Objective:** To compare the antenatal fetal assessment method (non-stress test and biophysical profile) in predicting the outcome of the fetus in expectant mother. **Methods:** This was an observational study done in the Department of Obstetrics & Gynecology in Rajshahi Medical College (RMC), Rajshahi, Bangladesh between the periods of January 2007 & December 2008, and in Khulna Medical College (KMC), Khulna, Bangladesh between the periods of August to December of 2020. Hundred high risk pregnant women (80 in RMC and 20 in KMC) were selected for antenatal fetal assessment. They were divided in 2 groups. In one group (n = 50) non-stress test (NST) was done by CTG and in another group (n = 50) Biophysical profile (BPP) was done by real time USG. Outcome of the new born was assessed by Apgar score in one and five minute. **Results:** Sensitivity (75 vs 73), specificity (85 vs 80) and positive predictive values (70 vs 61) were higher in BPP than NST group and negative predictive value was equal (87 vs 87) in both groups. But these differences were not remarkable. **Conclusion:** High risk pregnancies demand more careful attention in their management. Antenatal assessment play an important role for prediction of outcome and timely intervention. In this study two different antenatal methods were compared for prediction of outcome. Abnormal test results were better predictor of abnormal outcome than normal test results for normal outcome. As the sample size is small in this study, further studies with larger sample can be done to evaluate these methods more profoundly.

Keywords: Non-stress test, Fetal Biophysical Profile, High risk pregnancy.

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Introduction

The term "high-risk pregnancy" refers to a pregnancy with an increased risk of poor outcome [1]. The high-risk concept in maternity care will continue to be a priority in obstetrics. A significant improvement in obstetric care has been derived from the investigation of high-risk pregnancies [2]. In different studies, the reported prevalence of high-risk pregnancy varied from 5 to 40 percent [3, 4].

According to World Health Organization [1], the incidence of high-risk pregnancy in Southeast Asia and some countries of Africa and Latin America may exceed 30 percent. The

at-risk-pregnancies account for a significant proportion of low- birth-weight (LBW) babies, perinatal morbidity and mortality. Fetal asphyxia, due to dysfunction of the feto-placental unit, is a major cause of morbidity and mortality among perinates [5]. Recognition of this complication is extremely important because expeditious delivery may result in intact survival. Perinatal asphyxia is an insult to the fetus or newborn due to lack of oxygen (hypoxia) and/or lack of perfusion (ischaemia) to various organs [6]. The effect of hypoxia and ischemia may not be identical but they are difficult to separate clinically. Both factors probably contribute to asphyxial injury. Ninety percent of asphyxial insult occur in the antepartum or intrapartum period as a result of placental insufficiency, resulting in an inability to provide O_2 to and remove CO, and H^+ from the fetus [6].

Any process that (a) impair maternal oxygenation, (b) decrease blood flow from mother to the placenta or from the placenta to the fetus, (e) impair gas exchange across the placenta or at the fetal tissue, or (d) increases fetal oxygen requirement, will exacerbate perinatal asphyxia. Such factors include maternal hypertension, either chronic hypertension or preeclampsia, maternal vascular disease, maternal diabetes, maternal hypoxia from pulmonary, cardiac or renal disease, fetal anemia, fetal or placental hydrops, intrauterine growth retardation (IUGR), post maturity, etc.

The objective clinical method for the detection of the fetus at risk in utero began only a few decades ago. The preferable method should have the following criteria: convenience, non-invasive and yield accurate and reliable results that would be immediately available. In other words, the ideal antepartum test should be highly sensitive and specific. Low sensitivity can result in asphyxiated fetus (false negative result). Low specificity can result in inappropriate intervention for the normal fetuses (false positive result) leading to iatrogenic fetal, neonatal and maternal morbidity and mortality.

The non-stress test (NST) and the fetal biophysical profile (BPP) are the two important biophysical tests. The NST shows the presence or absence of fetal heart rate acceleration associated with fetal movement. It is perhaps the simplest test for evaluation of antepartum fetal heart rate. It was first proposed by Hammacher et al. in 1968 [7].

NST performed by cardiotocograph shows fetal heart rate variables. The baseline fetal heart rate variation is 120-160 bpm, beat-to-beat variation is at least 5 bpm and acceleration of fetal heart rate is associated with fetal movement. Following Evertsen et al. (1979), [8] a reactive pattern was defined as two or more acceleration of fetal heart rate of at least 15 bpm in amplitude and at least 15 seconds duration associated with fetal movement during 20-40 minutes observation period. A NST may also show other abnormalities, e.g. deceleration in association with uterine contraction.

In the mid-1970s, a revolutionary clinical tool, dynamic real time ß-mode ultrasound became available. Dynamic ultrasound can give wealth of information ranging from gross body movement to five-finger control, detailed fetal structure, structural and functional evaluation. The biophysical method of fetal risk assessment has been used in a prospective clinical study by Manning et al. (1984) [9] involving 12,620 referred high-risk pregnancies. They showed a fall of perinatal mortality (PNM) to 3.53 per 1000 and stillbirth rate to 1.9 per 1000 compared to a rate of 8.8 per 1000 in control population. They compared the PNM with historical control population. The false negative test rate, i.e. death of a structurally normal fetus within one week of a normal test result (BPS≥8) was recorded as 0.685 per 1000. Clinical studies

from other centers involving 19,221 high-risk pregnancies and using this method showed similar results.

Similarly, Lee and Drukes (1979) [10] suggested NST as a simple reliable test as a primary screening procedure in antepartum heart rate monitoring. The reactive tests were indeed a reliable indicator of fetal wellbeing.

Materials and Methods

This was an observational study done in the department of Obstetrics & Gynecology of Rajshahi Medical College Hospital (RMCH) from January 2007 to December 2008 and in Khulna Medical College Hospital (KMCH) during the period of August 2020 to November 2020. Among the pregnant women attending in the department Obs. & Gynae 80 high risk patients in RMCH and 20 in KMCH were randomly selected for this study. The selected patient were alternately divided into two course (50 patient each) one group for Biophysical profile protocol and other group for non-stress test. Each subject was explained the nature of the study and was included into the study on agreement to participate in the study. Patient with following criteria were included in this study.

- Gestational age 32 to 43 weeks
- Post-dated pregnancy
- Preeclampsia
- Less fetal movement
- Diabetes mellitus
- IUGR
- Pregnancy with heart dieses
- Mild to moderate anti partum hemorrhage
- Bad obstetric history
- Rh isoimmunization

Pregnant women who had no apparent risk factor are excluded from this study.

Non Stress test was perform with the use of cardiotocografic instrument. Total 60 non stress test were perform in 50 cases. The test was allow to continue until either a reactive pattern was demonstrated or after 20 minutes start of the test. Test was them evaluated as reactive or no reactive on the basis of result.

Fetal Biophysical profile was done by real time B-mode ultrasound scan. Total 50 Biophysical profile were done for 50 cases. Fetal breathing movement, gross fetal body movement, fetal tone and qualitative amniotic fluid volume were recorded as fixed criterion described by Manning et all (1984) [9].

Clinical management of high risk study patients were based on the test results as interpreted, within the overall clinical contest including gestational age maternal condition and obstetric factors. Induction of labor and vaginal delivery were under taken unless contraindicated by other obstetric factors. In which case caesarean section was done. Fetal outcome was considered as abnormal in this study if Apgar score 1 and 5 minutes after birth were <7 determined by independent observer.

Results

In this study, 100 cases of high-risk pregnancy, of different gestational age ranging from 32 to 43 weeks, were selected. Among them 50 cases were managed by non-stress test and 50 cases were managed by biophysical profile protocol. All this patients delivered within 7 days of their last antepartum test.

Discussion

By evaluating the tests for antepartum fetal assessment, one can make a meaningful statistical assessment of these tests by the positive predictive value, negative predictive value, sensitivity and specificity of tests. Then, the clinician is able to judge the probability of abnormal outcome based on known test results. A truly valid test can only be judged through determination of the sensitivity and specificity of the tests. Sensitivity of a given test is an index of its reliability in detecting a problem. On the other hand, the specificity of

Table 1: Comparison of demographic and obstetric characteristics of study subjects (n = 100).

Variables	BPP group (n = 50) (Mean ± SE)	NST group (n = 50) (Mean ± SE)	*z* value	*p* value
Age (years)	25 ± 0.82	24.66 ± 0.73	1.2	NS
Parity	0.96 ± 0.16	0.84 ± 0.13	0.30	NS
Gravidity	2.16 ± 0.18	2.02 ± 0.15	0.22	NS

NS = Not significant

Table 2: Distribution of the study subjects according to indications for testing (n = 100).

Primary high-risk factors for testing	Patients managed by fetal BPP (n = 50) n (%)	Patients managed by NST (n = 50) n (%)
Postdated pregnancy	16 (32)	11 (22)
Preeclampsia	12 (24)	14 (28)
Decreased fetal movement	9 (18)	9 (18)
Diabetes mellitus (all classes)	5 (10)	3 (6)
Bad obstetric history	5 (10)	7 (14)
Anti-partum hemorrhage (APH)	1 (2)	4 (8)
Heart disease	2 (4)	0 (0)
Rh isoimmunization	0 (0)	2 (4)

Table 4: Distribution of the study subjects according to Interval between last test done and delivery of the women (n = 100).

Last test to delivery interval (days)	BPP Group (n = 50) n (%)	NST Group (n = 50) n (%)
On the date of examination	23 (46)	20 (40)
On the day of examination	19 (38)	21 (42)
Within 2-4 days of test	4 (8)	3 (6)
Within 5-6 days test	4 (8)	6 (12)

Table 3: Distribution of the study subjects according to mode of delivery (n = 100).

Variables	BPP group (n = 50) (Mean ± SE)	NST group (n = 50) (Mean ± SE)	*z* value	*p* value
LUCS	32 (64)	34 (68)	0.42	NS
NVD	18 (36)	16 (32)	0.42	NS

NS = Not significant; LUCS = Lower Uterine Caesarean section; NVD = Normal Vaginal Delivery

a les indicated how accurately the absence of problem will be predicted.

