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Address of Correspondence: Professor Dr. Sunil Krishna Baul, Editor in Chief, JSMC, Department of Biochemistry, Satkhira Medical College, Satkhira-9400. Phone: +88 02477741145, Email: satkhiramc@ac.dghs.gov.bd Website: www.satkhiramc.gov.bd

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EDITORIAL

Childhood Obesity: a Dual Burden of Bangladesh

Professor Dr. Sunil Krishna Baul

The world is undergoing a rapid epidemiological and nutritional transition. Concomitantly, there is a progressive rise in the prevalence of obesity, diabetes and other nutrition related chronic diseases like metabolic syndrome, cardiovascular disease, and some forms of cancer. Obesity has reached epidemic levels in developed countries. The highest prevalence rates of childhood obesity have been observed in developed countries; however, it is also increasing in developing countries as well [1].

It is emerging convincingly that the genesis of Type 2 Diabetes and Coronary Heart Disease begins in childhood, with childhood obesity serving as an important factor [2]. There has been a phenomenal rise in proportions of children having obesity in the last 4 decades, especially in the developed world. The low income countries are showing the same trend as the high income countries in increasing rates of obesity. The dual burden households are very common where under weight and over weight coexist among the children [3]. Rapid urbanization and industrialization are changing the food habits resulting in socio-economic, demographic and cultural changes leading to nutritional transition in low income countries [4, 5].

Although definition of obesity and overweight has changed over time, it can be defined as an excess of body fat. There is no consensus on a cut off point for excess fatness of overweight or obesity in children and adolescents. A study conducted by Williams et al. (1992), on 3,320 children in the age group of 5–18 years classified children as fat if their percentage of body fat was at least 25% for males and 30% for females, respectively [6]. The Center for Disease Control and Prevention defined overweight as at or above the 95th percentile of body mass index (BMI) for age and "at risk for overweight" as between 85th to 95th percentile of BMI for age [7]. There are also several methods to measure the percentage of body fat. In research, techniques include underwater weighing (densitometry), multi frequency bioelectrical impedance analysis (BIA), and magnetic resonance imaging (MRI). In the clinical environment, techniques such as BMI, waist circumference, and skin fold thickness have been used extensively. Although, these methods are less accurate than research methods, they are satisfactory to identify risk. While BMI seems appropriate for differentiating adults, it may not be as useful in children because of their changing body shape as they progress through normal growth. In addition, BMI fails to distinguish between fat and fat free mass (muscle and bone) and may exaggerate obesity in large muscular children. Furthermore, maturation pattern differs between genders and different ethnic groups. Studies that used BMI to identify overweight and obese children based on percentage of body fat have found high specificity (95–100%), but low sensitivity (36–66%) for this system of classification [8].

It is widely accepted that increase in obesity results from an imbalance between energy intake and expenditure, with an increase in positive energy balance being closely associat-

ed with the lifestyle adopted and the dietary intake preferences. However, there is increasing evidence indicating that an individual's genetic background is important in determining obesity risk. Genetics are one of the biggest factors examined as a cause of obesity. Some studies have found that BMI is 25–40% heritable [9]. However, genetic susceptibility often needs to be coupled with contributing environmental and behavioral factors in order to affect weight. The genetic factor accounts for less than 5% of cases of childhood obesity [9]. Therefore, while genetics can play a role in the development of obesity, it is not the cause of the dramatic increase in childhood obesity. Other factors include consumption of sugary beverages and snack foods and increase portion size. Physical activity level is also decreasing day by day. In addition, environmental factors, increase screen time, socio cultural factors, family factors and other psychological factors also play role in developing childhood obesity.

The prevalence of obesity and overweight is alarming among the school aged children in Bangladesh. The prevalence of obesity and overweight among Bangladeshi school children of 6 to 15 year olds found 3.5% and 9.7% respectively [10]. While underweight is still predominating among the rural children, obesity and overweight prevailing among the urban children. To combat the future dual burden of communicable and the non-communicable diseases as a consequence of underweight and overweight, we need to understand the social perspective of overweight and obesity in the low income countries and take appropriate measures by the government and other stakeholders.

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Original Article

Assessment of Difficult Laryngoscopy by using Thyromental Distance Test and Modified Mallampathi Test

Md. Saifullah[1], Md. Ashraful Alam[2],GM Faruquzzaman[3]
Md. Moniruzzaman[4], Md. Showkat Ali[5]

Abstract

Background: Unanticipated difficult intubation is one of the most dreaded complications in anaesthesiology practice. The predictive reliability of the various tests currently available for predicting difficult airway is unclear. **Aims:** To assess the diagnostic accuracy of Modified Mallampati Test (MMP) and Thyromental Distance Test (TMD) individually and also in combination in predicting difficult laryngoscopy, by correlating these tests with Cormack-Lehane's grading. **Methods:** This observational study was carried out in the department of Anesthesiology of Satkhira Medical College Hospital, Satkhira, Bangladesh during January 2021 to December 2021. A total of 400 patients belonged to 18 - 56 years of both sexes having American Society of Anaesthesiology (ASA) status I, II and scheduled for elective surgery under general anaesthesia with endotracheal intubation were selected for this study. **Results:** While assessing the airway assessment data, MMP / TMD had the highest 92.8% and TMD had the lowest 21.7% sensitivity. For specificity TMD had the highest specificity 99.7% among all the tests and MMP had the lowest specificity 89.3%. Diagnostic accuracy was highest in MMP / TMD 91.0% closely followed by TMD 83.5% and MMP 82.3% respectively. PPV was highest in TMD 94.7% and lowest in MMP 57.5% and NPV was highest in MMP / TMD 98.0% and lowest in TMD 82.9%.**Conclusion:** This study conclude that, MMP /TMD is the more preferred predicator than the individual tests MMP and TMD for assessing and predicting difficult airway.

Keywords: Modified Mallampati Test (MMP), Thyromental Distance Test (TMD), Difficult Laryngoscopy, Cormack-Lehane Classification.

1. Assistant Professor, Department of Anesthesiology, Satkhira Medical College, Satkhira, Bangladesh
2. Junior consultant, Department of Anesthesiology, Satkhira Medical College Hospital, Satkhira, Bangladesh
3. Assistant Professor, Department of ENT, Satkhira Medical College, Satkhira, Bangladesh
4. Assistant Professor, Department of Anesthesiology, Satkhira Medical College, Satkhira, Bangladesh
5. Assistant Professor, Department of Pediatrics, Khulna Medical College, Khulna

Address of Correspondence: Dr. Md. Saifullah, Assistant Professor and Head, Department of Anesthesiology, Satkhira Medical College, Satkhira, Bangladesh. Email: saifullahcerdi@gmail.com

Introduction

Endotracheal intubation is considered in every patient receiving general anesthesia. The ability to place an unobstructed conduit into a patient's airway to assist with ventilation and to protect the airway is potentially a lifesaving skill. Problems with airway management are among the most frequent causes of anesthetic mishaps (dental damage, aspiration of gastric contents, airway trauma, unanticipated surgical airway, anoxic brain injury, cardiopulmonary arrest) and fatality [1,2]. Difficult intubation occur in about 0.8-7% of patients in operating room settings [3]. Failed intubation of the trachea occurs in about 1 in 2000 patients in an elective setting [2,4]. Because of potentially serious consequences of failed tracheal intubation, considerable attention has been focused on attempts to predict patients in whom laryngoscopy and intubation might be difficult [5, 6]

and in this regard combination of different test scores have been developed but none of them have proven to be totally reliable [7, 8, 9].

A variety of tests and indices are in place for preoperative airway assessment and predicting difficult airway, however, none of these have been shown to be full proof [6, 10]. Endeavours to laryngoscopy along with stylet were made available in the operating room. Standard ASA monitors (pulse oximetry, ECG, NIBP, $ETCO_2$ monitor) were attached. Intravenous midazolam (0.05 mg/Kg), glycopyrrolate (0.005 mg/Kg), ondansetron (0.1 mg/Kg), fentanyl (2 mcg/Kg) given before induction. After pre-oxygenation for 3 minutes, induction was done with intra-venous propofol (2 mg/Kg) and after mask ventilation was ensured, Injection Succinylcholine (2 mg/Kg) was given. Adequacy of the depth of anaesthesia and muscle relaxation was subjectively determined by the performing anaesthesiologist. Laryngoscopy and intubation were performed by an anaesthesiologist having experience in this speciality for more than 5 years. With the head in the sniffing position, a Number 3 or Number 4 Macintosh curved blade was used to obtain the laryngoscopic view, the grading of which was pursuant to the Cormack-Lehane classification which is generally considered the gold standard and includes Class I - Vocal cord fully visible; Class II - Only posterior commissure visible; Class III - Only epiglottis visible and Class IV - Epiglottis not visible [7, 10].

Research is ongoing to devise a simple bedside test to anticipate difficult tracheal intubation, which has high sensitivity, specificity, Positive predictive value (PPV), Negative predictive value (NPV), Likelihood ratio (LR) with minimal False positive (FP) and False negative (FN) values.In this context this study was conducted to evaluate sensitivity, specificity, Positive predictive value(PPV), Negative predictive value(NPV) and Odds ratio (OR) for various screening tests like Thyromental Distance Test and modified Mallampati (MMT) in isolation and in various combinations, with an attempt to determine a more comprehensive and accurate as well as simple and clinically applicable day to day basis parameter for predicting difficult laryngoscopy.

Materials and Methods

This prospective observational study was carried out in 400 adult patients of either sex, having American Society of Anaesthesiology (ASA) status I, II and scheduled for elective surgery under general anaesthesia where endotracheal intubation were selected for this study. The study was done in the department of General surgery, under supervision of Department of Anesthesiology of Satkhira Medical College Hospital, Satkhira, Bangladesh, during January 2021 to December 2021. Patients of both gender between 18 and 56 years of age were included in this study. Patients having facial trauma, edentulous patient, burns patients with neck contracture, intraoral pathology /infections, rheumatoid disease, degenerative spinal disease, Inability to open mouth were excluded from the study. A detailed history (demographic information, clinical history, past medical history), complete physical and general examination and necessary investigations were done for all patients. Where in the patients were asked to be in sitting position with fully open mouth and tongue maximally protruded, and patients were asked not to phonate for Mallampatti score. All the patients were properly explained about the objectives of the study along with its procedure, risk and benefits to be derived from the study in easily understandable local language and then informed consent was taken from them. It was assured that all records would be kept confidential and would not be disclosed anyway except for the purpose of study. It was assured that the procedure was helpful for both the physician

and patients in making rational approach regarding management of the case. All findings were collected in a pre-designed data collection sheet.

Study Procedure

During pre-anesthesia evaluation of patient airway was assessed by following tests:

Modified Mallampati Test (MMT): Visualization of oropharyngeal structures of patients in sitting position after asking patient to open his mouth as wide as possible with his tongue protruded. MMT class 3 and 4 were considered as predictors of difficult laryngoscopy.

Thyromental Distance (TMD): Distance between mentum and thyroid prominence with head in full extension. TMD less than 6.5 cm was considered difficult laryngoscopy.

On the day of surgery large bore IV line was secured prior to surgery in the preoperative room, once the patient was shifted to the operation theatre, patients were monitored with non-invasive blood pressure, electrocardiogram and pulseoximeter. Patients were anaesthetized using balanced anaesthesia technique i.e., premedicated with IV glycopyrolate 0.005 mg/Kg, IV midazolam 0.05 mg/kg and IV fentanyl 1.5 µgm/kg. After preoxygenation with 100% oxygen for 3 minutes, patients were induced with IV thiopentone 3-5 mg/Kg in titrated doses and endotracheal intubation was accomplished with suxamethonium 1.5 - 2 mg/kg by senior Anaesthesiologists having minimum five years of experience in clinical anaesthesia.

The patient's head and neck were kept in optimal intubating position with a pillow under the occiput during intubation (sniffing position), laryngoscopy was done using appropriate sized Macintosh blade and glottis view was graded according to Cormack and Lehane grading [12].

Grade I: Full view of the glottis
Grade II: Only posterior commissure visible
Grade III: Only tip of epiglottis visible
Grade IV: No glottic structure visible

Patients were intubated with an appropriate sized endotracheal tube. All difficult intubations were done with the help of bougie and BURP maneuver given by the assistant.

Patient's vital signs were monitored throughout the procedure. At the end of surgery patients were adequately reversed with inj. glycopyrrolate 0.01 mg /kg and inj. neostigmine 0.05 mg/ kg. Patients were extubated after through oral suctioning. After stabilization, patients were shifted to the postoperative recovery room.

Result

Distribution of the patients on the basis of airway assessment test is shown in table 1 that shows that there is significant low heart rate before and after intubation. Table 2 shows the incidence of difficult laryngoscopy (Cormack & Lehane's Classification). Table 3 shows the comparison of airway assessment data using modified Mallampati score and thyromental distance that shows MMP, TMD, MMP & TMD combined is significant. Table 4 shows the values of sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV) of MMP, TMD, MMP & TMD combined. Table 5 shows the incidence of assisted intubation along with the different aids used for difficult intubation.

Discussion

Unexpected difficult intubation is a major contributor to anaesthesia related morbidity and mortality. Pre-operative airway assessment is of utmost importance to safeguard against unexpected difficult intubation but which anatomical landmarks and tests are the best predictors still remain debatable. This

justifies the search for a predictive test which has both the ease of applicability and the accuracy of prediction. A pre-operative assessment test should be able to predict maximum number of patients of difficult laryngoscopy correctly at the same time predict easy laryngoscopy correctly. Thus, good pre-operative assessment tests should be highly sensitive and also highly specific. Tests should have a high positive predictive value with few negative predictions [13, 1].

Table 1: Airway assessment test: modified mallampati score and thyromental distance in the study population (n = 400).

MMP Class	Frequency n (%)
I	117 (29.2)
II	203 (50.8)
III	79 (19.8)
IV	1 (0.2)
TMD	**Frequency n (%)**
<6.5 cm	19 (4.8)
>6.5 cm	381 (95.2)

Table 2: Incidence of difficult laryngoscopy (Cormack & Lehane's Classification) (n = 400).

Laryngoscopic View (CL Class)	Frequency n (%)
I	135 (33.8)
II	182 (45.5)
III	81 (20.2)
IV	2 (0.5)

Table 3: Comparison of airway assessment data using modified Mallampati score and thyromental distance(n = 400).

MMP	Laryngoscopic View (CL Class)		Total	*p* value
	Difficult	Easy		
Difficult	46 (55.4%)	34 (10.7%)	80	0.001
Easy	37 (44.6%)	283 (89.3%)	320	
TMD	**Laryngoscopic View (CL Class)**		**Total**	***p* value**
	Difficult	Easy		
<6.5 cm	18 (21.7%)	1 (0.3%)	19	0.001
>6.5 cm	65 (78.3%)	316 (99.7%)	381	
MMP/TMD combined	**Laryngoscopic View (CL Class)**		**Total**	***p* value**
	Difficult	Easy		
Difficult	77 (92.8%)	30 (9.5%)	107	0.001
Easy	6 (7.2%)	287 (90.5%)	293	

Table 5: Incidence of assisted intubation along with the different aids used for difficult intubation (n = 400).

Aid Used	Frequency n (%)
External Laryngeal Manipulation	75 (18.7)
Fiber optic bronchoscope (FOB)	2 (0.5)
Gum elastic bougie (GEB)	23 (5.8)
None	300 (75)
Ease of Intubation	**Frequency n (%)**
Assisted	96 (24)
Easy	304 (96)

Table 4: Values of Sensitivity, Specificity, Positive Predictive Value (PPV), Negative Predictive Value (NPV) of MMP, TMD, MMP& TMD combined.

	MMP	TMD	MMP/ TMD Combined
Sensitivity	55.4	21.7	92.8
Specificity	89.3	99.7	90.5
Accuracy	82.3	83.5	91.0
Positive predictive value	57.5	94.7	72.0
Negative predictive value	88.4	82.9	98.0
Odds ratio	10.35	87.51	122.77
95% CI Sensitivity	50.53-60.27	17.66-25.74	90.27-95.33
95% CI Specificity	86.27-92.33	99.16-100	87.63-93.37

This study aim to find out the effectiveness of some simple airway assessment tests that are easy to perform at the bedside and are less time consuming, so that it can be performed in situations when constrain of time is there and most importantly can predict difficult airway quite accurately. Thyromental Distance Test (TMD) is a measure of the mandibular space, the area bounded by the plane of the line of vision and the part of the mandibular arch in front of this plane. It is an important test for difficult laryngoscopy. It is simple and easy to perform. TMD still remains the simplest popular bedside test [3, 14]. TMD has a wide range of cut off values from 5.5 to 7 cms. TMD less than < 6 cm predicts a difficult airway; 6-6.5 cm indicates less difficult airway and >6.5 cm signifies normal airway [15]. This study, took TMD of 6 cm as the cut off mark.

Mallampati classification based on oropharyngeal structure and first introduced by Mallampati et al. [16] for difficult airway assessment in obstetrics patients and subsequently modified by Samsoon and Young [17] is not widely used for difficult airway assessment for all categories of patients. Although, Mallampati Classification is a standard, it has got many limitations as has been pointed out by many studies [16, 17]. MMP class I and II are easy for laryngoscopy but MMP class III and IV can pose difficulty in viewing the glottis. MMP is noted in all patients with mouth maximally opened with head extended and tongue maximally protruded without phonation. In this posture MMP correlates best with Cormack-Lehane's grading as has been mentioned in certain studies [18, 19].

Cormack-Lehane class I and II signifies easy laryngoscopy whereas Cormack-Lehane class III and IV as difficult [20]. The present study correlated Cormack-Lehane's view during direct laryngoscopy with the finding of the thyromental distance testand modified mallampathi test.

In this study, no significant association was observed between mean age, sex, height and weight of patients to that of the two assessment tests namely TMD and MMP and for incidence of difficult laryngoscopy. This is in contrary to several studies which have shown that male sex, increased age, height and weight were more prone to difficult intubation and where risk factors for difficult intubation [21, 22].

In this study, Grade III Cormack & Lehane was found in 81 (20.2%) patients and Grade IV Cormack & Lehane was found in 2 (0.5%) patients. In remaining 317 patients, laryngoscopy was found easy (Grade I & II). This was in compatibility with many studies [21, 23].

In this study, it was found that Modified Mallampati Test showed a low sensitivity 55.4%, a moderately high specificity of 89.3% with a low positive predictive value of 57.5% and negative predictive value of 88.4% which corroborated with previous studies by Panjiar et al. [24], Rao et al. [25], Srinivasan and Kuppuswamy [26]. The study by Shah et al. [27] and Srinivasan and Kuppuswamy [26] showed that MMP had a specificity of 77.5% and sensitivity of 76.4% with PPV of 23.6%. In another study Basunia et al. [21] found different result where MMP had a high specificity of 93.4%, moderate sensitivity of 62.5% and a PPV of 59.5%.