The present study was carried out to determine the relative prognostic value of the fetal biophysical profile and non-stress test. Prognostic value of these tests were assessed in terms of the incidence of abnormal outcome of the fetus. The aim of the study also included comparison of the positive predictive value, negative predictive value, sensitivity and specificity between the tests (focal biophysical profile and non-stress test).

Patients were selected randomly. Ultimate cases were allocated to the two groups. Care was taken to maintain strict standard for patient entry and avoid personal bias for selection. Satisfactory randomization was achieved in this study as the groups were comparable in

Table 5: Comparison of performance characteristics of fetal BPP and NST for each of the different fetal outcome (n = 100).

Outcome	Positive predictive value		Negative predictive value		Sensitivity		Specificity	
	BPP (n = 50)	NST (n = 50)	BPP (n = 50)	NST (n = 50)	BPP (n = 50)	NST (n = 50)	BPP (n = 50)	NST (n = 50)
Overall abnormal outcome	70%	61%	87%	87%	75%	73%	85%	80%
Low 1 minute Apgar score	88%	77%	81%	81%	71%	70%	93%	86%
Low 5 minute Apgar score	70%	61%	87%	87%	75%	73%	85%	80%
Admission into pediatric word	96%	93%	29%	33%	72%	71%	83%	75%

respect mean age, purity and gravidity. Both the selected groups contained the common high-risk pregnancy in off hospital and included patients who were elderly and of low parity and gravidity. Gravidity was a bit higher due to any induced abortion or MR and history of repeated pregnancy loss.

In respect to mode of delivery, there was a high incidence of caesarean section in this study. The reason for high incidence of caesarean section in this study was due to obstetrical indications, like post-dated pregnancy, severe pre- eclampsia, antepartum hemorrhage.

The shorter the test to delivery interval, the more prognostic are the tests result in predicting fetal outcome. In the present study, in most cases, delivery occurred within day of the last test.

In this study, evaluation of abnormal test in respect to overall abnormal pregnancy outcome was done. Abnormal tests were more prediction of abnormal outcome than normal test, which is similar to the observation of Plant et al. (1985) [11]. Specific outcome, i.e. low 1 minute Apgar score, low 5 minute Apgar score, admission into Pediatric word in cases of abnormal test in both BPP and NST were similar in that of Platt et al. (1985) [14]. However, contrasting opinion on the benefit of antenatal fetal testing was shown by Thacker and Barkelman (1986) [12].

In the present study, sensitivity and specificity of BPP was 75% and 15% respectively, which is consistent with the findings of Thacker and Berkelman (1986) [12], who showed sensitivity over 50%. In respect to NST, in this study, sensitivity was 73% and specificity 80% Thacker and Barkelman (1986) showed sensitivity over 50% and specificity over 55% [12]. In respect to comparison of predictive value of fetal BPP and NST, there was no so remarkable difference of positive predictive value, negative predictive value sensitivity and specificity. The results are almost similar to Manning et al. (1984) and Platt et al. (1985) [9, 11]. In the present study, specificity in respect to low 5-minute Apgar score higher (85% vs 80%) in BPP than NST group, which is consistent with the study by Platt et al. (1985) [11].

Conclusion

Comparison of sensitivity, specificity, positive predictive value and negative predictive value

between UPP and NST showed no remarkable difference. Therefore, we can continue to perform NST as an antepartum surveillance technique for the fetus because it is less expensive, less time-consuming, and there is a record, on the basis of which clinician can take decision. Less expertise is necessary for performing and interpretation of the test. Equipment is less expensive than complicated real-time USG. In respect to IUGR, post-maturity or oligohydramnios, we can use supplementary test which may improve outcome. Moreover, obstetrician's decision and assessment of cases in respect to severity must be the preliminary criteria.

Limitation & Recommendation

As the present study included small sample size, further randomized study with larger sample size may further confirm the results of the present study.

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Original Article

Otomycosis: Clinical Presentation, Predisposing Factors and Treatment Outcomes among Patients Attending in ENT Outdoor of a Tertiary Care Hospital in Bangladesh

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Abstract

Introduction: In tropical and subtropical regions of the world otomycosis is one of the most frequently encountered fungal infections. As a tropical country, Bangladesh is not an exception. Various factors including local, systemic or environmental are responsible for otomycosis. The clinical presentations and the otoscopic examination of the affected ear are well suggestive of otomycosis. **Objective:** The present study is designed to reveal the predisposing factors, clinical presentations, and treatment outcomes in clinically diagnosed otomycosis cases. **Materials & Methodology:** This was a hospital-based cross-sectional prospective study conducted over six months period from May 2022 to October 2022 among the patients attending the outpatient department of ENT & Head-Neck Surgery of Shaheed Ziaur Rahman Medical College Hospital, Bogura. Our study group consisted of 60 patients clinically diagnosed with otomycosis. **Results:** Male to female ratio in the study participants was 1.5:1. The 21-40 years age group constituted the maximum of our study population and the mean age was 33.33 years. The itching was the predominant complaint. On otoscopic examination otomycotic debris found black in most cases. Overall, 54 (90%) cases had complete resolution with appropriate treatment. **Conclusions:** Otomycosis is commonly presented with pruritus and usually resolves with the local toileting of the ear and the instillation of antifungal agents. Otomycosis is common in the rainy and summer seasons and among patients having poor aural hygiene.

Keyword: Otomycosis, clinical presentation, treatment

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Introduction

Otomycosis is the fungal infection of the external auditory canal. It is one of the most widespread infections in the world. It accounts for approximately 10% of all cases of otitis externa among the patients attending the otolaryngology department [1, 2]. Otomycosis is a disease whose acute form affects four in 1,000 persons annually and the chronic form affects 3-5% of the population [3]. An overview of the literature reveals otomycosis to be a common ear problem in Bangladesh [4, 5]. People who live

in hot, dusty, and humid areas of the tropical and subtropical regions are primarily affected by otomycosis [6-8]. Variable climatic conditions, improper self-cleaning of the ear, increased temperature, dampness, age, bacterial infections that may lead to secondary infections, long-term use of broad-spectrum antibiotics, steroid use, injury, swimming, and immunological abnormalities, co-morbid conditions like diabetes and dermatological diseases, low socioeconomic situation precipitate otomycosis [5, 9, 10].

Several numbers of microbes are responsible for causing the infection but the most common saprophytes isolated from cultures include *Aspergillus niger*, *Aspergillus fumigatus* and *Candida albicans* [1, 11, 12]. But many studies point out that a few other fungal species (e.g, *Mucor sp., Penicillium sp., Rhizopus*) along with bacteria particularly *Staphylococcus aureus* and *Pseudomonas aeruginosa* are also responsible for increasing rate of the disease in human throughout the world [4, 8, 12, 13]. The patients having otomycosis frequently present with otalgia, aural fullness, tinnitus, diminished hearing, feeling of ear blockage, and ear discharge. People of all age groups ranging from infants to adulthood with the average age being 21-40 years are frequently affected [4, 5, 8, 11]. Males and females are equally affected and there is little difference in the occurrence of the infection in rural and urban areas. Clinical diagnosis of the infection is made by exploring clinical presentation, aural examination, presence of aural plaque in affected ear and culture of debris. On otoscopy examination of the external ear *Aspergillus niger* appears as having a black-headed filamentous growth, *Aspergillus fumigatus* as green or brown and *Candida albicans* as white & creamy fungal growth or debris [1, 6, 7].

Otomycosis has traditionally been treated with a variety of topical antifungal medications, either alone or in combination. Thorough cleaning of visible debris and fungal components is the mainstay of therapy for the infection. Apart from this, some other topical antifungal drugs such as clotrimazole, nystatin, tolnaftate, miconazole, and econazole are recommended for the control of this illness [14]. Clotrimazole is highly effective. Its usage has also been established to trim down the recurrence of the disease [3, 14-16].

Despite the climatic conditions of Bangladesh predispose people to develop otomycosis, a literature search reveals that not much work has been carried out in this region. The present study is designed to reveal the predisposing factors, clinical presentations, and treatment outcomes in clinically diagnosed otomycosis cases.

Methods

This was a hospital-based cross-sectional prospective study conducted over six months period from May 2022 to October 2022 among the patients attending the outpatient department of ENT & Head-Neck Surgery of Shaheed Ziaur Rahman Medical College Hospital, Bogura, Bangladesh. Our study group consisted of 60 patients with clinically diagnosed with otomycosis who got treatment for otomycosis and came for timely follow-up during the study period were included in the study. Clinical diagnosis of otomycosis based on clinical presentation and otoscopic findings. The patients with otomycosis alongside a history of prior ear surgery, patients with any serious debilitating diseases like malignancies, tuberculosis etc. and patient having no interest, unwillingness & irregular follow-up were excluded from our study. Data collection was based on the history taking by pre-structured questionnaire and Otoscopy. Statistical analysis was conducted using Statistical Package for Social Sciences (SPSS) software.

Results

Distribution of cases of our study is provided in Table & Charts. Figure 1 shows the Distribution of patients according to age & sex while table 1 shows the distribution of patients according to residence, occupation & socioeconomic condition. Table 2 is showing the distribution of patients according to predisposing factors explored during study. Figure 2 & 3 show the distribution of patients according to site of involvement and distribution of patients according to presenting symptoms at diagnosis respectively. Table 3 shows the appearance of otomycotic debris in otoscopic examination and figure 4 shows the distribution of patients according to treatment outcome.

Table 1: Distribution of patients according to residence, occupation & socioeconomic condition (n=60).