Enormous variations are seen in other studies, where Safavi et al. [28] had shown a high sensitivity of 87.37% and low specificity of 14.63% with MMP test. Tamire et al. [8] and Yıldırım et al. [29] in their respective studies showed MMP had a high sensitivity of 82.4%, moderate specificity of 66.0% and a very low PPV of 13.0%. A study by Khan et al. [30] had slightly different result of moderate sensitivity 70.2% and specificity 61.0% with very low PPV

19.5%. This variation may be due to significant inter-observer variation with Mallampati test. Khan et al. [30] showed that one critical factor in doing a reliable Mallampati score was maximal extrusion of tongue and opening of the mouth. Failure to employ these manoeuvres is a chief drawback when performing the evaluation [30]. Therefore this can conclude that, MMP test which is an age old test for predicting difficult intubation, definitely has great value in preoperative assessment although some previous studies may contradict.

The sensitivity, specificity, PPV, NPV and diagnostic accuracy of Thyromental Distance (TMD) in this study was good. Sankal et al. [18] showed that TMD had a sensitivity of 55%, specificity of 88% and PPV of 22%, although they used a very low cut off mark for TMD i.e. 4 cm. Another study Vannucci et al. [19] used a cut off of 6 cm, and showed that TMD had high specificity 96.1%, low sensitivity 23.3% and also a low PPV 16.5%. The above findings are corroborate with the present study. Other studies such as Basunia et al. [21] showed a different result. Basunia et al. (2013) study found that TMD has a moderate sensitivity of 65.0%, compared to it, specificity was low 56.1% and PPV was very low 18.5%, which showed different result. Prakash et al. [31] also showed a moderate sensitivity with low specificity and low PPV of TMD, although they used a very high cut off mark of 7 cms.

Other variations are also seen such as Shah et al. (2013) showed high specificity of TMD in their study but that at the cost of very low sensitivity. Such variations as seen may be due to variable cut off marks used for assessing TMD. A wide range of cut off values is quoted for TMD ranging from 5.5 to 7 cms. The cut-off values used in this study are mostly accepted and as recommended in the literature. TMD alone had been advocated as a screening test for predicting difficult laryngoscopy by Patil et al [32]. Thus from our study we can say TMD can also be used as a dependable predicator of difficult airway although variations among opinion are present.

The combination of the two tests was assessed sensitivity improved in comparison to any single test. Sensitivity was highest 92.8%, specificity was also high 90.5%. Diagnostic accuracy was also high 91.0%. Some studies also showed similar results, i.e. sensitivity was higher in the combination of MMP & TMD than the two individual tests [23, 24, 8].So, our study agrees with the previous studies and we may conclude that MMP / TMD in combination is a better predicator of difficult airway than the individual tests.

Ideal test for prediction should have perfect sensitivity and specificity. The present study considered sensitivity the most important parameter as target was to avoid the potentially serious outcome of unanticipated difficult tracheal intubation. Also, the False negative (FN) cases should be minimised which was the case with MMP & TMD combination. Therefore this can conclude that although many other tests are also available, among the two tests chosen for this study, namely MMP and TMD, MMP and TMD does not have huge advantage over one another, both are more or less equally potent in predicting difficult airway, but the combination of these two tests are definitely a much better predicator of difficult airway.

Limitations

This study was concerned only with elective surgical patients, and emergency patients were not considered. Extremes of age and obstetric patients were also excluded. Even though the internal validity in the present study seems to be adequate, it may not be applicable to all subgroups of population.

Conclusions

Combination of Modified Mallampati Test and Thyromental Distance Test is a better option because this has highest sensitivity with no false negative results. From the outcome analysis of this study, it can be also conclude that, both the tests individually are, also equally reliable. The main difference between Modified Mallampati Test and Thyromental Distance Test is that, Thyromental Distance Test can predict a difficult airway more accurately than Modified Mallampati Test, but the latter can rule out the possibility of a difficult airway more reliably than Thyromental Distance Test.

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Original Article

Hepatoprotective Effect of *Andrographis paniculata* (Kalomegh) in Rats

Md. Alamgir Azam[1], Professor Abu Saleh Md. Moosa[2]
Sumona Haque[3], Suraiya Yasmin[4]

Abstract

Introduction: The liver is the largest exocrine gland in our body. It is the vital organ undertaking wide range of functions, such as detoxification, metabolism, storage of iron and vitamins. It is very much important to protect liver in spite of continuous hepatotoxicity. The present study has been carried out with the aim to investigate the hepatoprotective effect of *Andrographis paniculata* (Kalomegh) in paracetamol induced acute toxicity in rat. **Materials and methods:** This study was conducted at the department of Pharmacology, Dhaka Medical College, Dhaka, Bangladesh from July 2014 to June 2015. Seven rats were taken as control while 7 rats were given hepatotoxic dose of paracetamol and 7 were given hepatotoxic dose of paracetamol along with *Andrographis paniculata* (Kalomegh). Serum level of bilirubin, ALT and AST were compared to find out any hepatoprotective effect *Andrographis paniculata*. **Results:** Serum bilirubin level were 0.55 ± 0.09 mg/dl, 3.31 ± 0.53 mg/dl and 0.67±0.27 mg/dl in control group, pretreated paracetamol and pretreated paracetamol with *Andrographis paniculata* group respectively, serum ALT were 18.51 ± 2.00 U/L, 76.74 ± 17.69 U/L and 23.92±5.94 U/L in control group, pretreated paracetamol and pretreated paracetamol with *Andrographis paniculata* group respectively and serum AST were 24.75 ± 3.27 U/L, 69.23 ± 15.18 U/L and 26.01±6.43 U/L in control group, pretreated paracetamol and pretreated paracetamol with *Andrographis paniculata* group respectively which were statistically significant. **Conclusion:** Compiling all results of this study it can be concluded that *Andrographis paniculata* have hepatoprotective activity. These results provide a rationale for the use of *Andrographis paniculata* in the development of new herbal medicine, much needed for the treatment of various liver ailments.

Key words: *Andrographis paniculata*

1. Assistant Professor, Department of Pharmacology, Satkhira Medical College, Satkhira, Bangladesh
2. Professor, Department of Pharmacology, Shah Makhdum Medical College, Rajshahi, Bangladesh
3. Assistant Professor, Department of Pharmacology, Dhaka Dental College, Dhaka, Bangladesh
4. Assistant Professor, Department of Pharmacology, Khulna City Medical College, Khulna, Bangladesh

Address of Correspondence: Dr. Md. Alamgir Azam, Assistant Professor and Head, Department of Pharmacology, Satkhira Medical College, Satkhira, Bangladesh. Email: dr.jewel44@gmail.com

Introduction

The liver is the largest exocrine gland in our body. It is the vital organ undertaking wide range of functions, such as detoxification, protein-fat-carbohydrate metabolism, storage of iron and vitamins. The liver also plays major role in decomposition of RBCs, hormone production, plasma protein synthesis, glycogen storage and synthesis of urea. The organ liver is inevitable for survival and one cannot live without it for long period [1]. Liver is the key organ for detoxification of toxic substance and disposition of endogenous substances [2]. It is continuously and widely exposed to toxins and chemotherapeutic agents that lead to impairment of its functions. All types of injuries to the liver (e.g. circulatory, traumatic, toxic or microbiological) lead to damage of hepatocytes which results in its malfunctioning [3]. Therefore, the disruption of the integrity of

liver function leads to fatal cases or even irreversible organic death. In liver injury, it is supposed that the intervention of free radicals in normal metabolic process is responsible for the pathological changes. Free radicals attack biomolecules and induce lipid peroxidation, enzyme inactivation, and finally cell necrosis [4].

Hepatotoxicity is a growing concern of today's modern society. The World Health Organization (WHO) estimates that 140 million people worldwide suffer from alcohol dependency [5]. The increasing incidence of alcoholism, cigarette smoking, abusing substance and other unhealthy lifestyle options, like eating fatty foods, have contributed to the morbidity and mortality due to liver disease [6]. More than 900 drugs have been implicated in causing liver injury. Chemicals often cause subclinical injury to the liver, which manifests only as abnormal liver enzyme tests. Drug-induced liver injury is responsible for 5% of all hospital admissions and 50% of all acute liver failures [7].

Paracetamol or acetaminophen, chemically named N-acetyl-p-aminophenol (APAP) is generally safe for use at recommended doses [8]. The initial symptoms of overdose are nausea, vomiting, diarrhea and abdominal pain. Acute overdoses of paracetamol can cause potentially fatal kidney, brain and liver damage and, in rare individuals, a normal dose can do the same [9]. In cases of paracetamol overdose, the sulfate and glucuronide pathways become saturated, and more paracetamol is shunted to the cytochrome P450 system to produce NAPQI. As a result, hepatocellular supplies of glutathione become depleted, as the demand for glutathione is higher than its regeneration [10]. NAPQI therefore remains in its toxic form in the liver and reacts with cellular membrane molecules, resulting in widespread hepatocyte damage and death, leading to acute hepatic necrosis [11].

Andrographis paniculata (Kalmegh) is a herbaceous plant, commonly known as "King of Bitters", in the family Acanthaceae. A. paniculata grows erect to a height of 30 – 110 cm with glabrous leaves and white flowers with rose-purple spots on the petals. It grows abundantly in southeastern Asia – India, Pakistan and Indonesia but is cultivated extensively in China, Thailand, the East and West Indies, and Mauritius. Because of its well-known medicinal properties, it is cultivated quite easily. A. paniculata has been used in Asia to treat variety of chronic and infectious diseases. It has been traditionally used as a remedy against diabetes, hypertension, inflammation and cobra bite [12]. *Andrographis paniculata* is used extensively in the Indian traditional system of medicine as a hepatoprotective and hepatostimulative agent. The aqueous extract of the leaves of this plant has traditionally been used for treatment of various liver disorders and jaundice [13]. The hepatoprotective activities include i) inhibiting carbontetrachloride (CCl_4), tert-butylhydroperoxide (t-BHP)-induced hepatic toxicity; ii) acting as cytochrome P450 enzymes (CYPs) inducers; iii) modulating glutathione (GSH) content; iv) influence glutathione S-transferase (GSTP) activity and phosphatidylinositol-3-kinase/Akt (PI3k/Akt) pathway; v) synergistic effect with anti-cancer drugs induced apoptosis contributing to the bioactivities of A. paniculata extracts and isolated bioactive compounds [14]. Due to hepatoprotective property, both N. sativa and A. paniculata have drawn attention of the researchers in recent years.

So, we have done an experiment in rats with the research question of whether there is any difference in hepatoprotective effect of *Andrographis paniculata* in paracetamol induced acute toxicity in rat? Our aim was to find out the hepatoprotective effect of *Andrographis paniculata* in animals.

Materials & Methods

This study was conducted at the department of Pharmacology, Dhaka Medical College from July 2014 to June 2015. Seven rats were taken as control while 7 rats were given hepatotoxic dose of paracetamol and 7 were given both paracetamol and Andrographis paniculata. Serum level of bilirubin, ALT and AST were compared to find out any hepatoprotective effect Andrographis paniculata.

The experiment was carried out on 21 Long Evan Norwegian rats of either sex weighing between 150-200 grams which were collected from icddr,b, Dhaka. The rats were kept in animal house of the Department of Pharmacology, Dhaka Medical College. Rats of different batches of different groups were kept in different metallic cages. Male and female rats were also kept in different metallic cages and were allowed to feed on standard laboratory diet and to drink ad libitum. These rats were acclimatized five days at room temperature and humidity.

The rats were grouped in-

Group A: This group consisted of 7 rats, were served as control. They received normal pelleted diet with water adlibitum for 15 days. On the 16th day 2cc of distilled water was feed orally to each rat through nasogastric tube.

Group B: This group consisted of 7 rats, were fed on normal diet with water adlibitum for 15 days. On the 16th day all the rats were treated with powdered Paracetamol orally at the dose of 2gm/kg body weight dissolved in 2cc distilled water.

Group C: This group consisted of 7 rats, received normal diet with adlibitum along with *Andrographis paniculata* at a dose of 800mg/kg body weight for 15 days. Then on the 16th day, all the rats were treated with powdered paracetamol orally at a dose of 2 gm/kg body weight dissolved in 2cc distilled water.

At the end of the scheduled treatment and after overnight fasting on the 18th day, blood sample was collected from all groups of rat by cardiac puncture and was collected in plain test tube for estimation of serum bilirubin, serum alanine aminotransferase (ALT) and serum aspartate aminotransferase (AST).

Results

We have taken serum bilirubin, ALT and AST as marker of hepatotoxicity. We have compared these markers with control group (Group A), the group given toxic dose of paracetamol (Group B) and the group given *Andrographis paniculata* (Group C).

The comparison of serum bilirubin, ALT and AST between group A and group B is shown in table 1 which shows significant hepatotoxic effect of paracetamol on rats.

Table 2 shows the markers of hepatotoxicity is significantly normal after given toxic dose of paracetamol as well as Andrographis paniculata.

Discussion

In this study, hepatotoxicity was induced by single oral administration of paracetamol at the dose of 2gm/kg body weight. Hepatic damage was assessed by significant rise of serum bilirubin, ALT and AST, which were compared to that of the control group. The elevation of the enzyme levels was found by several studies [15, 16].

A. paniculata was used at a dose of 0.5gm/kg body weight for 15 days. The dose, route of administration and duration was selected according to Choudhury and Poddar [17]. The dose was higher than the study conducted by Nasir et al. [12] who used a daily dose of 100,

200 and 300 mg/kg body weight (orally) of aqueous leaf extract of A. paniculata respectively, for four days.

In the present study, comparison of hepatoprotective effects of A. paniculata was evaluated by estimating the levels of serum bilirubin, ALT and AST. There was evidence of significant prevention in rise of the biochemical parameters pretreated with A. paniculata. Same observation were found by most of the studies reviewed so far [12, 14 and 17].

Comparing the biochemical findings in different groups of experimental animal, it is obvious that toxic effects in the liver produced by paracetamol can be prevented by pretreated A. paniculata.

Conclusion

Compiling all results of this study it can be concluded that Andrographis paniculata have hepatoprotective activity. These results provide a rationale for the use of Andrographis paniculata in the development of new herbal medicine, much needed for the treatment of various liver ailments.

Table 1: Comparison of serum bilirubin, ALT and AST between group A and group B.

Variable	Group	Mean ± SD	*p* value*
Serum bilirubin (mg/dl)	A (Control)	0.55 ± 0.09	<0.001
	B (Paracetamol)	3.31 ± 0.53	
Serum ALT (IU/L)	A (Control)	18.51 ± 2.00	<0.001
	B (Paracetamol)	76.74 ± 17.69	
Serum AST (IU/L)	A (Control)	24.75 ± 3.27	<0.001
	B (Paracetamol)	69.23±15.18	

*Unpaired t-test was done

Table 2: Comparison of serum bilirubin, ALT and AST between group B and group C.

Variable	Group	Mean ± SD	*p* value*
Serum bilirubin (mg/dl)	B (Paracetamol)	3.31 ± 0.53	<0.001
	C (Pretreated AP)	0.67 ± 0.27	
Serum ALT (IU/L)	B (Paracetamol)	76.74 ± 17.69	<0.001
	C (Pretreated AP)	23.92 ± 5.94	
Serum AST (IU/L)	B (Paracetamol)	69.23 ± 15.18	<0.001
	C (Pretreated AP)	26.01 ± 6.43	

*Unpaired t-test was done

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Original Article

Outcome of Hemodialysis on FVC, FEV1 and FEV1/FVC% in Chronic Kidney Disease Stage V Patients

Upama Guha Roy[1], Noor-E- Akhter Mukta[2], Shelina Begum[3]

Abstract

Background: Pulmonary dysfunction has been found in chronic kidney disease (CKD) stage-V patients. Hemodialysis may cause improvement of this pulmonary function. **Objective:** To assess the effects of hemodialysis on FVC, FEV1 and FEV1/FVC% in CKD stage-V patients. **Methods:** This prospective observational study was implemented on 40 male newly diagnosed CKD stage-V patients aged 30-55 years who were advised to take maintenance hemodialysis as part of their treatment, selected from the department of Nephrology, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh. Forty age and BMI matched apparently healthy male were control. The subjects were enrolled by purposive sampling method. To assess FVC, FEV1 and FEV1/FVC% of all subjects were recorded by portable digital spirometer. Spirometry was done in study group before their first hemodialysis session (day 0) and after taking 6 months (180 days) of maintenance hemodialysis. For statistical analysis one way ANOVA, paired and independent sample 't' tests were done, as applicable. **Results:** FVC and FEV1 were found significantly lower in study group than the healthy control. FEV1/FVC% was almost similar to control. FVC and FEV1 were found significantly higher after taking 6 months of maintenance hemodialysis than before their first hemodialysis session. **Conclusion:** Ventilatory function of lung reduced in CKD stage-V patients and it was significantly improved after taking maintenance hemodialysis for six months.

Keywords: Chronic kidney disease (CKD) stage-V, maintenance hemodialysis, FVC, FEV1, FEV1/FVC%.

1. Department of Physiology, Satkhira Medical College, Satkhira, Bangladesh
2. Department of Physiology, Shaheed Ziaur Rahman Medical College, Bogura, Bangladesh
3. Department of Physiology, Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh

Address of Correspondence: Dr. Upama Guha Roy, Assistant Professor, Department of Physiology, Satkhira Medical College, Satkhira, Bangladesh. Email: upamafmc@gmail.com

Introduction

Chronic kidney disease (CKD) is a progressive and irreversible loss of kidney function [1]. CKD is considered a public health problem worldwide and about 50 million people suffering from chronic kidney disease worldwide [2]. CKD is classified in to five stages (stage I-V). In CKD Stage -V GFR is <15 ml/min/1.73 m² which is also known as end stage renal failure. Maintenance hemodialysis is one of the treatment options of CKD stage-V patient [3]. The lung and kidney function are intimately related in both health and diseases. Respiratory changes help to mitigate the systemic effects of renal acid-base disturbances and the reverse is also true [4].

CKD is associated with a variety of respiratory manifestations. These include acute conditions such as acute pulmonary edema, pleural effusion and acute respiratory distress syndrome (ARDS) and chronic effects such as calcification of the lung tissue and the vascular intima and impaired cardiorespiratory system [5]. The toxic effects of uremia on the endothelium of the pulmonary capillaries lead to increased permeability of the pulmonary capillary, leading to edema and increased

resistance in the small airways and alveoli [6].

On the other hand, hemodialysis contributes to alternations in airflow [7] and produces transient changes in pulmonary gas exchange [8]. Dialysis leads to decrease in the water content of the lungs which can lead to reduction of pulmonary edema and small airway obstruction [9]. Hemodialysis can result in better respiratory function [10].

Earlier studies showed that, spirometric parameters in CKD stage-V patients on hemodialysis were significantly improved after hemodialysis [6, 11, 12]. According to the results obtained by Navari et al., dialysis with bicarbonate dialysate causes significant improvement in spirometry parameters in men on maintenance dialysis [6]. Some researchers reported that hemodialysis significantly improve ventilatory function (VC, FEV1) in chronic renal failure patients [12]. On the other hand, some authors have also reported that long term hemodialysis had decreased FVC, FEV1 with normal or increased FEV1/FVC% [11-13].

Although different author of different country reported different results, no published data is available showing effect of hemodialysis on lung function test in Bangladeshi population. So we designed this study to observe the effects of hemodialysis on FVC, FEV1, FEV1/FVC% in (CKD) stage-V patients.

Methods

This prospective analytic study was performed in the Department of Physiology, BSMMU, Dhaka during September 2015 to August 2016, after obtaining approval of Institutional review board of BSMMU. Forty newly diagnosed male patients with CKD stage-V in the age group of 30-55 years were included by purposive sampling from Department of Nephrology, BSMMU. Nephrologist diagnosed the patient based on a thorough clinical evaluation and by eGFR <15 ml/min/1.73 m^2 [3]. These new patients were advised for maintenance hemodialysis. Forty age, sex and BMI matched healthy subjects were taken as control. Control group is considered as Group-A. History of acute or chronic lung & chest wall diseases e.g. asthma, pneumonia, tuberculosis, COPD, bronchiectasis, pneumothorax, malignancy, history of connective tissue diseases, cardiovascular disease, diabetes mellitus, alcohol/tobacco users, smokers and drugs that can damage the lungs e.g. cyclophosphamide were excluded. The goal, benefit and detailed procedure of the study were explained to each subjects and informed written consent was taken from all the subjects. A detailed medical and family history was taken. A thorough clinical examination of all subjects was done and all information was recorded in a prefixed questionnaire. Study group was divided into Group B1 and Group B2. In Group B1, spirometry was done on Day 0 (before first hemodialysis session) and in Group B2, spirometry was done after taking maintenance hemodialysis for 6 months (on Day 180), in same patients. In both Group B1 and B2 data were collected before hemodialysis session. Dialysis was performed alike in all patients complying with the following criteria: constant blood flow 200-250 ml/min, constant dialysate flow 500 ml/min, dialysate type- bicarbonate and duration of hemodialysis 2-4 hours. So, 40 patients of Group B1 were received maintenance hemodialysis (2- 3 times weekly).

FVC, FEV1 and FEV1/FVC% of all the subjects were measured by a digital spirometer (PONY FX, Cosmed, Italy). Spirometry was done in all patients at least half to one hour before hemodialysis session. Data were expressed as mean ± SE of the percentage of predicted value and in frequency percent. Data between Group A, B1 and B2 was compared by one-way ANOVA. Paired sample “t” test was done to compare between Group B1 and B2. Independent

sample "t" test was done to compare lung function parameters between control and study group. The data were statistically analyzed by a computer with Statistical Packages for Social Sciences (SPSS) for windows version 16. The p value of ≤ 0.05 was taken as statistically significant.

Results

There were no significant differences in respect of age and BMI between study group and healthy control (Table I).

Table 1: Age and BMI in different groups (n=80).

Parameters		Control (Group A) (n=40)	CKD stage-V (Study Group) (n=40)
Age (Years)	Mean ± SD (Range)	43.65 ± 0.49 (30-55)	43.32 ± 0.68 (30-55)
BMI (kg/m²)	Mean ± SD (Range)	24.35 ± 0.26 (16.40-27.70)	24.68 ± 0.30 (16.40-27.40)

Statistical analysis was done by Independent sample't' test

The mean percentage of predicted values of FVC and FEV1were significantly lower (p ≤ 0.001) in study group than those of control. The mean percentage of predicted value of FEV1 /FVC% was lower in group B1 and higher in group B2 in comparison to that of group A. But these differences were statistically non significant (Table II-III).

The mean percentage of predicted values of FVC and FEV1 were significantly increased after 6 months (180 days) of their maintenance hemodialysis in comparison to their corresponding first follow up, day 0 (before first hemodialysis session) value (Table II). These increments were highly significant (Table III).

The mean percentage of predicted values of FEV1/FVC % was increased after 6 months (180 days) of their follow up in comparison to their corresponding first follow up (day 0) value (Table II). But this increment was not statistically significant (Table III).

Table 2: Percentage of predicted values of FVC, FEV_1 and FEV_1/FVC% in different groups (n=80).

Groups	FVC	FEV_1	FEV_1/ FVC%
A (n=40)	91.22±1.18 (80-105)	95.65±1.34 (80-109)	102.42±1.14 (85-113)
B1 (n=40)	46.15±1.52 (21-68)	45.72±1.83 (22-79)	101.65±2.25 (68-126)
B2 (n=40)	64.00±1.34 (50-89)	65.47±1.73 (47-92)	102.42±1.46 (75-114)

Table 3: Statistical analysis.

Groups	FVC	FEV_1	FEV_1/ FVC%
A vs B_1 vs B_2^{ξ}	0.001*	0.001*	0.932^{ns}
A vs B_1^{ϕ}	0.001*	0.001*	0.760^{ns}
A vs B_2^{ϕ}	0.001*	0.001*	1.000^{ns}
B_1 vs B_2^{Ω}	0.001*	0.001*	0.774^{ns}

Statistical analysis were done by one way ANOVA$^{\xi}$,Independent sample 't' test$^{\phi}$ and Paired sample 't 'test$^{\Omega}$.
Group A : Control group.
Group B_1: Newly diagnosed CKD stage-V patients before 1st hemodialysis (On day 0).
Group B_2: Patients of Group B_1 receiving 6 months maintenance hemodialysis (On day 180).
*: Significant ($p \leq 0.001$), ns=non-significant.

In this study, all the control subjects had normal lung function on the basis of spirometric results. On the contrary, no study subjects had normal lung function. In study group, before hemodialysis (Group B1), 34 (85%) patients had both restrictive and obstructive disorders and 6 (15%) patients had only restrictive disorder. And after 6 months maintenance hemodialysis (GroupB2), 15 (37.5%) patients had both restrictive and obstructive disorders and 22(55%) had only restrictive disorder (Fig I).

Moreover, among 40 restrictive disorder patients of group B1, 1 (2.5%) were presented with moderate restriction, 15 (37.5%) with moderately severe restriction, 19(47.5%) with severe restriction and 5(12.5%) were with very severe restriction (Fig II).

Again, among 37 restrictive disorder patients of group B2, 6 (16.22%) were presented with mild restriction, 17 (45.94%) with moderate restriction and 14 (37.84%) were with moderately severe restriction (Fig II).

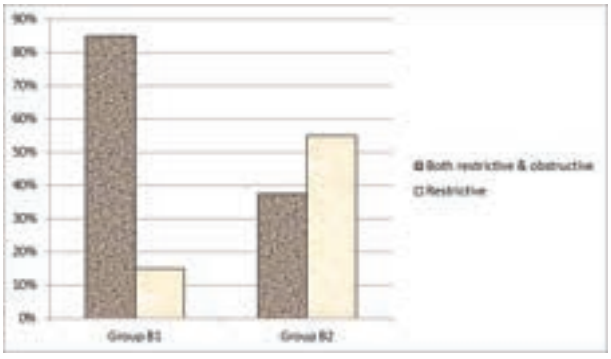

Figure I: Frequency percent of different type of pulmonary disorders in newly diagnosed CKD stage-V patients before their 1st hemodialysis session (Group B_1) and after taking maintenance hemodialysis for 6 months (Group B_2).

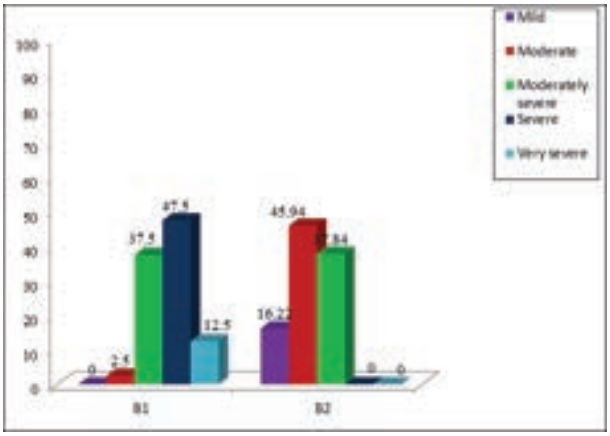

Figure II: Frequency distribution of CKD stage - V patients by the type of restrictive disorders in study groups (Group B_1: before 1st hemodialysis session and Group B_2: after taking 6 months of maintenance hemodialysis).

Discussion

The present study had been undertaken to observe the effect of maintenance hemodialysis on pulmonary functions in newly diagnosed male CKD stage-V patients. In this study, values of all study variables of the healthy subjects were within physiological limit and were almost similar to those reported by different investigators [8, 9, 14].

The mean percentage of predicted values of FVC and FEV1 were significantly lower in study group than those of control. Almost similar findings were reported by other investigators [8, 15]. FEV1 /FVC% was lower in group B1 and higher in group B2 in comparison to that of group A, but these differences were statistically non significant. Similar finding was reported by an investigator [8].

FVC and FEV1 values were significantly improved after taking 6 months of maintenance hemodialysis. But FEV1/FVC% was non-significant after taking 6 months of maintenance hemodialysis when compared to newly diagnosed CKD stage V patients. Whereas several investigators reported that these values was significantly improved in post dialysis period than pre dialysis period in those patients who received 6 months maintenance hemodialysis [16-18].

Several investigators of different countries have suggested different mechanisms for pulmonary involvement in this specific group of patients [7-18]. Several studies showed that most common cause of decrement of ventilatory variables in CKD stage-V patients may be due to pulmonary edema, pleural effusion, intravascular and interstitial volume overload, pulmonary hypertension, decrease respiratory muscle strength, anemia, uremic toxins, electrolyte disorders and/or acid base imbalance. Pulmonary dysfunction also may be the direct consequence of circulating uremic toxin. These changes cause altered physiological and mechanical function of the lungs and subsequently increase in airway resistance [6, 9].

These pulmonary dysfunctions may improve or resolve after hemodialysis. Hemodialysis

improves lung function as a result of removal of excess fluid, better diffusing capacity of lungs and increase in ventilation of basal lung area [11].

In this study, all patients had abnormal lung functions. In addition, 34 (85%) and 15 (37.5%) patients had both restrictive and obstructive disorders before 1st hemodialysis session and after taking 6 months maintenance hemodialysis respectively. 6 (15%) and 22 (55%) patients had only restrictive disorder before 1st hemodialysis session and after taking 6 months maintenance hemodialysis respectively. These results showed that after maintenance hemodialysis obstructive disorder was improved in CKD stage-V patients. Also, after taking maintenance hemodialysis the severity of restrictive pulmonary disorder is improved. Receiving 6 months maintenance hemodialysis, no patients had severe or very severe restrictive pulmonary disorder in comparison to newly diagnosed CKD stage-V patients. Research evidences showed that this improvement may be due to removal of excess fluid around the airways by hemodialysis [19].

Conclusion

Lung functions were decreased in newly diagnosed CKD stage-V patients and these functions were improved after taking six months of maintenance hemodialysis. Restrictive type of pulmonary disorder was more pronounced in CKD stage-V patients and hemodialysis improved the severity of restrictive type of pulmonary disorder.

Acknowledgement

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Conflict of interest: None.

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Original Article

Comparison of Post-operative Pain in Tonsillectomy Done by Bipolar Diathermy and Cold Steel Dissection Method

Md. Hasanuzzaman[1], Professor Kamrul Hasan Tarafder[2], Narayan Proshad Sanyal[3], G. M. Faruquzzaman[4]

Abstract

Introduction: Tonsillectomy is the single most common operation performed in Ear, Nose and Throat Department. Various methods of tonsillectomy have been practiced over the century aimed at reducing or eliminating intraoperative and postoperative morbidity. Common post-operative complications are bleeding and pain. **Objectives:** To compare the result of bipolar diathermy assisted tonsillectomy with those of cold steel blunt dissection technique with regards to post-operative pain. **Methods:** This was a prospective comparative study conducted in 60 patients admitted into the department of Otolaryngology and Head-Neck Surgery, BSMMU, Dhaka over the period of March 2012 to August 2012, diagnosed as recurrent tonsillitis or obstructive tonsils. **Results:** Post-operative pain (Visual Analogue Scale-VAS) within 24 hours, for bipolar diathermy group was 4.34 compared with 2.95 for dissection group. There was no significant difference as far as early pain scores (pain within 24 hours) were concerned among two groups. However patients in group A (Bipolar diathermy) had significant higher pain scores than group B (Cold steel blunt dissection) on 7th and 14th post-operative day as evident by p value <0.05. During follow up period, no other major or minor complications occurred in our study. **Conclusion:** This study revealed that tonsillectomy done by bipolar diathermy was associated with less pain in early post-operative period and quick return to normal diet and daily activity.

Keywords: Tonsillectomy, bipolar diathermy method, cold steel dissection method.

1. Registrar, Department of ENT, Satkhira Medical College Hospital, Satkhira, Bangladesh
2. Professor, Department of ENT, Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh
3. Associate Professor, Department of ENT, Satkhira Medical College, Satkhira, Bangladesh
4. Assistant Professor, Department of ENT, Satkhira Medical College, Satkhira, Bangladesh

Address of Correspondence: Dr. Md. Hasanuzzaman, Registrar, Department of ENT, Satkhira Medical College Hospital, Satkhira, Bangladesh. Email: hasanuzzaman81bd@gmail.com

Introduction

Tonsillectomy is the surgical procedure to remove the tonsils from tonsillar fossa. It is recommended in patients with repeated attacks of acute tonsillitis (7 or more attacks in one year, 5 or more episodes in previous two years), peritonsillar abscess, obsructed tonsil causes sleep apnea syndrome and suspicion of malignancy in unilateral hypertrophy of tonsil [1, 2]. Under general anesthesia extra capsular or the standard tonsillectomy is performed involving removal of tonsils along with capsule. Ligature or diathermy is used to secure haemostasis [3]. The peroprative and post-operative hemorrhage as well as severe post-operative pain resulting in odynophagia are the most important complications of tonsillectomy. Ear pain, dehydration due to poor intake, fever and airway obstruction may arise as a postoperative complication [4].

Cold steel dissection, monopolar and bipolar electrocautry, KTP laser, ultrasonic dissector coagulator, coblation and thermal welding have been described for various procedures of tonsillectomy. There remains debate as to the

optimal method with the least patient morbidity. Two of the most common dissection techniques in the United States and even in Bangladesh are cold dissection and electrocautry dissection. Since 1930 electrocautery has been used as common practice during tonsillectomy. Electrocautry usage became common with general inhalation anesthesia after the advent of non-explosive mixtures [5].

The most important potential complications of tonsillectomy are bleeding and pain. The operating surgeon may be more concerned about bleeding but for the patient pain is likely to be the most important issue.

This study was undertaken in an attempt to compare the techniques of bipolar electrocautery and cold steel dissection tonsillectomy. Details about post-operative pain was sought by Visual Analogue Scale-VAS. We hypothesized that, tonsillectomy done by bipolar diathermy has relatively less post-operative pain in comparison with that done by cold steel blunt dissection method.

Methods

This was a prospective comparative study conducted in 60 patients admitted into the department of Otolaryngology and Head-Neck Surgery, BSMMU, Dhaka over the period of March 2012 to August 2012, diagnosed as recurrent tonsillitis or obstructive tonsils. Thirty patients undergone tonsillectomy by bipolar diathermy who were grouped into group A and 30 patients undergone tonsillectomy by cold steel dissection method and were grouped into group B. All the data were checked and edited after collection. Then the data were entered into computer and statistical analyses of the results were obtained by using window based computer software devised with Statistical Packages for Social Sciences (SPSS-22). The results were presented in tables and figures. In each group, calculation for the continuous variables (mean, standard deviation, no of observations), frequency were calculated in percentage (%). Statistical significance was set at $p<0.05$ and confidence interval was set at 95% level.

Results

Age and sex distribution of the patients are shown in table 1 which shows that, the distribution is not statistically significant. Comparison of post-operative pain between two groups are shown in table 2 which shows except pain in 24 hour, pain in 7th and 14th POD is significantly less in group A (bipolar diathermy group).

Discussion

Tonsillectomy is the most frequently operative procedure performed in Otolaryngolog. Cold steel blunt dissection technique is still considered a most common and standard method of tonsillectomy. Before going to perform any other tonsillectomy one has to be master in cold steel method. Now, in Bangladesh using of bipolar diathermy day by day is increasing. Though the sample size of this study is small, will give some ideas about the application of bipolar diathermy in tonsillectomy. Various methods have been described which are frequently compared and discussed in otolaryngology literature [9]. Cold steel blunt dissection tonsillectomy is usually preferred because the healing is more rapid and post-operative pain less than other techniques [10-13]. Those who are studied various method of tonsillectomy, usually they have compared to the standard blunt dissection technique. The value of a new technique must be judged by the results concerning intra-operative and postoperative morbidity and complications. The most common postoperative concerns following tonsillectomy are hemorrhage and pain. Post-operative pain is the most significant subjective symptoms as far as patient is concerned.

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

Variable		Group A (n=30)	Group B (n=30)	*p* value*
Age (Years) (Mean ± SD)		18.78 ± 6.57	16.54 ± 5.74	0.168
Sex	Male n (%)	21 (70)	19 (63.3)	> 0.05
	Female n (%)	9 (30)	11 (36.7)	

Unpaired Student's 't' test was performed to compare between groups.

Table 2: Comparison of post-operative pain between two groups (n=60).

Variable		Group A (n=30) Mean ± SD	Group B (n=30) Mean ± SD	*p* value*
Pain on	24 hour	4.34 ± 1.21	2.95 ± 0.92	0.165ns
	7th POD	2.91 ± 0.67	2.14 ± 0.51	<0.001*
	14th POD	1.44 ± 0.78	0.32 ± 0.39	<0.001*

Unpaired Student's 't' test was performed to compare between groups.