Variables	Frequency n (%)
Residence	
Urban	27 (45)
Rural	33 (55)
Occupation	
Agriculture	14 (23.3)
Business	5 (8.3)
Day laborer	9 (15)
Transport Worker	12 (20)
Student	6 (10)
Housewife	11 (18.3)
Others	3 (5)
Socioeconomic Condition	
Poor	39 (65)
Middle Class	16 (26.67)
Affluent	5 (8.3)
Total	**60 (100)**

Table 3: Appearance of Otomycotic debris in Otoscopic examination (n=60).

Appearance	Frequency n (%)	Characteristic Fungi (Suggestive)
Black	37 (61.67)	*Aspergillus niger*
Blue/Green	8 (13.33)	*Aspergillus fumigatus*
Whitish	15 (25)	*Candida albicans*

Table 2: Distribution of patients according to predisposing factors explored during study (n=60).

Predisposing Factor	Frequency n (%)
Ear Cleaning	
Cotton Bud	47 (78.33)
Chicken Feather	25 (41.67)
Match Stick	22 (36.37)
Key	6 (10)
Cloth & Stick	18 (30)
Others	5 (8.33)
Diabetes Mellitus	**16 (26.67)**
Pre-existing COM	**12 (20)**
Use of ear drop	**17 (28.33)**

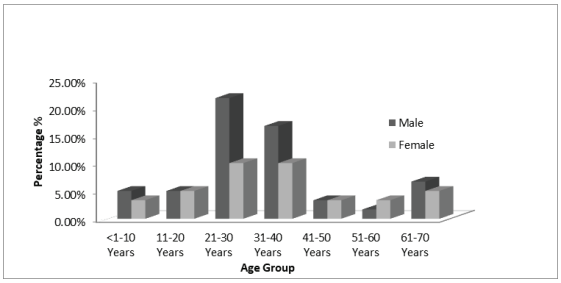

Figure 1: Distribution of patients according to Age & Sex (n=60).

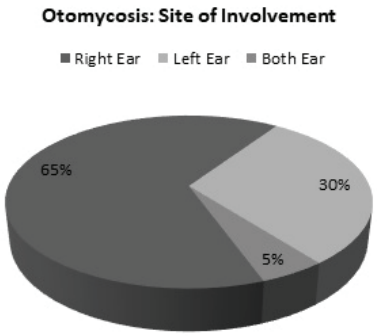

Figure 2. Distribution of Patients according to site of involvement (n = 60).

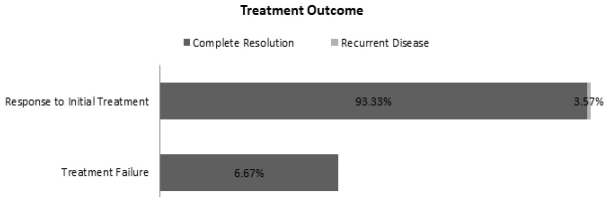

Figure 4: Distribution of patients according to Treatment Outcome.

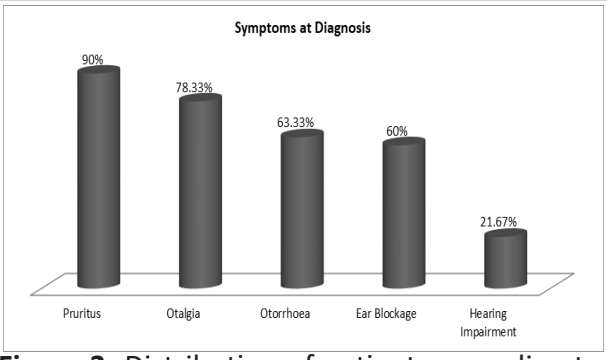

Figure 3: Distribution of patients according to presenting symptoms at diagnosis.

Discussion

Otomycosis is a superficial fungal infection of the outer ear canal which has become one of the most common otologic conditions encountered in ENT outdoor or general practice. Patients affected by otomycosis frequently seek advice from quacks, pharmacy holders, general practitioners or goes to ENT specialists. Otomycosis is easily amenable to treatment but its notorious recurrence rate is a matter of increasing concern throughout the world. Many studies in different parts of the world were done on otomycosis to know the pattern of the disease, to find out the predisposing factors, its prevention, and treatment and also to explore the causes of its recurrence or chronicity [4, 11].

Otomycosis is not uncommon in Bangladesh [5]. Bangladesh is a tropical country where the climate is hot and humid, especially in the summer and rainy seasons. The prevalence of otomycosis is high in tropical countries [6-7, 17-18]. The relative humidity usually rises to very high during the monsoon months and easily reaches saturation levels. Warmth and moisture are highly conducive to the growth of fungi. The incidence of otomycosis was high (78%) in the rainy months of July, August, and September compared to the months between January and March (22%) [11].

Otomycosis can affect at any age [5, 11, 12]. So less than one year to more than sixty years aged patients were incorporated in our study. The majority of patients belonged to 21 -30 years of age (31.67%) and 31-40 years of age (26.67%) constituting more than half of our total study population and the lower incidence was noted in the age group of <10 years and 41-60 years of age. The mean age was 33.34 years. Among 60 patients the male-female ratio was 1.5:1 resulted from male 36 (60%) and female 24 (40%) (Figure-1). In our study, we observed that young men were more commonly affected than female ones. Several studies conducted in our country and abroad in different time periods consistent with our study results explored the high prevalence of the disease among young men because they generally spend more time outdoors than others exposing more to fungal spores. It is well known that outdoor air is an important vector for locally prevalent fungal flora [5, 11-14].

The external ear canal almost simulates a culture tube due to its anatomical disposition and being exposed to the external environment by a small inlet that favors fungal and bacterial growth. Further, the presence of excessive cerumen in patients with poor personal hygiene predisposes them to otomycosis by favoring the germination of spores and conidia of the commonly prevalent fungi [19]. In our study we found repeated exploitation of the external ear with cotton buds 47(78.33%), chicken feathers 25 (41.67%), match sticks 22 (36.67%), key 6 (10%), cloth & sticks 18 (30%) or any other hard objects to clean the earwax and for relief from itching is a common practice in our country (Table-2). These practices usually cause minor trauma to the skin of the external auditory canal and deposit fungal conidia in the wound leading to fungal infection. The study done in the outpatient department of ENT and Head, Neck surgery in BSMMU, Dhaka, Bangladesh depicts almost similar scenario [14]. History of diabetes mellitus, pre-existing chronic otitis media, long term

topical use of topical antibiotic ear drops are also commonly associated with otomycosis. Several comparative studies and literature reviews done by Viswanatha et al. (2011) and others showed that bilateral involvement of otomycosis was more common in immunocompromised patients than immunocompetent ones [9, 10, 20, 21]. Otomycosis is predominantly unilateral [22]. In our study 57 (95%) of patients had unilateral otomycosis either right (65%) or left (30%) ear involvement. Only 3(5%) of cases showed bilateral involvement [8, 23] (Figure-2).

The incidence of otomycosis is more common among people working in humid, hot, dusty and windy environments. Farmers, transport workers, and outdoor labourers of low socioeconomic status working in highly humid, hot and dusty environments are constantly exposed to dust containing fungal spores even housewives and housemaids are exposed to dust while cleaning the floors and they are more prone to otomycosis [13]. In our study majority of the patients were involved in agriculture 14 (23.33%) or transport workers 12 (20%), day labour 9 (15%) and housewives 11(18.33%) (Table-1).

Usually, otomycosis can be diagnosed by means of proper history taking and clinical examination. In addition, a high rate of assumption is also required based on the most frequent symptoms. Pruritis has been frequently described as one of the hallmark symptoms in many studies [3, 11]. Otomycosis causes inflammation, accumulation of superficial epithelial debris containing hyphae, suppuration and pain. Hearing loss and feeling of ear blockage are a result of the accumulation of fungal debris in the canal [11, 14]. However, in this study, the diagnosis was based on symptoms such as pruritus, otalgia, otorrhea, feeling of ear blockage and hearing loss in conjunction with the otoscopic examination. Pruritis (90%), otalgia (78.33%) otorrhoea (63.33%) were the more frequently reported symptoms as the chief complaints in most of the patients of this study population (Figure-3). In the otoscopic examination, we found black, blue or green and whitish otomycotic debris which is highly suggestive of *Aspergillus niger*, *Aspergillus fumigatus* and *Candida albicans* respectively [6, 7] (Table-3).

The application of appropriate topical antifungal agents along with aural toileting usually results in prompt resolution of symptoms, although the recurrent or residual disease can be common. Our treatment regimen included aural toileting followed by the antifungal drop (1% Clotrimazole), antibiotic (Ciprofloxacin/Cefuroxime), antihistamine (Fexofenadine/Levocetrizine/Bilastin), analgesic (Paracetamol/Ketorolac/Ibuprofen) according to patient's need [3]. Treatment duration ranged from 2-8 weeks. In this series, 90% of the patients had resolution of the infection with initial treatment, within two weeks. In a few cases, 4 (6.67%) failed initial treatment and 2 (3.57%) patients had recurrent disease during the study period (Figure 4). Topical clotrimazole was our preferred antifungal agent for its efficacy against both aspergillus and Candida species that was proven in many other studies [3, 14].

Limitations

The study was done on limited samples and for a short period (six months). The study was conducted only among the patients attending the ENT outdoor of SZMCH, Bogura so the samples are neither representing the whole district nor the whole Bangladesh. A microscope was not used to examine the ear because it is not available in OPD. The culture of otomycotic debris was not done due to the unwillingness of the patient.

Conclusion

Otomycosis is commonly presented with pruritus, otalgia & otorrhoea occasionally ear blockage and hearing impairment. It usually resolves with the local toileting of the ear and the instal-

lation of antifungal agents. It can be concluded that otomycosis is common in the rainy and summer seasons and among patients having poor aural hygiene. The result of the study evidently established some important clinical criteria for diagnosing otomycosis which will be supportive for ENT practitioners.

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Original Article

Thyroid Dysfunction in Patients with Type 2 Diabetes Mellitus and its Association with Diabetic Complications

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Abstract

Background: Diabetes mellitus and thyroid dysfunction are the two most common endocrinopathies seen in the general population. Diabetes mellitus (DM) and thyroid dysfunction (TD) often tend to coexist in patients. Both hypothyroidism and hyperthyroidism are more common in type 2 diabetes mellitus (T2DM) patients than in their non-diabetic counterparts. **Aim of the study:** This study aimed to assess the level of thyroid dysfunction in patients with type 2 diabetes mellitus and to identify the association of thyroid dysfunction with diabetic complications. **Methods:** This cross-sectional study was conducted in the department of Medicine at Satkhira Medical College Hospital, Satkhira, Bangladesh from January 2022 to June 2022. A total of 50 patients were enrolled and analyzed in this study. **Results:** The mean±SD of BMI of the study population is 25.5±5.15, the mean duration of diabetes is 5.85 years with a standard deviation of 2.21 and the mean HbA1c level is 9.2% with a standard deviation of 2.32. There were 4 cases (57.14%) in the hypothyroidism group and 2 cases (66.67%) in the hyperthyroidism group under normal fundus, under the parameter "Mild NPDR," (non-proliferative diabetic retinopathy) there were 2 cases (28.57%) in the hypothyroidism group and 0 cases (0.00%). Under the parameter "Moderate NPDR," there was 1 case (14.29%) in the hypothyroidism group and 1 case (33.33%) in the hyperthyroidism group. **Conclusion:** The prevalence of thyroid dysfunction was 20% among patients with type 2 diabetes mellitus in this study. Hypothyroidism was more common among the study subjects than hyperthyroidism. There were no correlation between thyroid dysfunction with diabetic complications.

Keywords: Thyroid dysfunction, type 2 diabetes mellitus, association and complication.

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Introduction

Problems with the thyroid include a variety of disorders that can result in the gland producing too little thyroid hormone (hypothyroidism) or too much (hyperthyroidism). Diabetes mellitus (DM) and thyroid dysfunction (TD) are endocrinopathies commonly seen in routine practice and frequently coexist. A high prevalence of TD is seen among both type 1 (T1DM) and type 2 (T2DM) diabetes mellitus patients [1, 2]. Autoimmunity can explain the common linkage between T1DM and autoimmune thyroid diseases; however, the linkage between T2DM and TD is more complicated. This study summarizes current knowledge about coexistence of T2DM and TD and discusses enhanced

screening recommendations and clinical implications for managing these two endocrinopathies.

This article is based on previously conducted studies and does not contain any studies with human participants or animals performed by any of the authors. Diabetic patients with subclinical hypothyroidism have been reported to be associated with an increased risk of nephropathy and cardiovascular disease [3, 4]. Micro angiopathic complications of diabetes like retinopathy and neuropathy can worsen in the presence of co-existing hypothyroidism due to dyslipidemia. Screening for thyroid abnormalities in diabetic patients will allow early treatment of subclinical and over-thyroid dysfunction [5].

This study was done to estimate the prevalence of thyroid dysfunction in the Bangladeshi population with type 2 diabetes mellitus and examine its association with diabetic complications. The study was aimed to estimate the prevalence of thyroid dysfunction in patients with type 2 diabetes mellitus & the association of thyroid dysfunction with diabetic complications.

Methodology & Materials

This cross-sectional study was conducted in the department of Medicine at Satkhira Medical College Hospital Satkhira, Bangladesh from January 2022 to June 2022. A total of 50 patients were enrolled and analyzed in this study who came to OPD of the hospital. We excluded the patients with known thyroid disorder, acute illness and chronic liver disease. The study obtained clearance from the Ethical Committee of the Hospital. The laboratory investigations that were performed were glycosylated hemoglobin, fasting lipid profile and urine albumin. Screening for diabetic retinopathy was done by dilated fundus examination. Diabetic retinopathy was classified as non-proliferative (NPDR) or proliferative (PDR) in the study subjects. NPDR was further subdivided into mild, moderate and severe categories. Twelve lead electrocardiogram (ECG) was taken for evaluation of cardiovascular disease. Study subjects with changes suggestive of ischemia on ECG were considered to have ischemic heart disease. Vibration perception threshold (VPT) was performed in subjects clinically suspected to have diabetic neuropathy. The VPT findings defined the study subjects as not having mild or severe neuropathy. Diabetic nephropathy was considered to be present if there was albuminuria. Microalbuminuria was defined as urinary albumin excretion of 30-300 mg/day while macroalbuminuria was defined as the presence of urinary albumin of more than 300 mg/day. Microalbuminuria was estimated with the help of the nephelometry technique in the biochemistry laboratory.

Serum TSH (Thyroid Stimulating Hormone), free T3 (Triiodothyronine) and free T4 (Thyroxine) were assessed in the fasting serum samples of the study subjects using chemiluminescent immunoassay method technology (ADVIA Centaur XP, Siemens Healthcare Global, USA). The normal range of TSH was 0.35-5.5 mU/L, 2.3-4.2 pg/ml for free T3 and 0.89-1.76 ng/dL for free T4. Sub-clinical hypothyroidism was defined as subjects with TSH values between 5-10 mU/L and normal free T3 & T4 levels. Overt hypothyroidism was present in subjects with TSH values above 10 mU/L and low free T3 & T4 levels. Sub-clinical hyperthyroidism was defined as low TSH with normal free T3 & T4 levels. Overt hyperthyroidism was defined as low TSH with high free T4 levels. Serum creatinine was estimated by using the enzymatic Jaffe method. A lipid profile was also done for all the study subjects. Dyslipidemia was considered to be present if total serum cholesterol was above 200 mg/dL. Glycosylated hemoglobin was done in all study subjects by the high-performance liquid chromatography

(HPLC) technique in the laboratory.

Data on continuous variables like age, duration of diabetes, BMI, HbA1c and lipid profile were expressed as mean with standard deviation (SD). Independent student's t-test was done to compare continuous variables between two independent groups. Categorical variables like the proportion of subjects having thyroid dysfunction, hypertension, dyslipidemia, obesity and diabetic complications were expressed as a percentage and were analyzed by the Chi-square test. All statistical analysis was carried out at a 5% level of significance and a P-value below 0.05 was considered significant.

Results

Table 1 shows the baseline characteristics of the study participants, the mean±SD of BMI of the study population is 25.5±5.15, the mean duration of diabetes is 5.85 years with a standard deviation of 2.21 and the mean HbA1c level is 9.2% with a standard deviation of 2.32. In this study, 26 (52.00%) patients were male and 24 (48.00%) were female. Most 32% of patients were from the age range 51-60 years (Table 2). Table 3 displays three parameters; serum TSH, free T3, and free T4, along with their normal range, increased value, and decreased value expressed in both numeric and percentage terms. The normal range is 41 (82%), an increased value is indicated by 7 (14%), while a decreased value is shown as 2 (4%). According to the free T3 (Triiodothyronine); the normal range is 43, with a percentage of 86. An increased value is indicated by 1, with a percentage of 2, while a decreased value is shown as 6, with a percentage of 12 and free T4 (Thyroxine); the normal range is 45, with a percentage of 90. An increased value is indicated by 3, with a percentage of 6, while a decreased value is shown as 2, with a percentage of 4. For hypothyroidism, out of a total of 7 individuals, 1 individual (14.29%) had diabetes for < 1 year, 3 individuals (42.86%) had diabetes for 1-5 years, 2 individuals (28.57%) had diabetes for 5-10 years, and 1 individual (14.29%) had diabetes for >10 years. And for hyperthyroidism, out of a total of 3 individuals, 1 individual (33.33%) had diabetes for <1 year, 2 individuals (66.67%) had diabetes for 1-5 years, and 1 individual (33.33%) had diabetes for >10 years (Table 4). Table 5 shows the thyroid dysfunction in study subjects according to the glycemic status of our study; where out of 7 hypothyroidism patients 42.86% had an HbA1c level above 9, and in the HbA1c (%) range of 7.1-8, there are 2 patients, which accounts for 28.57% of the total patients in this range. For hypothyroidism, 5 (71.43%) had a normal ECG and 2 (28.57%) had an abnormal ECG. For hyperthyroidism, 2 (66.67%) had a normal ECG and 1 (33.33%) had an abnormal ECG. The p-value is 0.12, which shows the difference between the proportions of normal and abnormal ECG results between hypothyroidism and hyperthyroidism is non-significant (Table 6). According to Table 7, there were 4 cases (57.14%) in the hypothyroidism group and 2 cases (66.67%) in the hyperthyroidism group under normal fundus, under the parameter "Mild NPDR," there were 2 cases (28.57%) in the hypothyroidism group and 0 cases (0%). Under the parameter "Moderate NPDR," there was 1 case (14.29%) in the hypothyroidism group and 1 case (33.33%) in the hyperthyroidism group. And under the parameter "Severe NPDR," there were 0 cases (0.00%) in both the hypothyroidism and hyperthyroidism groups. The p-value for this comparison is 0.23, which indicates that there is no statistically significant difference between the two groups.

Discussion

Insulin resistance which is typically seen in patients with type 2 diabetes mellitus plays a major role in the development of thyroid dysfunction in such patients. Thyroid dysfunction can occur in the form of hypothyroidism and hyperthyroidism. Sub-clinical hypothyroid-

Table 1: Baseline characteristics of study participants (n=50).

Parameter	Mean±SD
BMI (kg/m²)	25.5±5.15
Duration of diabetes (years)	5.85±2.21
HbA1c (%)	9.2±2.32

Table 2: Age and sex distribution of study participants (n=50).

Variables		Frequency n (%)
Sex	Male	26 (52)
	Female	24 (48)
Age (years)	21 30	1 (2)
	31 40	6 (12)
	41 50	13 (26)
	51 60	16 (32)
	61-70	10 (20)
	71-80	3 (6)
	>80	1 (2)

Table 3: Thyroid function test results of study participants (n=50).