In the present study, the self-paired comparison between cold steel blunt dissection and bipolar diathermy techniques reduced bias and increased precision of the study. Factors influencing the outcomes might not be equal in unpaired groups, such as age, tonsil size and degree of infection, concomitant medication and surgical indication. The mean age was 18.78 years for bipolar diathermy group and 16.54 years for cold steel blunt dissection group (Table 1). The mean difference of age is not statistically significant. Incidence in male is more in both. No significant difference was seen in sex distribution between two groups. Ahmed et al. [14] showed the mean age of the patients 15.8 years (SD = 9.4 years) ranging from 4-49 years. Of these 200, 111 (55.5%) were male and 89 (44.5%) were female.

In present study pain (VAS) within 24 hours, for bipolar diathermy group was 4.34 compared with 2.95 for dissection group (Table 2). There was no significant difference as far as early pain scores (pain within 24 hours) were concerned among two groups. However patients in bipolar diathermy had significant higher pain scores than cold steel blunt dissection on 7th and 14th post-operative day as evident by p value <0.05. Pain is the most common problem after tonsillectomy. Nunez et al. (2000) reported that pain is the main reason for seeking outpatient medical attention in the first 2 weeks after tonsillectomy [15]. We found that although immediate pain was not significant in two groups but late post-operative pain was significantly more in patients who underwent tonsillectomy with bipolar electrocautry dissection method. The same result was documented by Robert et al. (2003) who did a systemic review of literature comparing cold versus hot tonsillectomies techniques [16]. The main reason for this difference in pain score is because of more thermal damage caused during bipolar diathermy dissection procedure.

Conclusion

From the above study it could be concluded that, bipolar diathermy method of tonsillectomy is an effective safe and rapid method with obvious advantages of significant early post-operative pain when compared with cold steel dissection method.

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Original Article

Effect of Lacto-vegetarian Diet on Fasting Blood Glucose and Lipid Levels

Momena Khatun Munna[1], Saiful Islam[2], Md. Mijanur Rahman Sardar[3], Taslima Zannat[4], Sumona Tanu[5]

Abstract

Background: Regulation of blood lipid levels within narrow range is necessary because high blood lipid levels is associated with increased risk of atherosclerosis, ischemic heart disease, cerebro-vascular disease, peripheral vascular disease etc. Vegetarians have lower incidence of non-communicable disease. Majority of the vegetarians of Bangladesh are semi-vegetarian who consume lacto-vegetarian diet instead of strict vegetarian diet. But there is limited data available about the effect of lacto-vegetarian diet on fasting blood glucose and lipid levels. **Objectives:** To verify the effect of lacto-vegetarian diet on fasting blood glucose and lipid levels. **Methods:** This study was performed in the department of Physiology in collaboration with the department of Biochemistry at Rajshahi Medical College, Rajshahi, Bangladesh from July 2014 to June 2015. It was a cross sectional and comparative study which was carried out in a sample of 50 healthy adults, out of them 25 were vegetarians, 25 were age and gender matched non-vegetarians in the age group of 18-45 years. Age, height, weight and blood pressure were recorded and food habits of the study subjects were obtained using a questionnaire. Fasting blood glucose and lipid levels were measured by colorimeter. Unpaired t-test was used for statistical analysis. p-value less than 0.05 was considered as significant. **Results:** The mean HDL-C was significantly increased and LDL-C were significantly decreased in the vegetarians. Moreover TC and HDL-C ratio were significantly decreased in vegetarians than non-vegetarians. However total cholesterol and triglyceride levels did not show any significant difference between vegetarians and non-vegetarians. Fasting blood glucose was also significantly decreased in vegetarians than non-vegetarians. **Conclusion:** Lacto-vegetarian diet had no significant effect on total cholesterol level but significantly increased HDL-C level as well as significantly reduced LDL-C level. The study indicates that the TC and HDL-C ratio is more important than the absolute TC concentration to assess the disease risk. In addition, the study reveals that lacto-vegetarian diet improves blood glucose homeostasis for longer period. However vegetarian diet did not affect the triglyceride levels due to large intake of carbohydrate as main food.

Keywords: Vegetarians, non-vegetarians, cholesterol, triglyceride, blood glucose.

1. Associate Professor, Department of Physiology, Rajshahi Medical College, Rajshahi, Bangladesh
2. Assistant Professor, Department of Ophthalmology, Rajshahi Medical College, Rajshahi, Bangladesh
3. Associate Professor, Department of Physiology. Khulna Medical College, Khulna, Bangladesh
4. Assistant Register, Department of Paediatrics, Shaheed M Monsur Ali Medical College, Sirajganj, Bangladesh
5. Assistant Professor, Department of Physiology, Sylhet MAG Osmani Medical College, Sylhet, Bangladesh

Address of Correspondence: Dr. Momena Khatun Munna, Associate Professor, Department of Physiology, Rajshahi Medical College, Rajshahi, Bangladesh. Email: munna37rmc@gmail.com

Introduction

High cholesterol level is a risk factor for atherosclerosis, ischemic heart disease, cerebro-vascular disease, peripheral vascular disease, Alzheimer's disease etc. Decrease HDL-c and increase LDL-C is related to increase cardiovascular risk. Vegetarian diet is rich in saturated fat which increases chance of obesity, Hypertension, Cardiovascular disease and high blood cholesterol levels [1].

Zhang et al. (2013) have found no significant difference in total cholesterol concentration between vegetarians and non-vegetarians [2]. On contrary, Chen et al. (2011) and Dourado et al. (2011) have observed significantly higher TC level in non-vegetarians [3, 4]. In addition, Verma et al. (2015) and Kuchta et al. (2015) have found no significant difference in HDL-C level between vegetarians and non-vegetarians [5, 6]. But Chiu et al. (2015) have found significantly higher HDL-C level in vegetarians [7]. On contrary, Zhang et al. (2013) have found significantly lower HDL-C level in vegetarians [2]. Additionally, Verma et al. (2015) have found no significant difference in LDL-C level between vegetarians and non-vegetarians [5]. In contrast, Jian et al. (2014) have found significantly lower level of LDL-C in vegetarians [8]. Moreover Verma et al. (2015) have found no significant difference in TG level between vegetarians and non-vegetarians [5]. But Chiu et al. (2015) have found significantly higher TG level and De Biase et al. (2005) have found significantly lower TG levels among vegetarians in comparison to non-vegetarians [7, 9].

So the findings of the above mentioned studies are not conclusive regarding the effect of vegetarian diet on blood lipid levels. Saintila et al. (2021) found that vegetarians had better anthropometric profile [10]. However limited information is available regarding the influence of lacto-vegetarian diet on blood lipid levels which is the usual dietary habit of vegetarians of Bangladesh. As a result, the present study has been designed to determine the effect of lacto-vegetarian diet on lipid levels in healthy adults.

Methods

This study was performed in the department of Physiology in collaboration with the department of Biochemistry at Rajshahi Medical College from July 2014 to June 2015. The cross sectional and comparative study was carried out in a sample of 50 healthy adults, out of them 25 were vegetarians, 25 were age and gender matched non-vegetarians in the age group of 18-45 years. The protocol of the study was approved by the ethical review committee of Rajshahi Medical College. Inclusion criteria for the lacto-vegetarians were healthy and well-nourished adults, age between 18-45 years of both genders who consumed lacto-vegetarian diet for at least more than 6 months. Snow ball sampling was used to find out the lacto-vegetarians. Known case of hyperlipidemia, persons taking anti hyper-lipidemic drugs or oral contraceptive pills, known case of any vascular disease, Diabetes mellitus or any endocrine disease, known case of hypertension and any chronic illness, Pregnancy, Alcoholics and Smokers were excluded from the study. Age, height, weight and blood pressure were recorded and food habits of the subjects were obtained using a structured questionnaire. After taking informed consent, complete history taking and physical examination were done and recorded in a preformed data sheet. Following an overnight fasting (10-12 hours), 3 ml of venous blood samples were drawn into test tubes (from the antecubital space of the forearm) by venipuncture after taking all aseptic precautions. After coagulation, serum was separated by centrifugation at 3000 rpm for 10 minutes. Then serum was utilized for estimation of fasting blood glucose

and lipid profile. Fasting blood glucose and lipid profile were estimated by using colorimeter. Data was analyzed by computer using SPSS software program. The test of significance was calculated by using unpaired student-t test. P value less than 0.05 was considered as significant.

Results

Comparison of general characteristics of vegetarians and non-vegetarians age (years), weight (kg), height (meter), BMI (kg/m²), pulse (beats/min), systolic blood pressure (mm of Hg) and diastolic blood pressure (mm of Hg) showed no significant difference (Table I).

Fasting blood glucose concentration in healthy adult non-vegetarian group were significantly higher than the vegetarian group (Table 2).

Fasting serum total cholesterol concentration in healthy adult vegetarian group showed non-significantly lower level than the non-vegetarian group. Fasting serum HDL-C concentration in healthy adult vegetarian group were significantly higher than the non-vegetarian group. Fasting serum LDL-C concentration in healthy adult vegetarian group were significantly lower than the non-vegetarian group. Fasting serum TC and HDL-C concentration ratio in healthy adult vegetarian group were significantly lower than the non-vegetarian group. Fasting triglyceride level had no significant difference between the adult vegetarian and non-vegetarian group (Table 3).

Discussion

Increased blood lipid levels is associated with increase chance of non-communicable disease. Blood lipid level is modified by multiple factors like lifestyle, level of metabolism, total calorie intake, carbohydrate intake, type of dietary fat, dietary fibers intake and its solubility, anti-oxidants and minerals. Non vegetarians have higher incidence of heart disease, hypertension, diabetes mellitus and cancer. So it is possible that dietary habit is related to disease process [1]. As a result, the objective of the present study was to compare the lipid profile status between vegetarian and non-vegetarian and to identify the impact of diet on health risk.

The study has been conducted on 25 vegetarian and 25 non-vegetarian healthy adults after careful matching of age, gender, and BMI and life style factors. Snow ball sampling technique was used to select each study subject because study population was rare. Only lacto-vegetarians were included in the study because it is the usual dietary habit of vegetarians of our country. The aim of the study was to evaluate the impact of long term intake of lacto-vegetarian diet on lipid profile status. Fasting blood glucose was measured by colorimeter to exclude any metabolic disorder. Lipid profile status was measured after overnight fasting because consumption of food transiently increases TG level which may cause misinterpretation of the findings. Lipid profile was measured using colorimetric method because it was readily available.

We have found fasting blood glucose levels were significantly reduced in vegetarians in comparison to non-vegetarians. This observation coincides with Nivedita et al. (2012) [11]. It may be due to the fact that vegetarian diet is rich in dietary fibers which are a low glycemic index food. In the present study, we have observed that even after overnight fasting, fasting blood glucose level was significantly lower in vegetarians in comparison to non-vegetarians. It indicates that vegetarian diet is rich in dietary fibers which delays absorption of glucose, thereby prevents sustained rise of blood glucose.

Table I: General characteristics of the study subjects (n=50).

Parameter	Vegetarian (n = 25)	Non-vegetarian (n = 25)	*p* value
Age	33.68 ± 9.05	33.92 ± 9.04	>0.05^{NS}
Weight	62.76 ± 9.34	63.72 ± 9.79	>0.05^{NS}
Height	1.60 ± 0.07	1.61 ± 0.06	>0.05^{NS}
BMI	24.39 ± 3.65	24.40 ± 3.54	>0.05^{NS}
Waist/Hip ratio	0.86 ± 0.05	0.86 ±0.05	0.05^{S}
Waist/Height ratio	0.51 ± 0.06	0.51 ± 0.06	>0.05^{NS}
Pulse	79.68 ± 4.71	76.60 ± 4.22	>0.05^{NS}
Systolic BP	120.0 ± 9.46	114.8 ± 7.56	>0.05^{NS}
Diastolic BP	76.2 ± 5.05	74.2 ± 5.71	>0.05^{NS}

Data were expressed as mean ± SD
Significance level was calculated using unpaired t-test
p value at or below 0.05 considered as significant
NS = not significant
S = significant

Table 2 : Fasting blood Glucose concentration in healthy adult vegetarian group and non-vegetarian group (n = 50).

Parameter	Vegetarian (n = 25)	Non-vegetarian (n = 25)	*p* value
Fasting blood sugar (mmol/L)	4.76 ± 0.21	5.30 ± 0.41	<0.05^{S}
Range (Min-Max)	(4.5-5.3)	(4.5-6.0)	

Data were expressed as mean ± SD
Significance level was calculated using unpaired t-test
p value at or below 0.05 considered as significant
S = significant

Table 3: Fasting serum total cholesterol, HDL-C, LDL-C, Total cholesterol and HDL-C ratio in healthy adult vegetarian group and non-vegetarian group (n = 50).

Parameter	Vegetarian (n = 25)	Non-vegetarian (n = 25)	*p* value
Total cholesterol (mmol/l)	3.50 ± 0.76	3.76±0.41	>0.05^{NS}
Range (Min-Max)	2.3-5.4	3.1-4.5	
HDL-C (mmol/l)	0.93 ± 0.14	0.76±0.24	<0.05^{S}
Range (Min-Max)	0.6-1.2	0.4-1.4	
LDL-C (mmol/l)	2.05 ± 0.68	2.40 ±0.48	<0.05^{S}
Range (Min-Max)	0.8-3.6	1.6-3.2	
Total cholesterol and HDL-C ratio	3.89 ±1 .0	5.36±1.79	<0.05^{S}
Range (Min-Max)	1.9-5.9	3.0-8.4	
Triglyceride (mmol/L)	1.26 ± 0.43	1.33±0.41	>0.05^{NS}
Range (Min-Max)	0.76-2.4	0.40-2.7	

Data were expressed as mean ± SD
Significance level was calculated using unpaired t-test
p value at or below 0.05 considered as significant
NS = not significant
S = significant

We have found non-significantly lower total cholesterol level among vegetarians than non-vegetarians. This finding is consistent with Chiu et al. (2015) and Jian et al. (2014) [7, 8]. It may be due to the fact that cholesterol have both exogenous and endogenous source. So not only dietary factor affects total cholesterol level but also endogenous production affects TC level. Total cholesterol level have different subcomponent including HDL-C and LDL-C level. It is possible that subcomponent concentration is different in spite of same TC level. So the relation between TC and HDL-C level is more important to determine the disease risk instead of absolute TC concentration. Furthermore it is possible that total fat intake of our both groups were similar because our vegetarians consumed vegetable oil and dairy products and had easy access to sugar. In contrast, our finding contradicts with Chen et al. (2011), Dourado et al. (2011) and Gandhi et al. (2014) [3, 4, 12]. Gandhi et al. (2014) included only strict vegans in vegetarian group [12]. On contrary, Chen et al. (2011) and Dourado et al. (2011) included only lacto-ovo-vegetarians in vegetarian group [3, 4]. So the type of their food intake was different from ours which may explain the reason of variation of finding. It indicates that multiple subdivisions of dietary habit should be evaluated to determine the influence of each specific food on lipid profile.

We have found HDL-C level were higher in vegans than non-vegetarians which coincides with Chiu et al. (2015) [7]. It may be due to the fact that the vegetarian diet is rich in poly-unsaturated fatty acid (PUFA) which increases HDL-C level. Anti-oxidants are higher in vegetarian diet which increases HDL-C level. Furthermore, dietary fibers of vegetarian diet inhibit cholesterol absorption but not necessarily phospholipid and Apo-protein, thereby increases HDL-C concentration.

We have found LDL-C level were significantly lower in vegetarians than non-vegetarians which is in agreement with Chiu et al. (2015) and Jian et al. (2014) [7, 8]. It may be due to the fact that vegetarian diet contains lower saturated fat which decreases LDL-C level. Moreover, dietary fibers inhibits cholesterol absorption, thereby decreases LDL-C level in vegetarians. Furthermore, it is possible that greater intake of antioxidants by the vegetarians cause reduction of LDL-C level.

We have found TC and HDL-C ratio were higher in non-vegetarians than vegetarians which correlates with Zhang et al. (2013) [2].. This finding proves that vegetarians have better blood lipid level for healthy living than non-vegetarians. It also indicates that the absolute cholesterol concentration is less important than the relationship of total cholesterol with its subcomponents to determine health risk.

We have found no significant difference of triglyceride level between vegetarians and non-vegetarians. This finding is compatible with Verma et al. (2015) [5]. It may be due to the fact that carbohydrate was the main food intake by the both vegetarian and non-vegetarian groups. On the other hand, Gandhi et al. (2014) have opined that vegetarians had lower TG level than non-vegetarians [12]. However they have included only strict vegetarians in vegetarian group. On contrary, we have included lacto-vegetarians in vegetarian group which may be the reason of the different findings.

One of the strength of our study is that we have included only healthy adults in our study after careful matching of age, gender, BMI and life style factors. Moreover, we have included lacto-vegetarians in vegetarian group which is the dietary habit of majority of Bangladeshi vegetarians. One of the weakness of our study is that we have done a cross-sectional study on

small sample size of lactovegetarians. As a result, multiple subdivisions of dietary habit should be compared to establish the influence of specific food on lipid profile. In addition, poly-unsaturated fatty acid level, lipid peroxide level as well as anti-oxidants levels should be measured in relation to lipid profile status.

Conclusion

Present study proves that vegetarian diet is cardio-protective because it increases HDL-C but decreases LDL-C. Moreover it proves that the relationship among different sub-components of total cholesterol is more important indicator to determine disease risk than absolute total cholesterol concentration. Furthermore the study proves that vegetarian diet does not significantly reduce the triglyceride level as long as carbohydrate intake is high. Consequently vegetarian diet may be recommended for at risk group like obesity, positive family history of hyperlipidemia, atherosclerosis, ischemic heart disease, cerebrovascular disease, peripheral vascular disease etc. However multiple subdivisions of vegetarians should be compared to determine the contribution of each specific food on lipid profile.

Conflict of interest: None.

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Original Article

Evaluation of the Results of Proximal Femoral Locking Compression Plate for the Treatment of Comminuted Trochanteric and Subtrochanteric Femoral Fractures in Lateral Decubitus Approach without Peroperative Image Intensifier at District Level

Probir Kumar Das[1], Md. Enamul Hafiz[2], Md. Selim Reza[3], Md. Mahamudul Hasan[4], Md. Hafizullah[5], Fakhrul Alam[6], GM Alamgir Kabir[7], Md. Mehedi Hasan[8], Bhabotosh Kumar Mondal[9]

Abstract

Introduction: The Comminuted trochanteric and subtrochanteric femoral fractures are considered as one of the most difficult fractures to treat in the orthopaedic surgery and they associated with high incidence of nonunion, malunion. Various implants, both intramedullary and extramedullary, are available for their fixation. **Objective:** To assess the success rate of proximal femoral locking compression plate osteosynthesis in comminuted trochanteric and subtrochanteric femoral fracture in lateral decubitus approach without per operative image intensifier. **Methods:** Twenty consecutive patients with comminuted Trochanteric and subtrochanteric fractures were operated upon with PF-LCP. Detailed clinical conditions of all patients, duration of operation, technical difficulty with the implant, hospital stay period were recorded. Patients were visited at 6 weeks interval till union then 3 monthly. The Harris Hip Score was used to document hip function at final follow-up. **Results:** There were fifteen excellent (75%), two good (10%), two fair (10%) and one poor (5%) results according to Harris hip score. No instance of implant failure was recorded. **Conclusion:** Fixation of comminuted subtrochanteric fractures with PF-LCP in lateral decubitus approach without per operative image intensifier provides stable fixation with high union rate and fewer complications.

Keywords: Proximal femoral locking compression plate, femoral comminuted trochanteric and subtrochanteric fracture, plate osteosynthesis, lateral decubitus approach, per operative image intensifier

1. Assistant Professor, Department of Orthopedics, Satkhira Medical College, Satkhira, Bangladesh
2. Assistant Professor, Department of Orthopedics, Satkhira Medical College, Satkhira, Bangladesh
3. Senior Consultant (Orthopedics), Satkhira Medical College Hospital, Satkhira, Bangladesh
4. Junior Consultant (Orthopedics), Satkhira Medical College Hospital, Satkhira, Bangladesh
5. Junior Consultant (Orthopedics), Satkhira District Hospital, Satkhira Bangladesh
6. Junior Consultant (Orthopedics), Upazila Health Complex, Ashashuni, Satkhira Bangladesh
7. Resident (Orthopedics), Dhaka Medical College Hospital, Dhaka, Bangladesh
8. Assistant Surgeon, Upazila Health Complex, Debhata, Satkhira, Bangladesh
9. Resident (Orthopedics), NITOR, Dhaka, Bangladesh

Address of Correspondence: Dr. Probir Kumar Das, Assistant Professor & Head, Department of Orthopedics, Satkhira Medical College, Satkhira, Bangladesh. Email: drprobirkumardas992@gmail.com

Introduction

Trochanteric and subtrochanteric femoral fractures account for 10% to 34% of all hip fractures. They have a bimodal age distribution and different mechanism of injury. Older patients typically sustain low-velocity trauma, where as in younger patients these fractures commonly result from high-energy trauma and often are associated with other fractures and injuries [1].

Comminuted Trochanteric and subtrochanteric femoral fractures are high-energy injuries in adults. In the proximal part of the femur the medial cortex is subjected to compressive loads and the lateral cortex to tensile forces during weight bearing. Comminution of medial cortex may lead difficulty in anatomic reconstruction of this area. The blood supply of the comminuted fragments may be compromised in subtrochanteric region with predominantly cortical bone which has less healing capacity than metaphyseal region. Therefore, one should consider the biomechanics of mechanism of injury and preoperative plan for stability based on those assumptions [2].

The management of these fractures is challenging for 2 reasons: (1) the inherent instability of the fracture pattern and (2) the forces of the muscles acting on the proximal and distal fragments. Fracture patterns at the subtrochanteric level are typically transverse or run obliquely in an inferolateral direction from the lesser trochanter. Thus, the fracture line runs parallel to the direction of movement of the lag screw in a sliding hip screw (SHS) implant, rendering this implant ineffective. Often, the medial calcar is comminuted, giving the fracture a tendency to collapse into varus. Medial comminution and the strong pull of the adductor musculature promote medialization of the shaft. The powerful abductor and iliopsoas muscles insert on the proximal fragment and force it into abduction, flexion, and external rotation. This makes closed reduction of this fracture difficult and pushes the proximal fragment into a malreduced position [3].

Over the last few years, there has been a shift in the principles of management of these fractures from rigid anatomic reduction to relative biological fixation which preserves the vascularity of bone fragments and enhances their callus-forming abilities. Biological fixation, in comparison to traditional open plating, has produced good results for these fractures [4].

The proposed three requirements for an ideal internal fixation for pertrochanteric fracture: 1)femoral neck screw with at least three dimensional structures of the fixed system; 2) minimal angle between the femoral neck screw axis and the femoral shaft and thus maximum alignment between the angle of normal hip joint weight-bearing line and the femoral graft axis and 3) ability of the implant to prevent the rotation of the femoral head. Unfortunately, none of the currently used devices can fully meet these three criteria. Future studies should be conducted to determine the optimal implant for the internal fixation of pertrochanteric fractures that can maximally meet the three criteria described above [5].

Methods

This is a prospective interventional study (Quasi experimental type) done From December 2018 to December 2019 at department of Orthopaedic Surgery, Satkhira Medical College Hospital, Satkhira, Bangladesh and some private Hospitals in Satkhira District. All patients with clinical and radiological evidence of comminuted trochanteric and subtrochanteric fracture admitted in hospitals for operation within three weeks of incidence. Active or latent infection, pathological fracture other

than osteoporotic fracture, open fracture, non-united fracture were excluded from the study. Surgery was performed with the patient in lateral position in a normal operating table (not in a fracture table). Length restoration and fracture reduction was done by open method. A lateral approach typically is performed by a straight incision from the greater trochanter, extending approximately 10 cm distally. The proximal fragment is first fixed to the plate, and the plate is then reduced to the femoral shaft. After ensuring perfect anatomic placement of the plate to the proximal fragment, a 2.5-mm drill tip guide wire is inserted through a wire sleeve that is threaded to the most proximal hole at a predetermined 95° angle. A second guide wire is then inserted through the drill sleeve of the second hole in a 120° angle. Finally, a third guide wire is inserted through the sleeve on the third hole above the calcar in a 135° angle. The plate was then distally fixed with bicortical locking head screws. After proper haemostasis a drain was placed at appropriate site and wound was closed in layers. The skin was closed with skin stapler.

The patients started static quadriceps exercises after 24 hours. Drain tube was removed after 48 hours. Stitches were removed on 14th post-operative day. Postoperatively antibiotics were given routinely for 2 weeks. The Patients was allowed moving out of bed using crutch and without bearing weight on operated limb as pain permits. Knee bending was allowed as pain permits. The patients was discharged with the advice to walk on crutch non - weight bearing on affected side for 6 weeks and then to report to the outpatient department. Partial weight bearing was allowed as soon as the patient could tolerate it with considering the fracture configuration, bone quality and the stability of the fixation. Full weight bearing was started when the fracture showed complete union clinically by absence of limb pain when standing upon the fracture limb alone and radiologically by the presence of the abundant callus at least in two views. Range of Motion and Shaft Neck Angle of the hip joint of the injured and healthy side were measured at the last follow-up. Paired t- test was done for calculation of test statistic and there was no significant difference between them (p>0.05).

Results

Distribution of patients according to bony union time is shown in table 1 which shows that most of the union (80%) took place in 12-18 weeks. Table 2 shows the distribution of patients according to post-operative complications. In table 3 range of motion and shaft neck angle is compared with a non-significant result. Table 4 shows that satisfactory result (90%) is obtained as an outcome.

Table 1: Distribution of patient according to bony union time (n = 20).

Time (weeks)	**Frequency** n (%)	**Mean ± SD**
12-18	16 (80)	
19-24	02 (10)	17.79 ± 2.89
25-30	02 (10)	

Table 2: Distribution of patient according to post-operative complication.

Postoperative complication	**Frequency** n (%)
Infection	1 (5)
Screw cutout	0 (0)
Implant failure	0 (0)
Limb shortening 1 cm	2 (10)

Table 3: Comparison of Range of Motion (ROM) and Shaft Neck Angle (SNA).

Outcome	**Injured Hip** Mean ± SD	**Healthy Hip** Mean ± SD	***p* value**
ROM	139.47 ± 4.04	142.37 ± 2.57	> 0.05
SNA	133.58 ± 1.07	134.32 ± 0.94	> 0.05

Table 4: Distribution of the results according to the final outcomes (n=20).

Result	**Frequency** n (%)
Satisfactory (Excellent & Good)	18 (90)
Unsatisfactory (Fair & Poor)	2 (10)
Total	20 (100)

Discussion

Comminuted Trochanteric and subtrochanteric femoral fractures are considered as one of the most difficult fracture to treat for the orthopaedic surgeons. It was found that indirect reduction and biological fixation method with the dynamic condylar screw and plate is considered as a valuable cheap fixation method for the management of comminuted subtrochanteric fractures of femur especially in the young patient's populations [6].

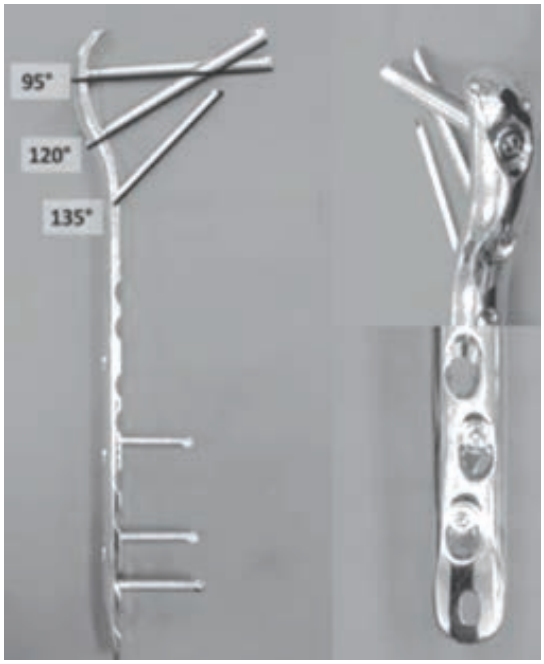

Figure 1: The locking compression plate for the proximal femur is a precontoured, angular stable, with large fragment screw (7.3/5.0/4.5mm).

In our study we evaluated the result of proximal femoral locking compression plate osteosynthesis in lateral decubitus approach without per operative image intensifier for the treatment of comminuted trochanteric and subtrochanteric fracture and we did a prospective study. Lateral positioning neutralizes the gravitational forces acting on the bone and soft tissues, facilitating reduction and exposure which in turn provide as a technical trick for anatomic and stable reduction of complex proximal femur fractures with proximal femoral locking plates [7]. Out of our 20 patients, age range from 21-70 years with a mean age of 41.35 years. Among them maximum were between 31-40 years (35%). From June 2009 to December 2010, a similar study was done in

Pre-operative X-ray Post-operative X-ray X-ray 1 month after operation

the department of Orthopaedics and Traumatology, Tire State Hospital, Izmir, Turkey by Kayali, et al., (2008), [2] where the mean age was 46 years (29-76 years).

Like all trauma cases comminuted trochanteric and subtrochanteric fracture is more common in male due to more activities and traveling. In a study of comminuted subtrochanteric fracture by Saini et al, (2013) [4] male patients were 87.5%. In our study, out of 20 patients, male patients were 17 (85%). High velocity trauma due to road traffic accidents was the main cause of these fractures seen in our study similar to a study in Department Of Orthopaedic Surgery, Chung Gung Memorial Hospital Taoyuan, by Lee, et al., 2002 [8].

The mean duration of follow up was 39.70 weeks (24-58 weeks). Average time to union was 17.35 weeks (14-28 weeks). In a study conducted at the Department of Orthopaedics, Swami Man Singh Medical College and Hospital, India, by Saini et al, (2013) [4], the mean duration of follow up was 40.25 weeks, and time to union was 16.2 weeks. Partial weight bearing (15-20kg) was allowed as soon as the patient could tolerate it and full weight bearing was started when the fracture showed complete union clinically by absence of limb pain when standing upon the fracture limb alone and radiologically by the presence of the abundant callus at least in two views. Bone union was defined as callous formation at the fracture site, with the fracture line visible for less than a quarter of the circumference (Lee, 2002) and as painless full weight bearing clinically (Kayali, 2008) [2]. Sixteen patients had union within 18 weeks, two patients had union within 24 weeks, and 2 patients had delayed union (28 weeks). One centimeter shortening was seen in two patients. No patient had significant rotational malalignment as determine by clinical examination. There were no cut-outs, breakage or pull-out of screws. A similar study of fixation of comminuted proximal femoral fracture in Orthopaedic Department CMH, Lahore, from October 2009 to September 2010, with 29 patients by Bukhari and Ashgar, (2011) [9], in which one patient developed nonunion.

Shaft-neck angle and range of motion of hip joint of the injured and healthy sides were measured at the last follow up, and there was no significant difference between them ($p>0.05$). Another study done by Kayali, et al., (2008) [2] in the Department of Orthopaedics and Traumatology, the state Hospital Izmir, Turkey also evaluated no significant differences between injured and healthy hip movements and SNA.

Harris Hip Score was used for clinical assessment, as per Harris Hip Score 18 patients (90%) had good or excellent outcome with two fair result(10%) , which was similar to the outcome of the study of Siani et al, (2013) [4].

Conclusion

The present study conclude, with proper patient selection, good instrumentation and surgical technique, proximal femoral locking compression plate is the implant of choice in the management of comminuted trochanteric and subtrochanteric fracture. Large scale studies with longer follow up are essential requirement for an optimum outcome measurement. Though the study was small which may not represent the whole scenario but the results of the study can be utilized for future large study.

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Original Article

Association of Glycated Hemoglobin with Dyslipidemia in Type 2 Diabetes Mellitus Patients with Poor Glycemic Control

Dalia Sultana[1], Khondakar Alwan Nahid[2], Pijush Karmaker[3], Fatema Tuz Zohora[4]

Abstract

Introduction: The relatively new term diabetic dyslipidemia comprises a triad of raised triglycerides (TG), reduced high density lipoprotein (HDL-C) and excess of low density lipoprotein (LDL-C). Diabetic subjects with accompanied dyslipidemia are soft targets of cardiovascular deaths. The mortality and morbidity is increased if there is poor glycemic control and abnormal lipid levels in blood. **Methodology:** The present study was carried out in departments of Biochemistry, Medicine and Endocrinology of Sir Salimullah Medical College and Mitford Hospital, Dhaka, Bangladesh between the periods of July 2020 to June 2021. We aimed to evaluate the association of glycated hemoglobin (HbA1c) with dyslipidemia (TC, HDL-C and LDL-C) in 50 subjects of type 2 diabetes mellitus (T2DM). Study subjects were divided into 2 groups. Group A included subjects with good glycemic control (n=25) and group B included subjects with poor glycemic control (n=25). **Results:** Mean total cholesterol, LDL-C were significantly higher in group B subjects ($p<0.05$) and HDL-C was significantly lower in group B subjects ($p<0.001$). **Conclusion:** Glycated hemoglobin is associated with dyslipidemia in poor glycemic control in T2DM.

Keywords: HbA1c, Dyslipidemia.

1. Assistant Professor, Dept. of Biochemistry, Eastern Medical College, Cumilla, Bangladesh
2. Associate Professor, Dept. of Biochemistry, TMSS Medical College, Bogura, Bangladesh
3. Assistant Professor, Dept. of Biochemistry, Eastern Medical College, Cumilla, Bangladesh
4. Assistant Professor, Dept. of Biochemistry, Eastern Medical College, Cumilla, Bangladesh

Address of Correspondence: Dr. Dalia Sultana, Assistant Professor, Department of Biochemistry, Eastern Medical College, Cumilla, Bangladesh. Email: dalia.sultana2016.sa@gmail.com

Introduction

Diabetes mellitus (DM) is a group of metabolic disorders of multiple etiologies. It is characterized by chronic hyperglycemia with disturbances of carbohydrate, protein and lipid metabolism resulting from defects in insulin secretion, action or both [1]. It is mainly of two types; among them, T2DM, a heterogeneous, complex, multi-factorial metabolic disorder characterized by chronic hyperglycemia, is the most predominant form [2]. T2DM patients are prone to develop dyslipidemia, which puts them at risk of developing macrovascular (stroke, peripheral vascular disease) and microvascular (nephropathy, neuropathy and retinopathy) diseases. Patients with T2DM often exhibit an atherogenic lipid profile, which greatly increases their risk of CVD compared with people without diabetes [3]. For T2DM patients, one of the most common complications linked with uncontrolled hyperglycemia is dyslipidemia.

Glycosylated hemoglobin (HbA1c) is an absolute indicator of long-term blood glucose control and is a gold standard of glycemic control in subjects with T2DM [4]. In accordance with its function as an indicator for the mean blood glucose level, HbA1c predicts the risk for the development of diabetic complications in diabetes patients. Individuals with diabetes who have inadequate glycemic control may experience a dyslipidemic state such as an increase in triglycerides (TG), low density lipoprotein cholesterol (LDL-C) and a decrease in high density lipoprotein cholester

ol (HDL-C) [5]. As a gold standard for evaluating glycemic control, HbA1c < 7.0 % was clinically defined as glycemic control. Glucose binds to hemoglobin in red blood cell at a steady rate. Since red blood cells last 3-4 months, the HbA1c test indicates the glycemic status of an individual for the last 3 months. This test shows how well has been the diabetes mellitus controlled in the past 2-3months [6].

Diabetes is also accompanied by the coexistence of metabolic syndrome (hypertension, dyslipidemia, abdominal obesity and hyperglycemia) have a very high risk for the occurrence of cardiovascular complications [7]. The World Health Organization (WHO) and International Diabetes Federation (IDF) use the term "Metabolic Syndrome" to describe this clustering of conditions. The term diabetic dyslipidemia comprises a triad of raised triglycerides, reduced high density lipoprotein (HDL-C) and excess of small, dense low density lipoprotein (LDL-C) particles [8]. The lipid abnormalities are prevalent in diabetes mellitus because insulin resistance or deficiency affects key enzymes and pathways in lipid metabolism. In a recent study, it was observed significant trends for rising risk of coronary heart disease, stroke and all-cause mortality in relation to higher levels of baseline HbA1c in more than 11,000 participants in the atherosclerosis risk in communities' study [9]. It was attempted to correlate blood glucose levels with serum lipid profile parameters in previous studies and it was clear that HbA1c values were lower in individuals with a decreased risk of microvascular complications. On one hand, reasonable control of lipid profile was an important factor influencing glycemic control in subjects with T2DM [10].

Diabetic subjects with accompanied dyslipidemia are soft targets of cardiovascular deaths. Subjects with T2DM often exhibit an atherogenic lipid profile, which greatly increases their risk of CVD compared with people without diabetes. An early intervention to normalize circulating lipids has been shown to reduce cardiovascular complications and mortality. The existence of these findings illustrates there is a link between lipid profiles on the glycemic index and vice versa. This provides a possible association between glycemic control and dyslipidemia in subjects with diabetes mellitus. The aim of this study was to determine the association of HbA1c with TC, HDL-C and LDL-C in T2DM with poor glycemic control.