Paramenter	Normal n (%)	Increased n (%)	Decreased n (%)
Serum TSH	41 (82)	7 (14)	2 (4)
Free T3	43 (86)	1 (2)	6 (12)
Free T4	45 (90)	3 (6)	2 (4)

Table 4: Thyroid dysfunction in study subjects according to the duration of diabetes (n=50).

Duration of diabetes (year)	Hypothyroidism (n=7) n (%)	Hyperthyroidism (n=3) n (%)
<1	1 (14.29)	1 (33.33)
1-5	3 (42.86)	2 (66.67)
5-10	2 (28.57)	-
>10	1 (14.29)	1 (33.33)

ism can also occur in diabetic patients and can contribute to diabetic complications like retinopathy, neuropathy and cardiovascular disease [6].

The prevalence of thyroid dysfunction among diabetic patients in our study was found to be 17.5%. Hypothyroidism was more common among the study subjects. This is similar to a

Table 5: Thyroid dysfunction in study subjects according to glycemic status (n=50).

HbA1c (%)	Hypothyroidism (n=7) n (%)	Hyperthyroidism (n=3) n (%)
6.5 7	1 (14.29)	1 (33.33)
7.1 8	2 (28.57)	1 (33.33)
8.1 9	1 (14.29)	-
> 9	3 (42.86)	1 (33.33)

Table 6: Correlation of thyroid dysfunction with cardiovascular disease in study participants (n=10).

Parameter	Hypo-thyroidism (n=7) n (%)	Hyper-thyroidism (n=3) n (%)	*p* value
Normal ECG	5 (71.43)	2 (66.67)	0.12
Abnormal ECG	2 (28.57)	1 (33.33)	

Table 7: Correlation of thyroid dysfunction with diabetic retinopathy in study participants (n=10).

Parameter	Hypo-thyroidism (n=7) n (%)	Hyper-thyroidism (n=3) n (%)	*p* value
Normal fundus	4 (57.14)	2 (66.67)	0.23
Mild NPDR	2 (28.57)	0 (0)	
Moderate NPDR	1 (14.29)	1 (33.33)	
Severe NPDR	0 (0)	0 (0)	

study done in south India by Jali MV et al. that showed the prevalence of thyroid dysfunction among diabetic patients to be 16.2% [7]. Another study done in north India showed that the prevalence of sub-clinical hypothyroidism in diabetic patients was 18.8%. This study also found that the prevalence of thyroid dysfunction was more among females, patients with dyslipidemia and retinopathy and patients with poor glycemic control & long duration of diabetes [8]. A retrospective study done by Demitrost L et al. showed that hypothyroidism was seen in 11.4% of type 2 diabetic patients while hyperthyroidism was seen in only 1.5% of the

cases [9]. A study to assess the prevalence of thyroid dysfunction in patients with type 2 diabetes mellitus was done by Diez JJ et al. and it was found that 15.1% of the patients had overt hypothyroidism while overt hyperthyroidism was seen in 3.5% of the patients [10].

The study also showed that thyroid dysfunction was not linked to the duration of diabetes, glycosylated hemoglobin and the presence of diabetic complications. The study findings are in line with the present study which did not show a correlation between thyroid dysfunction and diabetic complications in the study subjects. However, another study done in Egypt showed that the prevalence of thyroid dysfunction increased with an increase in glycosylated hemoglobin which suggests that poor glycemic control could play a role in the occurrence of thyroid dysfunction in diabetic patients [11].

Our study showed that the duration of diabetes (> 5 years) was an important factor in patients with hypothyroidism. However, this was not found in diabetic patients having hyperthyroidism. A study that was done by Metab Al-Geffari et al. showed that the duration of diabetes (more than 10 years) was an important risk factor for the development of thyroid dysfunction among type 2 diabetic patients in their study population [12]. Apart from insulin resistance, autoimmunity may also have a role in the development of thyroid dysfunction in patients with type 2 diabetes mellitus. A study done by Radaideh AR et al. showed that 12.5% of diabetic patients were found to have thyroid disease. Among diabetic patients with thyroid dysfunction, thyroid peroxidase antibody was found to be positive in 8.3% of cases [13]. This study showed that screening for asymptomatic thyroid dysfunction may help diagnose thyroid disease among diabetic patients. Hypothyroidism can be associated with an increased risk of nephropathy and cardiovascular disease among diabetic patients. This was shown in a study done by Chen HS et al. that found sub-clinical hypothyroidism to be a risk factor for nephropathy and cardiovascular disease among type 2 diabetic patients [14]. However, our study showed that there was no correlation between thyroid dysfunction with nephropathy and cardiovascular disease in patients with type 2 diabetes mellitus.

Thyroid dysfunction is a common occurrence among patients with type 2 diabetes mellitus. It is more pronounced in patients with long--standing diabetes and the female gender. Treatment of thyroid dysfunction in diabetic patients can improve their morbidity and prevent the worsening of diabetic complications.

Limitations of the study

Anti-thyroid peroxidase (anti-TPO) antibody estimation was not done in our study. Thus, the role of thyroid auto-immune antibodies in patients developing thyroid dysfunction among type 2 diabetic patients could not be assessed.

Conclusion & Recommendations

The prevalence of thyroid dysfunction was 20% among patients with type 2 diabetes mellitus in this study. Hypothyroidism was more common among the study subjects than hyperthyroidism. There was no correlation between thyroid dysfunction with diabetic complications.

Funding: No funding sources.

Conflict of interest: None declared.

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Original Article

Risk Factors for Scar Dehiscence of Previous Cesarean Section

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Abstract

Background: Cesarean section (CS), avoided for its alarming mortality rate over a little more than a century ago, is now the most popular mode of delivery worldwide for various reasons. The incidence of cesarean section increased worldwide with subsequent increase in the risk of cesarean section scar dehiscence (CSSD). In this study we assessed the risk factors for CSSD in our settings. **Methods:** We have done a retrospective case-control study in the department of Obstetrics & Gynecology of Satkhira Medical College, Satkhira, Bangladesh between the periods of January 2020 to December 2022. Women with CSSD were the cases while women with repeated CS without CSSD were the control. We enrolled 27 women with CSSD (case) while 54 women without CSSD (control). **Results:** We found positive correlation of need for augmentation of labor, CS in the non-active stage and more than one CS with CSSD. **Conclusion:** The need for augmentation of labor, CS in the non-active stage and more than one cesarean section, all increased the risk of dehiscence.

Keywords: Cesarean section (CS), Cesarean Section Scar Dehiscence (CSSD), Risk factor.

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Introduction

Over a little more than a century ago, Cesarean section (CS) was avoided for its alarming mortality rate. Now a days, CS has become a popular mode of delivery worldwide [1, 2]. But due to various reason complications of CS is still not under the desirable limit in many parts of the world especially in developing countries. One of the major and devastating complication is uterine rupture or Cesarean Section Scar Dehiscence (CSSD).

Uterine rupture or CSSD refers to complete disruption of all uterine layers, including the serosa. It is a life-threatening pregnancy complication for both mother and fetus in women undergoing a trial of labor after cesarean section (TOLAC) [3]. Most uterine ruptures in resource-rich countries are associated with TOLAC. In resource limited countries, many uterine ruptures are due to obstructed labor and lack of access to operative delivery. By comparison, uterine dehiscence generally refers to an incomplete, and frequently clinically occult, uterine scar separation where the serosa remains intact and is not usually associated with hemorrhage or adverse maternal or perinatal outcomes. It is found incidentally in < 2% of prior Caesarean section patients [4].

Most cases of uterine dehiscence are diagnosed incidentally at repeat cesarean delivery, but some are identified during a prenatal ultrasound examination, sometimes with extrusion of a sac containing fetal membranes and amniotic fluid. A defect in the scar may detected as

early as the first trimester, with the possibility of "cesarean scar" pregnancy [5]. Scar defects and uterine windows have also been detected in the non-pregnant uterus [6, 7].

As the causes of CSSD is not fully understood, risk factors are tried to be identified. So, we have done this study with an objective to find out the risk factors of CSSD in our settings.

Methods

We did a retrospective case control study in the department of Obstetrics & Gynecology of Satkhira Medical College Hospital, Satkhira, Bangladesh between the periods of January 2020 to December 2022. Women with previous CS without CSSD were our controls while women with previous CS with CSSD were our cases. We enrolled 54 subjects as control (women with repeated CS without CSSD) while 27 subjects as cases (women with repeated CS with CSSD). After getting the clearance of Ethical Review Committee all data were taken from the patient's history sheet. The following parameters were included in the data collection: age, number of pregnancies, number of births, spontaneous abortions, termination of pregnancy, ectopic pregnancy, number of cesarean sections, number of births after the first cesarean section, the number of pregnancies with dehiscence, cause of first and last cesarean section, complaints about pain in the surgical scar, evidence of infection or fever after the last cesarean section (fever was determined by two temperature measurements above 38 with a range of 6 hours). We also examined whether there was evidence of infection during surgery (according to the surgical report), duration of hospitalization at previous birth, uterine incision closing method in the previous cesarean section (either one or two layers), time elapsed between last birth and present (< or > 18 months), need for and type of augmentation of labor, type of anesthesia and the stage of labor when the cesarean was performed. Quantitative data were described using mean and standard deviation/-median and range according to data distribution. Quality data were described using prevalence and percentage. For comparison between the research group and the control group, quantitative data were evaluated using the Wilcoxon rank sum test due to their asymmetric distribution.

Results

The study group consisted of 27 women diagnosed with dehiscence, while the control group consisted of 54 women. All women had at least one cesarean section. There was no statistically significant differences between the study group and the control group in age, number of births or pregnancies, number of abortions or termination of pregnancy (TOP), ectopic pregnancy, and number of births after the first cesarean section (Tab. 1). Women in the study group had a higher number of cesarean sections than women in the control group with statistical significance (Tab. 2). Table 3 summarizes the comparison between the two groups: there were statistically significant differences between the groups in the need for augmentation (more in the study group) and the stage of labor when the last cesarean was performed (more active stage in the control group) while other parameters were not statistically different.