Methodology

The study was conducted from July 2020 to June 2021 after receiving Institutional Review Board approval from of Sir Salimullah Medical College (SSMC) and Mitford Hospital, Dhaka, Bangladesh. By convenient and purposive sampling, a total of 50 subject of age between 30-59 years attending in Biochemistry department and department of Medicine and Endocrinology of SSMC, were enrolled in this study. The study subjects with type 1 diabetes mellitus, liver disease, gastrointestinal disease, thyroid disease, underweight or morbid obese, taking medications like corticosteroids, antiepileptic, methotrexate, amiodarone, tamoxifen or other hepatotoxic drugs were excluded from this study.

After enrollment, they were grouped on the basis of glycemic control. Among them (group A), 25 were diabetic with good glycemic control (T2DM subjects having duration of ≤ 8 years and HbA1c level ≤ 7%) and (group B), 25 were diabetic with poor glycemic control (T2DM subjects having duration of > 8 years and HbA1c level > 7%). Informed written consents were taken and with all aseptic precaution fasting blood samples were collected from each study subject. Initial evaluation of the study subjects by history and clinical examination was performed and were recorded in the preformed data collection sheet.

Demographic profile and pulse, BP, height, weight, BMI, WC etc. were measured. HbA1c was measured using immunoflurescence method. Fasting serum total cholesterol was measured by enzymatic end point (CHOD-PAP) method [11], fasting serum HDL-C was estimated by enzymatic end point (CHOD-PAP) method [12] and fasting serum LDL-C was estimated by using Friedewald's formula [13].

The statistical analysis was carried out using the SPSS version 23. Categorical variables were expressed as frequency and percentage. Continuous variables were expressed as mean and standard deviation. To determine the association between categorical variables chi-square test was done. Unpaired t-test was performed to compare between good glycemic control and poor glycemic control. To determine linear relation between continuous variables, pearson correlation test was done. A p value of <0.05 was considered statistically significant.

Results

Distribution of study subjects according to age and sex was shown in table 1 with shows significant age difference but no differences in sex distribution. Glycemic profile between the groups was shown in table 2 which shows significant poor control of glycemic status in group B patients. Comparison of lipid profile (TC, HDL-C & LDL-C) between groups are shown in table 3 which shows significant higher levels of TC and LDL-C and significant lower HDL-C between the groups. Table 4 shows the association of glycemic control with dyslipidemia between the study subjects that shows dyslipidemia is significantly associated with poor glycemic control. Table 5 showed correlation between HbA1C and TC, HDL-C and LDL-C among the respondents. High-density lipoprotein was (r=-0.333; p=0.018) negatively significant with HbA1C but total cholesterol (r=0.199; p=0.165) and low-density lipoprotein (r=0.209; p=0.146) were positively not significant with HbA1C.

Table 1: Distribution of the respondents according to age and gender (n = 50).

Variables		Group A (n=25) n (%)	Group B (n=25) n (%)	*p* value
Age (Year)	30-39	11 (44)	4 (16)	
	40-49	7 (28)	7 (28)	
	50-59	7 (28)	14 (56)	a0.001^{s}
	Mean ± SD	42.04 ± 9.14	47.8 ± 7.88	
	Range	30, 58	33, 58	
Sex	Male	14 (56)	18 (72)	b0.239^{ns}
	Female	11 (44)	7 (28)	

s = significant
ns = not significant
a = p value reached from Unpaired t-test
b = p value reached from Chi-square test

Table 2: Distribution of the study subjects according to glycemic profile (n = 50).

Glycemic profile	Group A (n=25)	Group B (n=25)	*p* value
HbA1C (%) (Mean ± SD)	5.98 ± 0.95	10.9 ± 12.02	0.035^{s}

s= significant
p value reached from Unpaired t-test

Table 3: Comparison of lipid profile between two study groups (n = 50).

Lipid profile	Group A (n=25) Mean ± SD	Group B (n=25) Mean ± SD	*p* value
TC (mg/dl)	164±13.38	179.84±24.27	.001^{s}
HDL-C (mg/dl)	41.92±2.96	39.32±4.23	.001^{s}
LDL-C (mg/dl)	87.45±11.01	96.62±17.28	.002^{s}

s= significant
p value reached from Unpaired t-test

Table 4: Association of glycemic control with dyslipidemia in the study subjects (n=50).

Lipidemic status	Group A (n=25) n (%)	Group B (n=25) n (%)	*p* value
Normal	22 (88)	15 (60)	0.024^{s}
Dyslipidemia	3 (12)	10 (10)	

s= significant
p value reached from Chi-square test

Table 5: Correlation between HbA1c and lipid profile among the respondents (N=50).

Parameters	HbA1c	
	p	*r*
Total cholesterol (TC)	0.199	0.165^{ns}
HDL-C	-0.333	0.018^{s}
LDL-C	0.209	0.146^{ns}

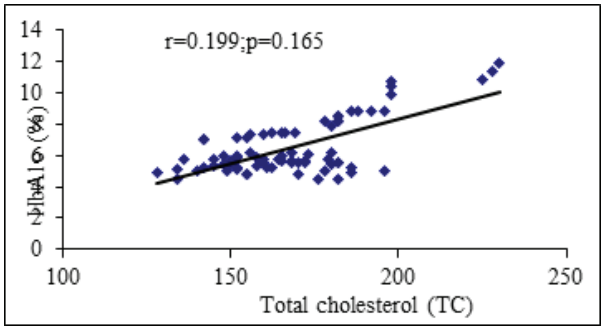

Figure 1: Scatter diagram showing correlation between TC and HbA1c (N=50).
Scatter diagram showed total cholesterol had positive correlation (*r* = 0.199; *p* = 0.165) with HbA1c which was not significant.

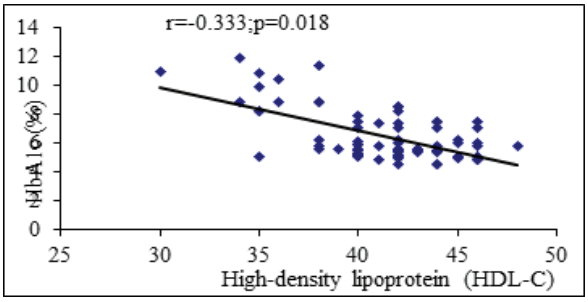

Figure 2: Scatter diagram showing correlation between High-density lipoprotein (HDL-C) and HbA1c (N=50).
Scatter diagram showed high-density lipoprotein (HDL-C) had significant negative correlation (*r* = -0.333; *p* = 0.018) with HbA1c.

Discussion

This study was aimed to evaluate the association of serum TC, LDL-C & HDL-C with poorly controlled diabetes mellitus. The study subjects were a cross section of population. A total of 50 subjects were included in this study based on predefined enrolment criteria. The subjects comprised of 25 T2DM subjects with good glycemic control and 25 T2DM subjects with poor glycemic control. This study was conducted in the departments of Biochemistry, Medicine and Endocrinology of Sir Salimullah Medical College, Dhaka during the period of July, 2020 to June, 2021.

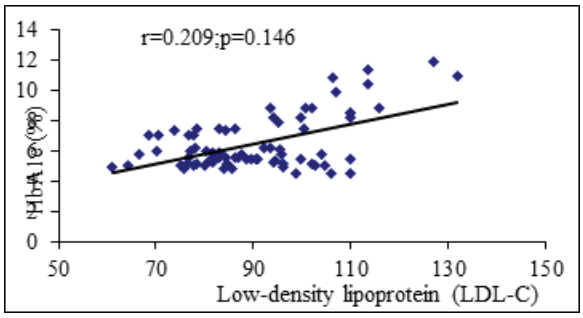

Figure 3: Scatter diagram showing correlation between Low-density lipoprotein (LDL-C) and HbA1c (N=50).
Scatter diagram showed low-density lipoprotein had positive correlation (*r* = 0.209; *p* = 0.146) with HbA1c which was not significant.

The mean age of the subjects was 42.04 ± 9.14 years in group A and 47.8 ± 7.88 years in group B. The difference of age was statistically significant (p<0.05) between two groups. Aamir et al., 2019 [14] and Saleh et al., 2012 [15] also reported similar age distribution of diabetes mellitus subjects.

In present study more than half (56%) patients were male in group A and 18 (72%) in group B. Sisodia and Chouhan, 2015 [16] reported that out of 100 T2DM subjects 62 were male and 38 were female which was comparable to our study.

The current study showed mean HbA1c were significantly higher (p<0.05) in T2DM with poor glycemic control when compared to good control group. This observation were consistent with the findings of Tabazzum et al., 2016 [17].

Serum TC and LDL-C were significantly higher and HDL-C was significantly lower in subjects with poor glycemic control in comparison to good glycemic control subjects. These study findings were supported by the studies by Klisic et al., 2017 [18], Baranwal et al., 2017 [19]. They also concluded study that diabetic patients are more prone to develop dyslipidemia. Thus early diagnosis of dyslipidemia and good glycemic control can be used as a preventive measure for the development of cardiovascular disease in T2DM.

Insulin resistance (IR) in adipose tissue may lead to increased lipolysis (Sakugawa et al., 2004) [20]. Insulin affects the liver apolipoprotein production and regulates the enzymatic activity of lipoprotein lipase and cholesterol ester transport protein. Insulin deficiency also reduces the activity of hepatic lipase and production of biologically active lipoprotein lipase. The increased flux of free fatty acids from the peripheral tissue to the liver in the IR state stimulates increased hepatic TG synthesis, which in turn enhances the assembly and secretion of VLDL from hepatocyte to systemic circulation (Gorter et al., 2004) [21]. In the presence of increased serum TG level, the cholesterol ester transport protein mediates exchange of TG and cholesterol ester between LDL and VLDL as well as between VLDL and HDL particles forming TG rich HDL that are more prone to catabolized (Kolovou, Anagnostopoulou and Cokkinos, 2005) [22]. Thus occurrence of dyslipidemia happens. So, in DM, lack of insulin results in dyslipidemia. Elevated HbA1c and dyslipidemia are independent risk factors of cardiovascular disease and presence of both factors along with DM are considered as a very high risk group.

We have done Pearson correlation test to see the correlation between dyslipidemia and glycemic control and found that poor glycemic control is correlated with low HDL-C (the good cholesterol); but we did not found the correlation between poor glycemic control with TC and LDL-C.

Conclusion

In conclusion it can be said that, diabetic subjects with poor glycemic control shows higher level of TC, LDL-C, while lower values of HDL-C. Moreover, it is evident that diabetic subjects with poor glycemic control are associated with dyslipidemia.

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Original Article

A Clinical Study of Benign Breast Disease in Female in Rural Population of Bangladesh

Md. Shariful Islam[1], Suman Chandra Roy[2], Md. Mozammel Haque[3], S. M. Golam Azam[4], Md. Atiqul Islam[5],Palash Kumar Dey[6], Md. Rasiduzzaman[7], Md. Kabirul Islam[8]

Abstract

Background: Benign breast disease is a common problem. This study was done to evaluate the different type of benign breast disease in female based on their epidemiological characteristics, clinical, radiological and pathological findings. **Aims:** To evaluate the different type of benign breast disease in female. **Methods:** It is an observational study done in 70 patients who came with breast symptoms in OPD of Satkhira Medical College Hospital, Satkhira, Bangladesh. All the findings and investigations were recorded and analysed for evaluation. **Results:** The age group of 30-39 years had the highest incidence of the cases (34.28%). Lump in the breast was the most common (51.42%) presenting symptom. Most commonly involved quadrant was upper outer quadrant (60%). Fibroadenoma (51.42%) the most common lesion in our study and presented mostly as lump in the breast in the upper outer quadrant and occurred in the age group of 20-29 years mostly. **Conclusions:** Benign breast diseases are fairly common in the younger age group. Fibroadenoma is the most common benign breast condition. Proper assessment and investigations are necessary for its diagnosis. The patient needs assurance regarding the benign nature of their disease by appropriate clinical, radiological and pathological diagnosis to allay their anxiety.

Keywords: Benign breast disease

1. Assistant professor, Department of Surgery, Satkhira Medical College, Satkhira, Bangladesh
2. Assistant professor, Department of Surgery, Dhaka Dental College, Dhaka, Bangladesh
3. Assistant Professor, Department of Urology, Satkhira medical College, Satkhira, Bangladesh
4. Assistant professor, Department of Surgery, Satkhira Medical College, Satkhira, Bangladesh
5. Assistant professor, Department of Surgery, Satkhira Medical College, Satkhira, Bangladesh
6. Junior Consultant (Surgery), Khulna Medical College Hospital, Khulna, Bangladesh
7. Resident Surgeon (Surgery), Satkhira Medical College Hospital, Satkhira, Bangladesh
8. Medical Officer, Department of Surgery, Satkhira Medical College, Satkhira, Bangladesh

Address of Correspondence: Dr. Md. Shariful Islam, Assistant Professor & Head, Dept. of Surgery, Satkhira Medical College, Satkhira, Bangladesh. Email: drmdsharifulislam35@gmail.com.

Introduction

Benign breast disease is a common problem in a day to day surgical practice. These disorders usually occur in the reproductive period of life and there is a dramatic fall in the incidence after menopause [1].

Benign pathology is depicted in almost 80% of breast biopsies [2]. Up to 30% of women will suffer from a benign breast disorder which requires treatment. Benign breast diseases as such are not life threatening. Proper understanding of these disorders is important so as to give a clear explanation to the patient.

There are many types of benign breast diseases like fibroadenoma, fibrocystic disease, galactocele, mastitis etc. These diseases usual

ly presents with symptoms of pain, lumpiness or a lump in breast. Fibroadenoma commonly occurs in adolescents and is one of the most common benign breast disorders.

Fibrocystic disease occurs mostly in the age group of 20-50 years and presents bilaterally [3]. There occurs cyclic bilateral breast pain, increased engorgement and density of the breasts. In mastitis, the breast is indurated, red and painful. Nipple retraction may also occur. Fever may also be present. Galactocele is commonly seen in lactating women and this typically present with a painless breast lump. In duct ectasia there is dilatation of sub-areolar ducts. Usually presents with a palpable mass and nipple discharge. We did the study to evaluate the different types of benign breast diseases in females based on their epidemiological characteristics, clinical, radiological and pathological findings.

Methods

It is an observational study done in 70 patients who came with breast symptoms in OPD of Satkhira Medical College Hospital, Satkhira, Bangladesh. Their epidemiological characteristics, clinical, radiological and pathological findings were observed.

Inclusion criteria

Female patients clinically diagnosed as having benign breast diseases were included in this study after obtaining their written consent and on guidelines as per the institute's ethical committee.

Exclusion criteria

1. Cases diagnosed as having malignant breast disease were excluded.
2. Women who were previously treated for breast malignancy.

A detailed history and clinical examination of the patients was done. General physical, systemic and local examination of both breasts were done. Ultrasonography and or mammography of both breast and FNAC and or histopathology was done in study subjects.

Results

In our study, age group of 30-39 years had most of the cases (34.28%) of benign breast diseases (Table 1). Lump in breast was the most common (51.42%) presenting symptom (Table 2). In our study, most of the patients were having duration of symptoms of 1-6 months (45.71%).

Table 1: Age distribution of benign breast diseases (n = 70).

Age groups (years)	**Frequency** n (%)
<20	4 (5.71)
20-29	14 (20)
30-39	24 (34.3)
40-49	20 (28.57)
>49	8 (11.42)
Total	**70 (100)**

Table 2: Symptoms of benign breast disease (n = 70).

Symptom	**Frequency** n (%)
Lump	36 (51.42)
Pain	10 (14.28)
Lump + Pain	16 (22.87)
Nipple Discharge	8 (11.43)
Total	**70 (100)**

Table 3: Disease pattern of benign breast diseases (n = 70).

Diseases	**Frequency** n (%)
Fibroadenoma	36 (51.46)
Fibrocystic Disease	16 (22.85)
Galactocele	4 (5.71)
Phyllodes tumor	2 (2.85)
Duct ectasia	8 (11.42)
Breast abscess	4 (5.71)
Total	**70 (100)**

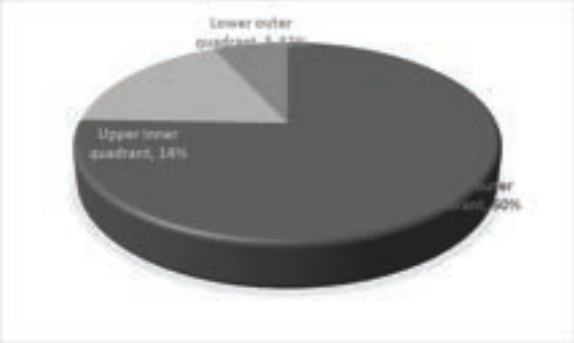

Figure 1: Involvement of breast.

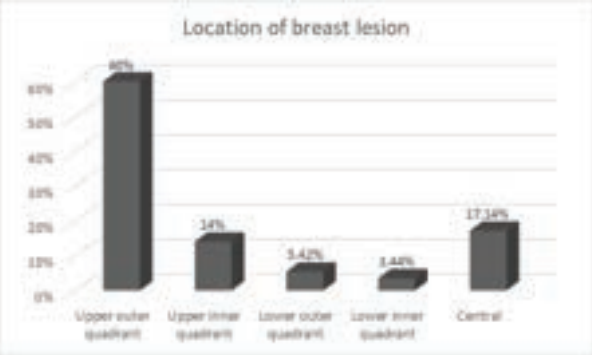

Figure 2: Location of lesion in breast.

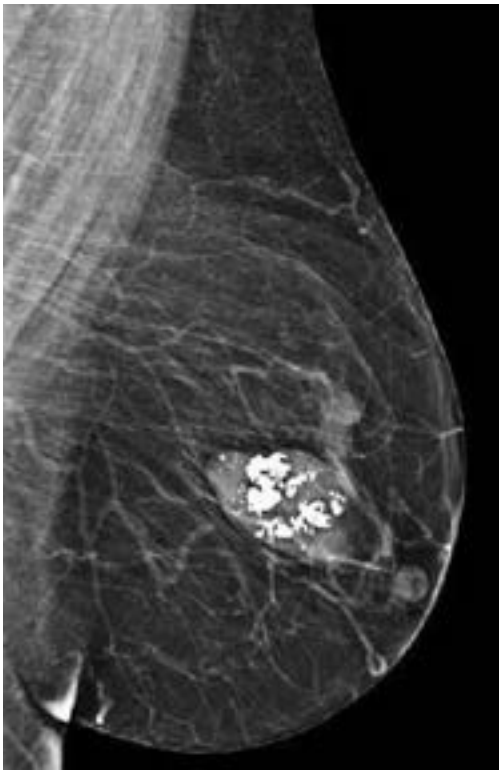

Figure 3: MRI breast showing popcorn image of fibroadenoma breast.

Discussion

Benign breast disease is a common surgical problem. We have done a study on 70 OPD patients in Satkhira Medical College Hospital. We enrolled 70 patients for our study. Any malignancy and history of malignant breast disease was excluded.

In our study, maximum cases of fibrocystic disease were in the age group of 40-49 years. This was in agreement with the study conducted by Bartow et al (1987), in which most of the cases of fibrocystic disease were in the 5th decade of life [4]. In our study, the mean age of presentation for non-lactational breast abscess was 43.5 years. Study conducted by Mcdivitt (1992) showed that the mean age of presentation for breast abscess was 39 years [6]. In our study, 50% of cases of duct ectasia were seen in the 5th decade of life. This was not in accordance with the study by Onukak (1989), in which most cases (50%) of duct ectasia were seen in the 3rd decade of life [7]. In our study, cases of both phyllodes tumor and galactocele were seen in the 4th decade of life.

Lump in the breast was the most common presenting symptom in our study (51.42%). Lump and pain was the presenting symptom in 22.85% of cases in our study. In other study also breast lump was the most common symptom having incidence of 49% followed by lump and pain having incidence of 28% [8]. In another study also, the most common symptom was breast lump having incidence of 54.5% followed by lump and pain having incidence of 28.9% [9]. Pain in the breast as the only presenting symptom was seen in 14.28% cases of our study. Nipple discharge was present in 11.42% of cases in our study. The study conducted by Najeeb S jabbo (2010) showed an incidence of nipple discharge as 8.8% [4].

[8]. In another study also, the most common symptom was breast lump having incidence of 54.5% followed by lump and pain having incidence of 28.9% [9]. Pain in the breast as the only presenting symptom was seen in 14.28% cases of our study. Nipple discharge was present in 11.42% of cases in our study. The study conducted by Najeeb S jabbo (2010) showed an incidence of nipple discharge as 8.8% [4].

The most common benign breast lesion (51.46%) was fibroadenoma in our study. This was also observed in other studies, where the incidence of fibroadenoma was found to be 61.4% and 57% respectively [10]. Fibrocystic disease was the second most common (22.85%) benign breast lesion seen in our study. Najeeb S jabbo (2010) also observed fibrocystic disease as the second common benign breast lesion in his study [4]. In our study, duct ectasia was present in 11.42% of cases. This was in accordance with the study conducted by Najeeb S jabbo (2010), in which duct ectasia was present in 8.78% of cases [4]. In the studies conducted by Pawan tiwari (2013) and Mima MBS et al (2013), the incidence of duct ectasia was 4.4% and 6% respectively [10, 11]. In our study, non-lactational breast abscess accounted for 5.71% of benign breast lesions. This was in accordance with the study by Siddiqui MS et al (2003), in which breast abscess accounted for 6.8% of cases [12].

Conclusions

Benign breast diseases are fairly common in the younger age group. Patients may be unaware of their problems in the initial stages till symptomatology becomes fairly constant. Fibroadenoma is the most common benign breast condition. It can be diagnosed appropriately by proper clinical, radiological and pathological examination. The patient needs assurance regarding the benign nature of their disease by appropriate clinical, radiological and pathological diagnosis to allay their anxiety.

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Original Article

Association of Serum Sex Hormone Binding Globulin with Carotid Atherosclerosis in Male

Khondakar Alwan Nahid[1], Shaikh Nazmus Saqueeb[2], Khandakar Urmina Akther[3], Md. Rafiqul Islam[4], Mohammad Shiblee Zaman[5], Dalia Sultana[6], Fatema Tuz Zohora[7], Mohammad Saiful Islam[8]

Abstract

Introduction: Atherosclerosis is a chronic condition where the arteries become narrowed and hardened due to excessive buildup of plaque around the arterial wall, containing cholesterol, lipoid materials and macrophage. In addition to transporting steroid in plasma Sex Hormone Binding Globulin (SHBG) may also help mediate the cardiovascular protective effects of estradiol and testosterone at the cellular level by regulating intracellular physiology. **Methodology:** The present study was aimed to evaluate the association of serum SHBG in 86 patients of carotid atherosclerotic. Grouping of the study subject was done on the basis of the findings of carotid Doppler. Serum SHBG was measured by chemiluminescence micro particle immunoassay. **Results:** Concentration of SHBG differed significantly among case and control (p=<0.001). Logistic regression analysis revealed that low SHBG (SHBG ≤25 nmol/L) was independently associated with development of carotid atherosclerosis (p=0.02, OR 4.89, 95% CI 1.20-21.11). **Conclusion:** SHBG is associated with carotid atherosclerosis in male.

Keywords: Serum Sex Hormone Binding Globulin (SHBG), Carotid atherosclerosis.

1. Associate Professor, Department of Biochemistry, TMSS Medical College, Bogura, Bangladesh
2. Associate Professor, Department of Biochemistry, Satkhira Medical College, Satkhira, Bangladesh
3. Assistant surgeon, Upazilla Health complex, Kahalu, Bogura, Bangladesh
4. Resident, Department of Pediatrics, BSMMU, Dhaka, Bangladesh
5. Assistant Professor, Department of Biochemistry, Bangabandhu Medical College, Sunamgonj, Bangladesh
6. Assistant Professor, Department of Biochemistry, Eastern Medical College, Cumilla, Bangladesh
7. Assistant Professor, Department of Biochemistry, Eastern Medical College, Cumilla, Bangladesh
8. Assistant professor (Dermatology), Center for Medical Education, Dhaka, Bangladesh

Address of Correspondence: Dr. Khondakar Alwan Nahid, Associate Professor, Department of Biochemistry, TMSS Medical College, Thengamara, Bogura, Bangladesh. Email: khondakarnahid13@gmail.com

Introduction

Atherosclerosis underlies the pathogenesis of coronary, cerebral and peripheral vascular disease and causes more morbidity & mortality (Roughly half of all death) [1]. The South Asian countries like India, Pakistan, Bangladesh, Sri Lanka and Nepal contributes the highest proportion of the burden of cardiovascular disease (CVD) compared to any other region globally [2]. Over 80% of CVD takes place in this region [3]. According to health bulletin 2014, published by ministry of health and family welfare, Bangladesh, death caused by disease of circulatory system (33.2%) was highest among all cause of death [4].

Atherosclerosis is a chronic condition where the arteries become narrowed and hardened due to excessive buildup of plaque around the arterial wall, containing cholesterol, lipoid materials and macrophage [5]. Atherosclerotic events begin in childhood and remain clinically silent until they become large enough to impair tissue perfusion or until ulceration and disruption of the lesion, result in thrombotic occlusion or distal embolisation of the vessel

[6]. There are some well-known non modifiable and modifiable risk factors of atherosclerosis. But traditional risk factors fall short in identifying individuals at high risk for atherosclerosis [7]. So there is continuous search for biomarkers which are easy to measure, standardize and independent from establish risk factors [8]. An atheromatous plaque consists of a grumous core of lipid (mainly cholesterol and cholesterol ester) covered by a white fibrous cap [9]. For many years physician only look for dyslipidemia in their patients with atherosclerosis. In a study of 27,939 healthy American, 77% of first cardiovascular events occurred in those with only moderately elevated low density lipoprotein cholesterol (LDL-C) and 46% occurred among those with normal levels of LDL-C. Moreover, as many as 50% of first cardiovascular events occur in individuals with neither elevated cholesterol nor any other traditional risk factors [9].

SHBG is a multifunctional glycoprotein, which is mostly produced by the liver and released into the bloodstream. Other sites that produce SHBG include the brain, uterus, testes & placenta [10]. A membrane receptor for SHBG was found in uterine endothelial cell membrane, isolated prostatic cell membrane, human placenta, normal breast, liver and epididymes but not in striated muscle [11]. There was an association between SHBG and endothelial cells, through the receptor for SHBG. SHBG may mediate its protective effect on atherosclerosis 1) by regulating levels of bioavailable testosterone or other androgens and 2) by its direct effects at cellular level [12]. In vitro studies have demonstrated SHBG receptors in certain human tissues, which, when, bound by SHBG and testosterone or estradiol, increase intracellular cyclic adenosine monophosphate. Thus, in addition to transporting steroid in plasma, SHBG may also help mediate the cardiovascular protective effects of estradiol and testosterone at the cellular level by regulating intracellular physiology [12, 13]. A recent study showed a strong association of SHBG as well as genes controlling the expression of SHBG with risk of insulin resistance, type 2 diabetes mellitus and metabolic syndrome [14]. A cross sectional study in a Swedish population showed, a strong association between blood pressure and SHBG. This association explained by a direct effect of SHBG on endothelial cell, which might be a factor of developing carotid atherosclerosis [12].

The potential role of SHBG in the development of carotid atherosclerosis in men has been matter specific interest in recent years. That is why we designed a study was aimed to evaluate the association serum SHBG with carotid atherosclerosis in men.

Methodology

The study was conducted in department of Biochemistry of Bangabandhu Sheikh Mujib Medical University (BSMMU), department of Radiology & Imaging of BSMMU & National Institute of Neurosciences (NINS) from March 2015 to February 2016 after receiving Institutional Review Board approval. By convenient and purposive sampling, a total of 86 male of age between 40-65 years attending in Radiology & Imaging department of BSMMU & NINS for carotid doppler study, were enrolled in this study. The study subjects with liver disease, renal disease, thyroid disease, castration or taking any medication known to affect testosterone concentration (eg: anti androgenic agents for prostate cancer) were excluded from this study. After enrollment, they were grouped on the basis of doppler findings. Among them 27 were normal carotid doppler findings (group-I), 26 had stenosis upto 50% (group-II) and 33 had >50% stenosis (group-III). Informed written consents were taken and with all aseptic precaution, fasting blood samples were collected from

each study subjects. SHBG was measured by chemiluminescence micro particle immunoassay (Architect Abbott Diagnostics, 2013) [15]. Low SHBG was defined as a serum SHBG level below 25 nmol/L in accordance with the generally accepted standard [16].

The statistical analysis was carried out using the SPSS version 25. Quantitative data were expressed as mean and standard deviation (mean± SD). Differences among the groups were analyzed using ANOVA test, as well as the Chi-square test for categorical values. Differences between groups were assessed by mean of Mann Whitney U test or Bonferroni post hoc test as adequate. Multinomial regression analysis was performed to evaluate the relationships between carotid atherosclerosis and low total testosterone & also evaluate the odds ratio (OR), controlling for covariates. Spearman rank correlation coefficient was used to analyze correlation between total testosterone and carotid atherosclerosis. A p value <0.05 was considered significant.

Results

This was a cross sectional study. The study subjects were included who came for carotid doppler scanning. After getting the reports of the doppler study, the subjects were categorized into groups according to the reports. The study subjects who had normal sonographic findings were grouped into group-I (n=27), the study subjects who had up to 50% stenosis were grouped into group-II (n=26), and the study subjects who had >50% stenosis were grouped into group-III (n=33) (Table 1). The concentration of serum SHBG (nmol/L) differed significantly among groups (p=<0.001) and it was significant in both <50% stenosed and >50% stenosed group (p=<0.001, & p=0.017) (Table 2). Multinominal logistic regression analysis of serum total testosterone, age, hypertension, DM, smoking, BMI, TC, HDL-C in relation to atherosclerosis severity, revealed that serum total testosterone (≤25 nmol/L) was independently associated with development of carotid atherosclerosis (p=0.027, OR 4.89, 95% CI 1.20-21.11) irrespective of the DM, HTN, smoking, TC, LDL-C, BMI and age of the study subjects (Table 3).

Figure-1 showed the mean distribution of SHBG in different groups of study subjects. It showed the decrease trend of SHBG with severity of atherosclerosis. Spearman's correlation test revealed that there was a significant negative correlation between SHBG and atherosclerosis severity (y=-0.163 and p=<0.001) (Figure-2).

Table 1: Grouping of study subjects on the basis of ultrasonographic findings.

Ultrasonographic findings	Frequency n (%)
Normal sonographic findings Group I	27 (31.39)
Stenosis up to 50% Group II	26 (30.24)
Stenosis > 50% Group III	33 (38.37)
Total	86 (100)

Table 2: Comparison of serum SHBG among groups.

Groups	SHBG (nmol/L) Mean ± SD	*p* value
Group I	34.34 ±12.75	
Group II	25.72 ± 8.97	**<0.001**
Group III	21.13 ± 12.39	

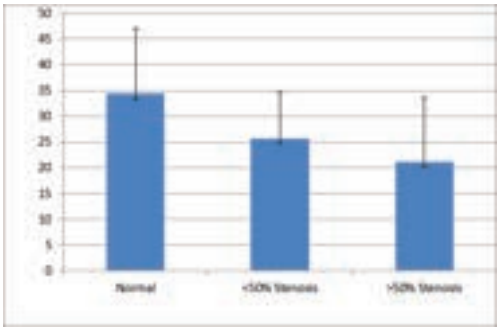

Figure 1: Mean distribution of SHBG in different groups of study subjects.

Table 3: Logistic regression analysis of Age, SHBG, HTN, DM, Smoking, BMI, TC. HDL-C with carotid atherosclerosis

Variable of interest	OR	95% CI of odds	*p* value
Age (≥55 years)	0.60	0.65 – 6.92	0.211
SHBG (≤ 25 nmol/L)	4.89	1.20 – 21.11	**0.027**
HTN	0.35	0.30 - 4.53	0.549
DM	2.83	0.06 - 1.23	0.092
Smoking	5.21	0.57- 0.804	**0.022**
BMI (≤25 kg/m²)	0.22	0.21 – 2.53	0.639
TC (>200 mg/dL)	5.36	1.23 - 23.29	**0.025**
HDL-C (≤30 mg/dL)	2.307	0.76 - 8.17	0.122

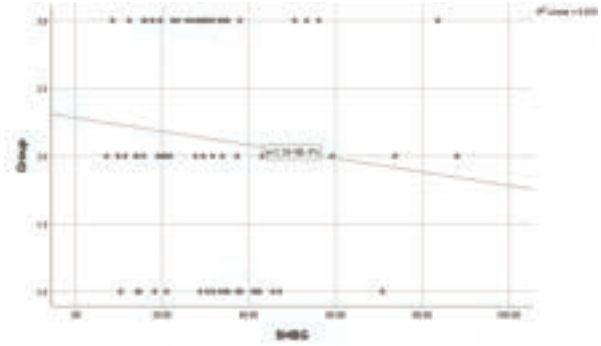

Figure 2: Correlation between SHBG and atherosclerosis severity.

Discussion

This study was aimed to evaluate the association of serum SHBG with carotid atherosclerosis in male. The study subjects were a cross section of population who came for carotid doppler and blood samples were collected for the measurement of the markers of interest. We enrolled 86 male patients and among them 27 were normal (group-I), 26 had stenosis up to 50% (group-II) and 33 had >50% stenosis (group-III) diagnosed by carotid doppler.

Svartberg et al. (2006) [17] did a population based cross sectional study of 1482 men aged 25-84 years, participating in the 1994-1995 Tromos study. They found that there was a significant inverse association between SHBG and carotid atherosclerosis. Empen et al. (2011) [18] in their study showed that low serum SHBG levels were associated with decreased endothelial function which was evaluated by population based prospective study. However, Soisson et al. (2012) [19] found that there was no significant association between SHBG and carotid atherosclerosis. They included their study subjects, aged above 65 years.

We also did the Spearman's correlation test which showed significant negative correlation between serum SHBG and severity of carotid atherosclerosis but findings were not compatible with that of the study of Vikan et al. (2009) [20].

Finally, we did multinominal logistic regression analysis which showed that low levels of serum SHBG (≤ 25 nmol/L) were independently associated with the development of carotid atherosclerosis in male. This result suggested that SHBG deficiency is the sole contributing factor in developing carotid atherosclerosis irrespective to age, BMI, DM, HTN, smoker, TC and HDL-C.

Our study result was not coherent with the findings of Canoy D et al. (2014) [21] who conducted a large population-based study of atherosclerosis subjects. Another cross-sectional study of negatively associated SHBG with carotid atherosclerosis subjects conducted by Frister et al. (2012) [22] also supported the findings of Canoy D et al. (2014) [21] and this conflicted with our study result. These dissimilarities of these two study results with our study findings indicate that a multi-institutional large sample case-control study is needed to be conducted.

Conclusion

Serum low SHBG is independently associated with carotid atherosclerosis in male. However, the relationship between sex hormone binding globuin and carotid atherosclerosis still remains inconclusive.

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Original Article

Coverage of Post Electric Burn Soft Tissue Defect of Thumb by First Dorsal Metacarpal Artery Flap: A Reliable Option

Md. Joynal Abeden[1], Hasan Nazir Uddin[2], Md. Shariful Islam[3], Md. Rasiduzzaman[4], Md. Rafiqul Islam[5], Md. Ahad Ali Mahalder[6]

Abstract

Background: The thumb contributes 60% of all human hand functions. Therefore, thumb injuries have much more significant impact on the normal daily life activities than do other digits injuries. Electric burn is one of the common cause of thumb injury. Reconstruction of complex soft tissue defects of the thumb is challenging to hand surgeons. Limited local soft tissue availability makes the requirement difficult. First dorsal metacarpal artery (FDMA) flap is a versatile flap for covering thumb defects on dorsal or volar aspects. **Materials and method:** This is an observational study carried out on 30 patients with soft tissue defect on the thumb due to electric burn who presented between the times of January 2017 to September 2018 in the Department of Plastic surgery, Dhaka Medical College Hospital, Dhaka, Bangladesh. The wounds were examined preoperatively to assess the nature, examine the underlying structure and evaluate the appropriateness of the plan. **Results:** Maximum patients (15) are in the age group of 21-30 years. The mean length of flap is 28.20 mm and width is 15.57 mm. The results in all the cases are excellent except for four cases; one of which has marginal necrosis, and the other three has epidermal necrosis which healed without any surgical intervention. First web space span is excellent in 29 cases. Thumb movement in IP is excellent in 70% cases and in MP 96.67% is excellent. **Conclusion:** The FDMA flap is a reliable flap to reconstruct the soft tissue defect of the thumb following electric burn. The flap is sensate, durable, provides adequate soft tissue coverage.

Keywords: First Dorsal Metacarpal Artery (FDMA) Flap, thumb reconstruction, sensate flap, electric burn.