Discussion

Delivery that was considered normal (normal vaginal delivery) is decreasing day by day due to various reasons. Assisted delivery is going to be obsolete especially in developing countries. So, the most popular mode of delivery is caesarian section (CS). But in spite of its popularity it is not out of complications. The most devastating complication is Caesarian Section Scar Dehiscence (CSSD). The main purpose of this study was to identify factors that increase the risk of CSSD to avoid or reduce the risk of

Table 1: Demographic data for each group.

Parameter	Case n = 27	Control n = 54	*p* value
Age (mean±SD)	30.1±5.4	30.1±5.3	NS
Number of Pregnancies (median & range)	3 (2-6)	3 (2-11)	NS
Number of births (median & range)	2 (1-4)	2 (1-9)	NS
Spontaneous abortions	11	14	NS
Termination of Pregnancy	2	8	NS
Ectopic Pregnancy	0	1	NS
Number of births after 1st CS (≥2)	3	1	NS

NS=Not Significant

Table 2: Number of CS in both groups.

Number of CS	Case n = 27	Control n = 54	*p* value
One CS	77.8%	55.6%	NS
Two CS	22.2%	37%	**0.034**[s]
Three or more CS	0%	7.4%	

S=Significant, NS=Not Significant

Table 3: Comparison between the two groups.

Parameter	Case n = 27	Control n = 54	*p* value
Time elapsed from previous cesarean section less than 18 months	14.8%	18.5%	NS
Cervical opening in previous cesarean section (active stage of labor)	44.4%	18.5%	**0.027**[s]
Augmentation	1.9%	22.2%	**0.005**[s]
Scar pain	14.8%	18.5%	NS
Fever	5.7%	4%	NS

S=Significant, NS=Not Significant

this life-threatening complication in future pregnancy.

The study results showed that women in the study group had a higher number of cesarean sections. Many studies have shown that women undergoing cesarean section are at increased risk of maternal and fetal complications later [8, 9]. Our results agree with other studies since repeated CS creates yet another scar that further weakens the lower segment of the uterus, thus increasing the risk of dehiscence.

We found 22.2% of women in the study group, compared with 1.9% of the control group, augmentation of labor was required with a statistically significant difference. In our study, augmentation increased the risk of dehiscence, thus evaluation of the scar is mandatory before any type of augmentation is implemented, and close surveillance is crucial if augmentation is given. The issue of labor induction in previous cesarean section is controversial, as was found in the survey conducted by Udayasankar et al. [10] (2008) among obstetricians in Wales. Although most obstetricians would consider induction of labor in postdate even in the event of previous cesarean section, about 88% of the obstetricians stated that these women should be counseled regarding the increased risk of uterine rupture.

There was no statistically significant difference between the study group and the control group concerning complaints of pain in the surgical scar, 18.5% of the women in the study group reported scar pain vs 14.8% in the control group. This result is also in agreement with previous studies [11, 12]. Madaan et al. [13] (2011) concluded that scar tenderness and pain are poor indicators of scar dehiscence: in their series, 10 women were operated due to scar tenderness and dehiscence was not found in any of them.

We examined the medical records for fever in the previous CS since fever might indicate an infection of the scar, and subsequent impairment of the healing ability of the scar, thereby increasing the chance for dehiscence. However, the results of our study showed no difference between the two groups.

In the control group, 44.4% were in their active stage of labor during the previous cesarean section compared to 18.5% of the study group, with statistical significance. We attribute this difference to the fact that in women operated during active stage, the lower segment is already formed and the incision in these cases is done mostly without cutting the uterus muscle itself. In women not in active labor, the incision is often done in the muscle itself, even if performed in the lower segment. This hypothesis should also be confirmed in a prospective study with histological proof of the lower segment composition during elective cesarean section vs cesarean section in women in active labor. Irrespective of the reason for this finding, it is particularly important to clarify at what stage of labor the CS was performed in each patient choosing TOLAC.

However, there are some weakness of the study. This was a retrospective study and in some women dehiscence of scar were not diagnosed because our study included only women with definitive diagnosis of dehiscence during a repeated cesarean. Women with asymptomatic dehiscence were probably discharged undiagnosed.

Conclusion

In conclusion we can say that, cesarean section on non-active stage of labor and more than one cesarean section in the past are parameters that can increase the risk of dehiscence.

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Original Article

Clinical Presentation and Serum Ferritin Level among Children Presenting with Febrile Convulsion: Our Experience

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Abstract

Background: Febrile convulsion is a common childhood illness. Children below 5 years, especially 12 months to 24 months of age are the main sufferers. Boys suffer more than girls. Respiratory tract infection (RTI) is the leading cause of febrile convulsion. **Objective:** This study was conducted to evaluate the clinical presentations, disease pattern, laboratory findings of febrile convulsion and to evaluate the association between serum ferritin level and febrile convulsion. **Methods:** This prospective study was conducted in the Satkhira Medical College Hospital (SMCH), Satkhira, Bangladesh, among 74 children, both boys and girls with symptoms of fever and convulsion. The study period was from January 2022 to September 2022. Convenient purposive sampling was the sampling method. **Results:** Among 74 cases, 38 boys and 36 girls were found and male to female ratio was 1.10. Highest number of cases belonged to age group of 12-24 months (32.4%). The most common symptom was cough (37.8%). Upper respiratory tract infection (40.5%) is the leading cause of fever. Serum ferritin levels estimated in all cases were compared with pediatric reference intervals and found no association between low level of serum ferritin and febrile convulsion in children. **Conclusion:** Febrile convulsion is more common in boys of 12 -24 months with respiratory tract infection and serum ferritin level is normal in them.

Keywords: Febrile convulsion; Serum Ferritin, Children.

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Introduction

Febrile convulsion is the most common type of childhood seizure [1]. Febrile Seizure is defined as a seizure associated with a febrile illness in the absence of central nervous system (CNS) infections or acute electrolyte abnormalities in 6-60 months old children without previous afebrile seizures [2].

Iron deficiency is the most common micronutrient deficiency worldwide among children. Anemia is the most common clinical presentation of iron deficiency state. Iron deficiency also affects other organs and systems. Cognitive dysfunction, psychomotor retardation, behavioral impairments, pica, breath holding spells, restless leg syndrome, and thrombosis could be associated with iron deficiency.

Effect of iron deficiency in the developing brain and mechanisms such as altered development of hippocampus neurons, impairment of energy metabolism, delayed maturation of myelin, slowed visual and auditory evoked

potentials, and alterations in synaptic neurotransmitter systems including norepinephrine, dopamine, glutamate, γ amino butyric acid, and serotonin may be responsible for these symptoms [3, 4].

The causal relationship between iron deficiency anemia and febrile convulsion was evaluated in many studies, both in home and abroad with conflicting results. Most of the febrile convulsions occur within the 1st 3 years of age [5]. Though convulsion is a significant cause of morbidity and mortality among children, febrile convulsion is still considered as benign and self-limiting disease. Febrile convulsion is one of the common cause of parents' terrifying and anxiety provoking events.

The most common causes of febrile convulsion are respiratory tract infections (both upper and lower), gastroenteritis, urinary tract infection etc. It is an important cause for medical consultation on the emergency basis, in the hospital and doctor's chamber. Parents become apprehended, anxious regarding treatment, outcome and future prognosis. Clinical presentation laboratory investigations are important for appropriate diagnosis, treatment and counseling.

The aim of this study was to find out clinical presentation, disease pattern, laboratory investigation profiles regarding febrile convulsion in children attending the out-patient department (OPD) and in-patient department (IPD) of SMCH, Satkhira, Bangladesh.

Materials and Methods

This prospective study was conducted among the patients attending the OPD and IPD of Satkhira Medical College Hospital, Satkhira, Bangladesh between the periods from January 2022 to September 2022. A total of 74 cases, both boys and girls with symptoms of fever and convulsion were included. Convenient purposive sampling was used as a method of selecting study sample. Patients with metabolic disorder, head injury, known central nervous system (CNS) illness such as encephalopathy, meningitis were excluded from the study. Structured questionnaire was used to collect data. Detailed history of symptoms including fever and convulsion were taken. General and systemic physical examination were carried out in all patients. Routine test including complete bold count (CBC), comment on peripheral blood film (PBF), Urine for routine and microscopic examination (RME), chest X- ray (CXR) were done. Serum ferritin level were measured in all cases. The data were analyzed using both analytic as well as descriptive statistics. Informed consents were taken from patient's parents and ethical clearance was taken from the ethical review committee of Satkhira Medical College.

Results

There were 74 patients (aged from 1 month to 14 years) enrolled in this study from January 2022 to September 2022 attending the OPD and IPD of SMCH , Satkhira , Bangladesh. All the cases were selected. Serum ferritin were measured along with blood tests (CBC, PBF), urine (RME), CXR. A total number of 38 boys and 36 girls were found and male to female ratio was 1.10. Highest number of cases belonged to age group of 12-24 months years (Table-1). The most common clinical presentations were cough (37.8%), runny nose (36.4%), vomiting (18.9%), abdominal pain (8.1%), loose motion (8.1%), dysuria (5.4%) and sore throat (4.0%) (Table-2). The leading cause of febrile convulsion was upper respiratory tract infections (40.5%). Other causes were broncho-pneumonia (37.8%), gastroenteritis (8.1%), and urinary tract infection (8.1%). (Table -3) (Fig: 1). Serum ferritin level were done in all cases. Surprisingly all values were found within the normal reference level [6] (Table-4).

Table 1: Age and sex distribution of children with febrile convulsion (n=74).

Sex	0-12 months n (%)	12-24 months n (%)	25-72 months n (%)	>72 months n (%)
Boys	12 (16.2)	10 (13.5)	10 (13.5)	4 (5.4)
Girls	10 (13.5)	14 (18.9)	8 (10.8)	6 (8.1)
Total	22 (29.7)	24 (32.4)	18 (24.3)	10 (13.5)

Table 2: Clinical presentations of febrile convulsion in the study subjects (n=74).

Presentation	Frequency n (%)
Cough	28 (37.8)
Runny nose	27 (36.4)
Vomiting	14 (18.9)
Abdominal pain	6 (8.1)
Loose motion	6 (8.1)
Sore throat	4 (5.4)
Dysuria	3 (4)
Others	9 (9.7)

Table 3: Distribution of the study subjects according to cause (n=74).

Cause	Frequency n (%)
Upper respiratory tract infection	30 (40.5)
Bronchopneumonia	28 (37.8)
Gastroenteritis	6 (8.1)
Urinary tract infection	6 (8.1)
Others	4 (5.4)
Total	74 (100)

Table 4: Serum ferritin level in the study subjects (n=74).

Age (months)	Ref. value of S. ferritin (ng/ml)	Observed value	Inference
1-6	14-647.2	25, 30, 35, 37.3, 46.1, 52.2, 96, >1500	Mostly within limit
6-12	8.4-181.9	10.6, 12.5, 17, 18.7, 22.7, 23, 27, 31.3, 36.3, 41, 42.3, 53.1, 109, 257	Mostly within limit
12-60	5.3-99.9	8.9, 10.4, 12, 12.7, 21.4, 23.6, 24.1, 25, 25.1, 26.7, 28,4, 33, 39.3, 41.5, 41.9, 42.4, 45, 47.5, 49.7, 50.4, 53.3, 57.3, 71, 73, 75, 77.4, 79.5, 81.1, 87, 87.3, 87.8, 90.3, 95, 95.5, 96.2, 98, 100, 100.8, 100.9, 101, 101.1, 104.3, 105.1, 107.3, 120, 123, 126.1, 126.4, 126.7, 127, 138.9, 153	Mostly within limit

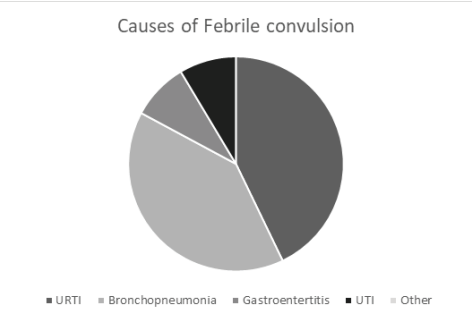

Figure 1: Causes of febrile convulsion.

Discussion

In our study, a total of 74 children were included who presented with fever and convulsion. The majority of patients belonged to age group of 2 to 3 years (Table-1). This finding is consistent with many other studies [7, 8]. The prevalence of febrile convulsion was found more among male child than female child in our study (Table-2) that is also in agreement with other studies [9]. The clinical presentations of

febrile convulsion other than fever and convulsion were cough (37.8%) runny nose (36.4%), vomiting (18.9%), abdominal pain (8.1%), loose motion (8.1%), sore throat (5.4%) and dysuria (4%) (Table-2). These findings are also consistent with the study findings of Deng CT et al. (1994) [10]. The causal background of febrile convulsion were upper respiratory tract infections (40.5%), bronchopneumonia (37.8%), gastroenteritis (8.1%) and urinary tract infection (8.1%) (Table 3) (Fig: 1). Our study findings were also similar to other study [11]. The serum ferritin levels were measures and compared with pediatric reference intervals [6]. We found that there was no reduced serum ferritin level among study populations [Table-4]. Momen and Hakimzadeh reported similar findings in 2003 [12]. Kobrinsky et al. (1995) also suggested that iron-deficiency anemia raises the threshold for febrile seizure [13]. But many other studies reported that low serum ferritin level were a risk factor for febrile convulsion in children [14, 15]. Ferritin is an acute-phase reactant agent. Ferritin level may be influenced by causes of febrile convulsion. Lead poisoning may also present with iron deficiency and convulsion [15].

Limitation of the study

The study has several limitations. It was conducted in a single hospital. Sample size was small, there was no control group and the study period was short. For these reasons it may not reflect the whole scenario.

Conclusion & Recommendations

From the above study we can conclude that the common childhood problem febrile convulsion is more prevalent in the boys between 2-3 years with RTIs (both upper and lower). As reported in many studies, we did not find a lower value of serum ferritin with febrile convulsion. So more well designed, larger scale and long duration study with mitigating confounding effect may draw a robust conclusion regarding serum ferritin level and febrile convulsion in children.

Conflict of Interest

There is no conflict of interest.

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Original Article

Association of General and Central Adiposity with the Oxidative Stress Status in both Genders: A Cross Sectional Study

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Abstract

Background: Oxidative stress results from increase oxidant to antioxidant ratio. Increase oxidative stress is related to the pathogenesis of hypertension, diabetes mellitus, cancer, cardiovascular and cerebrovascular disease etc. Limited data is present about the association of central and general adiposity with the oxidative stress status of both genders. **Objectives:** The objective of the present study was to find out the strength and nature of association between the markers of central and general adiposity with the oxidative stress status of both genders. **Methods:** This cross-sectional comparative study was carried out in the Department of Physiology, Rajshahi Medical College, Rajshahi from January 2014 to June 2018. This study included 44 healthy adults of both genders, out of which 24 were male and 20 were female. Following informed written consent and detailed history taking demographic data, plasma Alpha-tocopherol and plasma Malondialdehyde (MDA) an antioxidant were measured by standard laboratory methods. **Results:** Malondialdehyde showed positive correlation with the body mass index, waist circumference, waist to hip ratio and waist to height ratio in both genders. Alpha-tocopherol showed negative correlation with body mass index, waist circumference, waist to hip ratio and waist to height ratio in both genders. **Conclusion:** The findings of this study demonstrates that general as well as central adiposity increases oxidative stress status.

Keywords: Adiposity, oxidative stress, Malondialdehyde, Alpha-tocopherol

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Introduction

Oxidative stress occurs due to increase oxidant to anti-oxidant ratio. Oxidants are free radicals. These are highly reactive substances that cause injury to protein, lipid and nucleic acid [1]. Antioxidants are body's defense mechanism against oxidants mediated cellular injury. Antioxidants are two types. Enzymatic antioxidants are catalase, superoxide dismutase and glutathione peroxidase. Nonenzymatic antioxidants are vitamin A, C and E [2]. Oxidative stress occurs when there is overproduction of oxidants or the reduced ability of the antioxidants to prevent the oxidants mediated cellular injury [3]. Oxidative stress varies among normal individuals due to age, gender, smoking, alcohol consumption, exercise, shift work, diet etc [4-9].

Increased oxidative stress causes abnormal function of the vascular endothelium. As a result, there is decrease production of vasodilators secreted by the endothelium and

increased production vasoconstrictors secreted by the endothelium [10]. Moreover, there is increase proliferation of vascular endothelial cells [11]. Furthermore oxidative stress causes oxidation of low-density lipoproteins which leads to atherosclerotic disease [12]. Oxidized LDL deposits in the sub-endothelial region, thereby obstructs the blood flow [13]. Impairment of endothelial function leads to coronary artery disease. Consequently, endothelial dysfunction followed by atherosclerosis plays a key role for clinical features of the cardiovascular events [14]. Oxidative stress which initiates a series of inflammatory response causes increase risk of cardiovascular as well as cerebrovascular disease [15]. Increased oxidative stress alters the enzyme redox pattern in cardiac tissue of patients undergoing coronary artery bypass graft surgery [16]. On contrary, treatment with antioxidants prevent ischemic-reperfusion injury of the cardiac muscles and improves activity of the cardiac muscles [17]. Similarly, statins improved the condition of atherosclerotic cerebrovascular disease by exerting antioxidant effects [18]. Elevated oxidative stress status was also found to be related to pathogenesis of gestational diabetes mellitus, ovarian cancer and neurodegenerative disease [19-21].

Study indicates that overweight and obese people have greater oxidative stress than the people who have normal body weight. So higher body mass index may be the reason of chronic illness [22]. Researchers suggest that monitoring oxidative stress status at a regular interval and maintaining oxidative balance may reduce development of hypertension and cardiovascular morbidities [23]. A 5% reduction of adiposity markers like body mass index (BMI) and waist circumference will be helpful for healthy living [24]. Samir et al. (2019) revealed that waist circumference emerged as the best predictor of oxidative stress [25]. Margaret et al. (2016) mentioned that the waist to height ratio (WHtR) is a better predictive indicator of the 'early heath risks'. In other words, marker of central obesity like waist to hip ratio has better predictive value than the marker of general adiposity like BMI [26].

So, increase oxidative stress is related to the morbidity and mortality of many noncommunicable diseases. Oxidative stress increases due to obesity. There are multiple markers of obesity. Body mass index (BMI) represents general body fat and waist circumference (WC) represents visceral fat mass. Moreover, waist to hip ratio (WHR) and waist to height ratio (WHtR) are also used as markers of central adiposity [1]. However obesity should not only be determined by BMI because regional body fat distribution may be different with the same BMI [27]. Limited data is present about the relation between oxidative stress statuses with the different markers of obesity. As a result, the objective of this study was to find out the association between oxidative stress status with body mass index, waist circumference, waist to hip ratio and waist to height ratio in both genders.

Methods

This cross-sectional comparative study was carried out in the department of Physiology, Rajshahi Medical College, Rajshahi, Bangladesh between the periods of January 2014 to June 2018. Forty-four healthy adult subjects of both gender: male (n=24) and female (n=20) were enrolled in the study. Study subjects were selected by following systematic sampling technique from medical students, doctors and staffs of Rajshahi Medical College. The protocol of the study was approved by the Ethical Review Committee (ERC) of Rajshahi Medical College. All the subjects were free from diabetes, hypertension, chronic liver and renal disease, alcoholism and smoking. Persons taking antioxidant therapy or other drugs, pregnant and lactating women were excluded from the study. Before recruitment, aim, benefit and procedure of the study was explained and informed written consent was taken from each study subject. History and thorough physical examination was done before laboratory

procedure.

Standing Height was recorded without shoes in centimeters using standard height scale fixed to the wall with moving head piece. Weight was recorded in kilograms using standard weighing scale with minimum clothing. Body Mass Index (BMI) was calculated by dividing the body weight in kilograms with height in square meters. Waist circumference was measured by a measuring tape in between the lowest rib and the highest point of the iliac crest. Waist to hip ratio was calculated by dividing the waist circumference in centimeter with hip circumference in centimeters. Waist to height ratio was calculated by same method.

Then under aseptic precaution, 4 ml blood was taken from each study subject in a test tube containing anti-coagulant di-potassium EDTA. Plasma was separated by centrifugation for 15 minutes at 3000 rpm. Plasma was used to estimate Malondialdehyde (MDA) levels and Alpha-tocopherol levels. Plasma was used to estimate Malondialdehyde (MDA) levels by the method described by Das et al. (1990) [28] and Alpha-tocopherol levels was measured by the method described by Baker and Frank (1968) [29].

Data was analyzed by computer using SPSS software program. The test of significance was calculated by using unpaired student-t test. Correlation was done by Pearson correlation test. P value at or below 0.05 was considered as significant.

Results

Comparison of demographic variables between male and female subjects by weight in kg, height in meter, BMI in kg/m2, waist circumference in centimeters, waist to hip ratio and waist to height ratio. Weight, height and waist to hip ratio were significantly higher in male. Body mass index, waist circumference and waist to height ratio showed no significant difference between male and female (Table I). Comparison of oxidative stress markers Malondialdehyde (micro-mole/liter), Alpha-tocopherol (mg/dl) and malondialdehyde to alpha-tocopherol ratio between male and female. MDA levels were higher in female than male which was not statistically significant. Alpha-tocopherol levels were higher in female than male which was statistically highly significant. Malondialdehyde to alpha-tocopherol ratio was significantly higher in male than female (Table-II). Correlation of body mass index, waist circumference, waist to hip ratio and waist to height ratio with Malondialdehyde levels (micro-mole/liter) in male and female. All the variables showed positive correlation with Malondialdehyde levels in both genders (Table-III). Correlation of body mass index, waist circumference, waist to hip ratio and waist to height ratio with Alpha-tocopherol levels (mg/dl) in male and female. Body mass index, waist circumference, waist to hip ratio and waist to height ratio showed negative correlation with alpha-tocopherol levels in both genders. (Table-IV).

Table-I: Demographic data of healthy adult male and female study subjects (n=44).

Variables	Male (n=24)	Female (n=20)	*p* value
Age (years)	36.75±15.38	28.20±11.92	$<0.05^{S}$
Weight (kg)	67.54±9.85	58.20±11.61	$<0.05^{S}$
Height (m)	1.65±0.06	1.56±0.07	$<0.05^{S}$
BMI (kg/m²)	24.3±3±3.76	23.47±5.39	$>0.05^{NS}$
WC (cm)	88.83±11.11	82.60±11.33	$>0.05^{NS}$
WHR	0.90±0.05	0.82±0.05	$<0.0001^{S}$
WHtR	0.53±0.07	0.52±0.08	$>0.05^{NS}$

Data were expressed as mean±SD. Range is mentioned inside parenthesis.

The test of significance was calculated using unpaired t-test. *p* value at or below 0.05 considered as significant. S=significant, NS=not significant, HS=highly significant. n=number of study subjects, BMI=Body mass index. WC=waist circumference, WHR=waist to hip ratio, WHtR=waist to hip ratio.

Discussion

Obesity is increasing worldwide due to unhealthy food habit and sedentary life style. It increases the risk of cancer, cardiovascular and metabolic disease. Increase oxidative stress plays a key role in pathogenesis of obesity and

related complications. Oxidative stress means either increase in production of reactive oxygen species (ROS) or decrease ability of the body's antioxidant defense mechanisms to prevent ROS induced injury [3]. Moreover study indicates that obesity itself is a reason of increased oxidative stress status [30]. However it is unclear to what extent the different markers of obesity affect the oxidative stress status. So, the objective of the present study was to find out the association between BMI, waist circumference, waist to hip ratio and waist to height ratio with the oxidative stress status. Direct measurement of reactive oxygen species is difficult due to their unstable and transient nature. Therefore, lipid peroxide was measured which is product of reactive oxygen species mediated injury. Malondialdehyde (MDA) is a lipid peroxide which is produced by reactive oxygen species mediated injury of polyunsaturated fatty acids of biological membranes [31]. So the determination of MDA was used for monitoring lipid peroxidation. Alpha-tocopherol was measured because it is a major lipid soluble chain breaking antioxidant which prevents lipid peroxidation. Moreover, it is the most biologically active form of tocopherols and present in highest concentration [32].

Table-II: Comparison of Oxidative stress markers between male and female subjects (N=44).

Variables	Male (n=24)	Female (n=20)	*p* value
MDA (µmole/liter) Range	2.99±0.80	3.21±0.49	>0.05^{NS}
α-tocopherol (mg/dl) Range	1.79±0.83	2.57±0.76	<0.002^{HS}
MDA: α-tocopherol	2.05±1.05	1.43±0.79	<0.05^{S}

Data were expressed as mean±SD. The test of significance was calculated using unpaired t-test
p value at or below 0.05 was considered as significant.
S=significant, NS=not significant, HS=highly significant, N=total number of study subjects
n=number of study subjects in each group, MDA= Malondialdehyde.

Table-III: Correlation of anthropometric indices with MDA (µmole/liter) in male and female subjects (N=44).

Gender	Variables	Correlation coefficient	*p* value
Male (n=24)	BMI(kg/m²)	+0.2816	0.18^{NS}
	WC (cm)	+0.1257	0.56^{NS}
	WHR	+0.1744	0.41^{NS}
	WHtR	+0.2529	0.23^{NS}
Female (n=20)	BMI(kg/m²)	+0.0539	0.82^{NS}
	WC (cm)	+0.1445	0.54^{NS}
	WHR	+0.1916	0.41^{NS}
	WHtR	+0.0925	0.69^{NS}

Correlation coefficient was calculated by Pearson correlation test. (+) indicates positive correlation and (–) indicates negative correlation. *p* value at or below 0.05 was considered as significant.
NS=Not significant. N=Total number of study subjects, n=number of study subjects in each group, BMI=Body mass index, MDA= Malondialdehyde.
WC=waist circumference, WHR=waist to hip ratio, WHtR=waist to hip ratio.

Table-IV: Correlation of anthropometric indices with Alpha-tocopherol (mg/dl) in male and female subjects (N=44).

Gender	Variables	Correlation coefficient	*p* value
Male (n=24)	BMI(kg/m²)	-0.2583	0.22^{NS}
	WC (cm)	-0.2696	0.20^{NS}
	WHR	-0.3704	0.07^{NS}
	WHtR	-0.3177	0.13^{NS}
Female (n=20)	BMI(kg/m²)	-0.5503	0.011^{S}
	WC (cm)	-0.5946	0.005^{S}
	WHR	-0.2561	0.27^{NS}
	WHtR	-0.5044	0.023^{S}

Correlation coefficient was calculated by Pearson correlation test. + indicates positive correlation and – indicates negative correlation. *p* value at or below 0.05 was considered as significant.
NS=Not significant, S=significant. N=total number of study subjects, n=number of study subjects in each group.
BMI=Body mass index. WC=waist circumference, WHR=waist to hip ratio, WHtR=waist to hip ratio.

In the present study, weight, height and waist to hip ratio were significantly higher in male than female. But body mass index, waist circumference and waist to height ratio showed no significant difference between male and female. It indicates that male have central body fat distribution and female have peripheral body fat distribution due to different hormonal influence. We found, MDA levels were non-significantly higher in female than male but Alpha-tocopherol levels were significantly higher in female than male. It indicates that female compensatory mechanism against oxidative stress is very much potent. Moreover, Malondialdehyde to alpha-tocopherol ratio was significantly higher in male than female. It indicates that oxidative stress is more in male than female due to lack of potent compensatory antioxidant defense mechanism like female. It may be due to the fact that female sex hormones are protective against oxidative stress status.

In the present study, BMI, waist circumference, waist to hip ratio and waist to height ratio showed positive correlation with lipid peroxide (Malondialdehyde) levels in both genders. These findings are in agreement with several authors [1, 33]. It indicates that free radicals mediated injury increases with general adiposity like BMI as well as with central adiposity like waist circumference, WHR and WHtR. It may be due to the fact that adipose tissue secrets adiponectin, IL-1, IL-6 and TNF-alpha which initiates a chronic inflammatory condition, thereby generates reactive oxygen species [33]. Malondialdehyde is a lipid peroxide, generates due to the oxidative damage of polyunsaturated fatty acids. It prevents the phagocytosis of oxidized LDL by the macrophages. Consequently, it increases the risk of atherosclerosis [34]. So, weight reduction may be helpful for healthy living.

In the present study, body mass index, waist circumference, waist to hip ratio and waist to height ratio showed negative correlation with alpha-tocopherol levels in both genders. These findings are in agreement with several authors [1, 35]. It may be due to the fact that excess generation of free radicals result in excess consumption of antioxidants. Findings of this study indicates that markers of general and central adiposity are good predictor of anti-oxidant status.

One of the strengths of this study was that the study subjects had no comorbidity. Careful selection was done to exclude the smokers, alcoholics, shift workers and drug abusers. Both oxidant and antioxidant were measured for better interpretation of the study results. However, it was a cross-sectional comparative study with small sample size. So, the it had less statistical power to establish a cause-effect relationship. Moreover, percentage of body fat was not measured which was a limitation of this study.

Conclusion & Recommendations

Findings of the present study showed that both general as well as central adiposity are related with increase oxidants and decrease antioxidant capacity. So, ideal body weight should be maintained to improve the quality of living, to reduce morbidity and mortality related to non-communicable diseases. Study results indicate that both percentage of body fat and regional distribution of body fat are related to oxidative stress status.

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