1. Assistant Professor, Department of Surgery, Satkhira Medical College, Satkhira, Bangladesh
2. Assistant Professor, Department of Plastic Surgery, Enam Medical College, Dhaka, Bangladesh
3. Assistant Professor, Department of Surgery, Satkhira Medical College, Satkhira, Bangladesh
4. Residential Surgeon (Surgery), Satkhira Medical College Hospital , Satkhira, Bangladesh.
5. Assistant Professor, Department of Surgery, Jashore Medical College, Jashore, Bangladesh
6. Assistant Professor, Department of Surgery, Jashore Medical College, Jashore, Bangladesh

Address of Correspondence: Dr. Md. Joynal Abeden, Assistant Professor, Department of Surgery, Satkhira Medical College, Satkhira, Bangladesh. Email: jabedendr@gmail.com

Introduction

The thumb contributes 60% of all human hand functions. Therefore, thumb injuries have much more significant impact on the normal daily life activities than do other digits injuries [1]. Thumb injury is a common incident now a days due to increased frequency of electric burn and road traffic accident. However there are few other causes like household accident, others burns, excision of neoplasm or infection. Reconstruction of complex soft tissue defects of the thumb, with exposure of the underlying structures, is challenging to hand surgeons. To preserve the function of the thumb, always it requires coverage with pliable, durable and sensate skin. Limited local soft tissue availability makes the requirement difficult [2]. The coverage options are variable ranging from secondary healing to free flap depending upon the amount and type of tissue

lost.

Conventionally, these defects can be reconstructed by skin graft, V-Y advancement flap [3], Moberg advancement flap [1, 4], cross-finger flap [2, 5], Littler's neurovascular island flap [1, 6], first dorsal metacarpal artery (FDMA) flap [1, 2, 3, 7], reverse radial forearm flap [8, 9], distant flaps and various free flaps [1, 4]. Skin grafting is not suitable when bone or tendon is exposed. V-Y advancement flap is applicable for small defect like finger tip injury. Moberg flap is suitable for limited area of soft tissue defect in expense of extension of IP joint. Cross finger flap requires a staged approach and has limitations including a considerable period of immobilization, risk of joint stiffness and a limited arc of flap transposition [10]. With the neurovascular island flap, two major digital arteries are sacrificed and required extensive digital and palmar dissection [10]. Microvascular transfer of a free flap like partial toe transfer, ADP free flap, and free groin flap can be used but such a technique requires microsurgical experience and prolonged operative time [4].

Among these flaps, FDMA flap is a reliable flap for covering thumb defects on dorsal or volar aspects. The flap can be made sensate by including a branch of the superficial radial nerve. Hence it is a single stage surgery with less donor site morbidity. FDMA flap was first reported by Hilgenfeldt in 1961 and Hollevich in 1963 as a peninsular flap with preservation of the skin over the pedicle [11]. An island flap was demonstrated for the first time by Foucher and Braun in 1979, who described that a sensate skin island flap could be harvested from the dorsum of the index finger, based on the 1st dorsal metacarpal artery and incorporated a sensory branch of the superficial radial nerve [6].The FDMA flap comes into play in thumb reconstruction as there is deficiency of locally available tissue and tendon or bone is exposed. The main goal of thumb reconstruction is preservation of length and sensibility.

1st dorsal metacarpal artery (FDMA) flap, a sensate skin island harvested from the dorsum of the index finger, based on the 1st dorsal metacarpal artery and incorporated a sensory branch of the superficial radial nerve. The FDMA flap can extend proximally to the MP joint and distally to the PIP joint. If the flap is extended beyond the PIP joint, then its distal part is doubtful [7]. An islanded sensory FDMA flap has a pedicle length of around 7 cm, thus it allows for wide arc of rotation and resurfacing soft tissue defects of the thumb. Compared to hetero digital island flap for resurfacing thumb defects the FDMA flap has negligible donor site morbidity, complete cortical reorientation and better overall hand function [12]. The FDMA flap has been successfully used for reconstruction of thumb soft tissue defects as it is a durable flap with a constant vascular anatomy. It can cover both the dorsal and the volar aspect with restoring the sensation and maintaining the length. Besides, it has very few limitations like it demands high quality dissection and donor site skin grafting.

Aims & Objectives

The aim of this study is to implement the advantages of FDMA in soft tissue reconstruction of thumb following electric burn, for which it has been termed as a reliable flap. Objectives are followings-to evaluate the clinical outcome of 1st dorsal metacarpal artery (FDMA) flap as a reliable option for reconstruct post electric burn soft tissue defect of thumb, to assess the maximum dimension of flap that can be raised, observe the viability of the flap, to find out any complications and to assess the thumb function.

Materials & Methods

This is an observational study carried out on 30 patients with soft tissue loss on the thumb

who presented between the times of January 2017 to September 2018 in the Department of Plastic surgery, Dhaka Medical College Hospital, Dhaka, Bangladesh. A thorough history was taken from the patient and their attendants. The wounds were examined preoperatively to assess the nature, examine the underlying structure and evaluate the appropriateness of the plan. All patients had laboratory tests required for surgery under anesthesia done. Sample size was 30 (Thirty). Sampling method was purposive sampling.

Sample population- All the patients with post electric burn soft tissue defects on the thumb in the department of Plastic Surgery, Dhaka Medical College Hospital was the study population. Thirty patients fulfilled the inclusion criteria and were included into the study.

Inclusion criteria

1. Patients with soft tissue defect in thumb following post electric burn deformity.
2. Patients age between 1 - 60 yrs.

Exclusion criteria

1. Patients with potential injuries to the pedicle of donor site due to previous trauma or surgery.
2. Patients with significant major co-morbid medical conditions.
3. Patients with other cause of thumb injury.

Operational definition

Dimension of wound: Measured by measurement of length and width of the wound by scale in mm. Length means maximum dimension at long axis of the wound. Width means maximum dimension at short axis of the wound.

Flap survivability

- No loss of flap
- Epidermal flap loss - only epidermis of the flap loss
- Marginal flap loss – up to 1 mm of marginal flap loss.
- Partial flap loss – up to one third of the flap loss.
- Subtotal flap loss – up to two third flap loss
- Complete flap loss – whole portion of the flap loss
- Wound Dehiscence - is the partial or total disruption of any or all layers of the operative wound

Flap outcome

Excellent

- No flap loss
- No donor site morbidity
- Functional outcome good

Good

- Marginal flap loss/Epidermal necrosis managed by secondary healing
- <10% graft loss managed by secondary healing
- Functional outcome satisfactory

Poor

- Complete/ Partial flap loss alternative procedure needed
- 10%-100% graft loss managed by STSG. Functional outcome poor

Surgical technique

Patient was under regional or general anesthesia. Under tourniquet control with good illumination and magnification wound excision done. Then the wound dimension was measured and flap was marked on the dorsum of index finger. Flap is marked few millimeters larger than that of the wound. The distal limits were the proximal interphalangeal (PIP) joints and the proximal limits were usually the metacarpophalangeal joint but in 5 cases it cross metacarpophalangeal joint. As the FDMA is a constant artery, Doppler was not used. The tip of the first web space can be palpated between the bases of the first and the second metacarpal bone, which denotes the proximal most point of pedicle dissection and hence the pivot point.

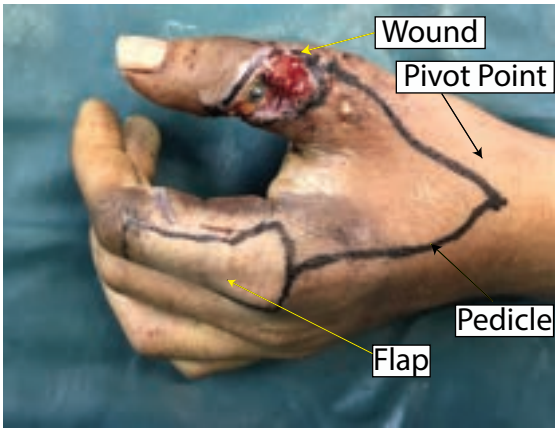


Figure 1: Wound and flap marking.

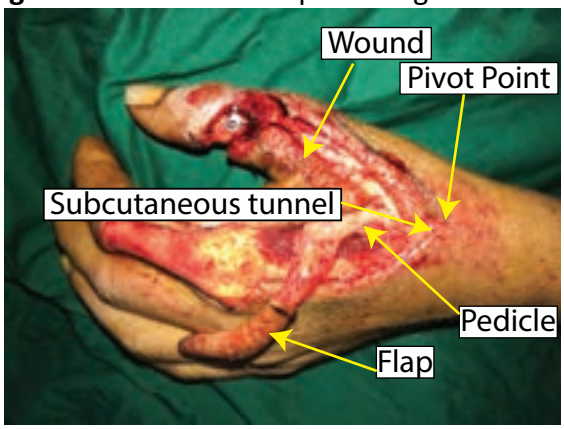
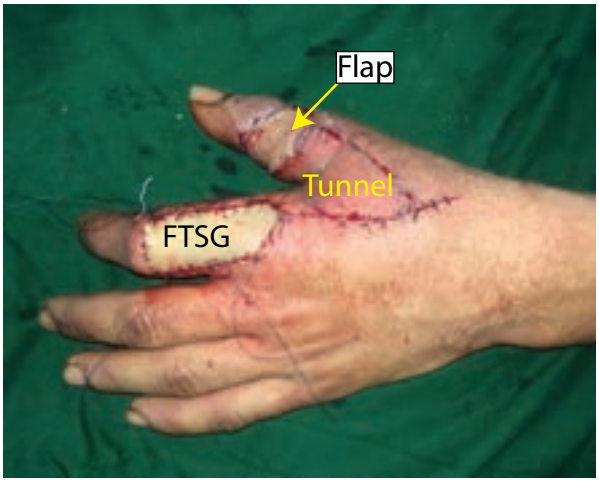


Figure 2: Flap raised



FTSG=Full thickness skin graft

Figure 3: Flap coverage done

Under tourniquet, the flap was raised in the loose areolar plane above the extensor tendon paratenon. Great care was taken to preserve the paratenon to ensure later skin graft take and the free gliding of the tendon. The flap

Figure 4: 30th POD

dissection was started from distal to proximal. The fascia pedicle will be taken through a zigzag or lazy s-shaped skin incision and sub-dermal dissection along the radial border of the MP joint toward the pivot point; thus, the maximal potential length of the flap pedicle can be achieved, allowing it to reach the thumb tip without tension. The pedicle includes 1st dorsal metacarpal artery, epimysium of the first dorsal interosseous muscle, the dorsal veins, and the sensory branch of the radial nerve. Although the ulnar branch of the FDMA is tiny and courses deeply within the musculo-osseous groove, no attempt is made to visualize the artery. Instead, safe dissection can be achieved by including the epimysium of the first dorsal interosseous muscle. Then an open tunnel was made from the proximal part of the pedicle up to the wound margin. It should be ensure that the tunnel should be adequate enough to transfer the pedicle and tension less closer of the tunnel. The tourniquet was released and the flap vascularity assessed. The flap was then passed through the open tunnel to the defect area and sutured without any tension. Then the tunnel was closed without any tension. The donor sites were covered by full thickness skin graft. The tourniquet was released and the flap vascularity assessed. The flap was then passed through the open tunnel to the defect area and sutured without any tension. Then the tunnel was

closed without any tension. The donor sites were covered by full thickness skin grafts in maximum case, in two cases by split thickness skin graft and in one case by fillet flap from the middle finger.

Post-operative care: 1st dressing was done on 5th POD. Stitches removed on 14th to 21st POD.

Follow-up: Patient was followed up to the 1st POD, 5th POD, 14th POD and 21st POD and 30th POD. Flap was evaluated at that time according to the preset criteria.

Table 1: Age group distribution of the study cases (n=30).

Age Group (years)	Frequency n (%)
01 – 10	3 (10)
11 – 20	5 (16.67)
21 – 30	15 (50)
31 – 40	4 (13.34)
41 – 50	3 (10)
Total	30 (100)

Mean age (±SD): 26.17 (±1.027)
Range: (8-48)

Table 2: Occupational status of the study cases (n=30).

Occupational status	Frequency n (%)
Day labor	10 (33.34)
Housewife	2 (6.67)
Service Holder	8 (26.67)
Student	9 (30)
Businessman	1 (3.33)
Total	30 (100)

Table 3: Distribution of patients according to involved area of thumb (n=30).

Location of wound	Frequency n (%)
Dorsum	5 (16.67)
Volar	13 (43.33)
Medial	5 (16.67)
Lateral	1 (3.33)
Complex	6 (20)
Total	30 (100)

Table 4: Exposed vital structure among study cases (n=30).

Type of exposed structures	Frequency n (%)
Bone	7 (23.33)
Tendon	6 (20)
Both bone and tendon	4 (13.33)
Both bone and implant	1 (3.33)
No structure exposed	12 (40)
Total	30 (100)

Table 5: Per-operative dimension of the soft tissue defect after excision among study cases (n=30).

Dimension of the defect		Frequency n (%)	Mean ± SD (mm)
Length	11-25 (mm)	17 (56.66)	27.10±10.35
	26-40 (mm)	9 (30)	
	>40 (mm)	4 (13.33)	
Width	6-15 (mm)	15 (50)	15.43±5.21
	16-25 (mm)	14 (46.66)	
	>25 (mm)	1 (3.33)	

Table 6: Dimension of the flap among study cases (n=30).

Dimension of the flap		Frequency n (%)	Mean ± SD (mm)
Length	11-25 (mm)	17 (56.66)	27.10±10.35
	26-40 (mm)	9 (30)	
	>40 (mm)	4 (13.33)	
Width	6-15 (mm)	15 (50)	15.43±5.21
	16-25 (mm)	14 (46.66)	
	>25 (mm)	1 (3.33)	

Table 7: Management of postoperative Complications among study cases (n=30).

Case number	Post-operative complications	Management
Case # 10	Marginal flap loss	Conservative
Case # 16	Epidermal loss	Conservative
Case # 20	Epidermal loss	Conservative
Case # 22	Epidermal loss	Conservative

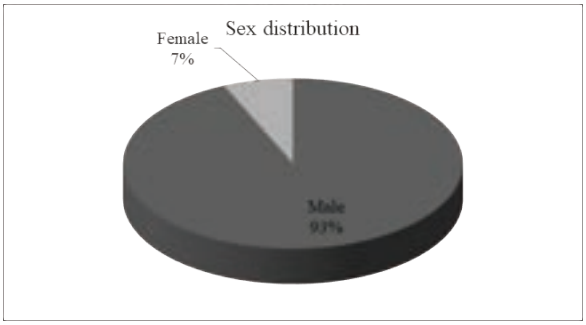


Figure 5: Sex distribution of the study subjects

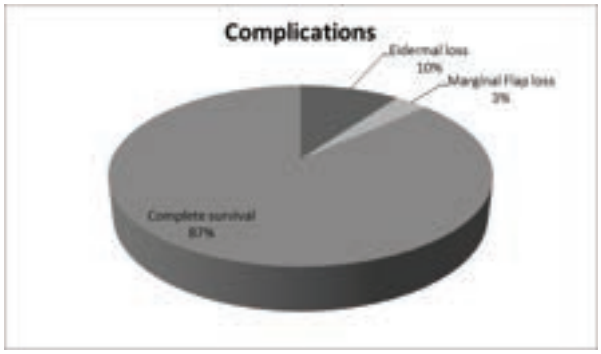


Figure 6: Overall Flap survival among study cases (n=30)

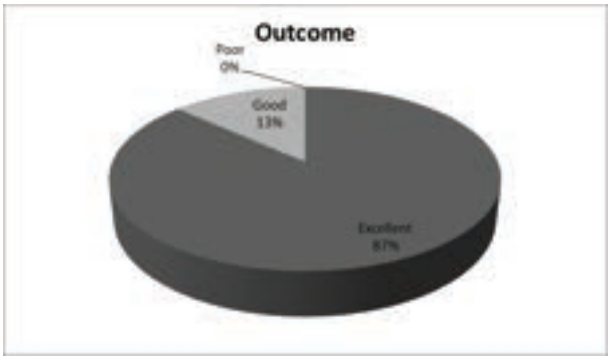


Figure 7: Final Outcome of flap based on preset criteria among study cases (n=30)

Discussion

The thumb is used in almost all human hand functions. Therefore, thumb injuries have much more significant impact on the normal daily life activities than do other digits injuries [2]. Reconstruction of complex soft tissue defects of the thumb, with exposure of the underlying structures, is challenging to hand surgeons due to limited local soft tissue availability and the requirements for pliable, durable and sensate skin coverage to preserve the thumb function which is of paramount value to the usefulness of the hand [9].

This study included 30 cases. The mean age of total cases was 26.16 years (age range: 08- 48 years). In a previous study (Samir et al, 2018) where they revealed the mean age of their respondents as 34.8 years (Range 15-49). In a study of Mahesh et al, (2013), average age was 30 years [13]. Ibrahim et al in 2018 average age was 17 -48 years [14]. Among 30 cases, 28 (60.87%) were male and 02 (39.13%) were female. Male female ratio was in this study 14:1. In a study of Samir et al, 2018 Male female ratio 6.5:1 [9]. Among 30 cases, 10 (33.34%) were day labor, 09 (30%) were student. They were followed by service holder 08 (26.67%), businessman 04 (17.39%) and 02 (6.67%) were housewife. But occupation was not included in any other study.

In this study, left hand was involved hand in maximum 17 (56.67%) cases. Regarding the site volar aspect of thumb was the affected area in 13 cases, followed by dorsum and lateral. The number was 05 (16.67%) in both sites. In the study of Waheduzzaman et al (2020), location of the wound was in volar in 04 cases, in dorsum in 11 cases; most of the injury occurred on thumb of dominant hand, 19 (61.3%) compared to not non-dominant hand, 12 (38.7%) and most of the patient was right hand dominant, 27 (87.1%) [15]. In this study flaps were transferred through open subcutaneous tunnel to prevent any kind of external pressure on pedicle from tissue edema and tightness. In Samir et al. [9] study, the flap was transferred through a subcutaneous tunnel into the defect of the thumb by gentle traction. The tunnel was tight in seven (46.7%) patients and had to be laid open then sutured primarily after flap in setting among the fifteen patients. The flap was then passed through a subcutaneous tunnel to the defect area and sutured. Thumb defect was left open for monitoring. The donor site was grafted over the dorsum of

the proximal phalanx index finger and the rat tail defect over the dorsum of the second metacarpal was closed primarily [9].

Among 30 patients, bone exposed in 7 patients, tendon exposed in 6 patients, both bone and tendon exposed in 4 patients, implant exposed in 1 patient and no vital structure exposed in case of 12 patients. In the study of Waheduzzaman et al (2020), exposed bone 12 (38.7%) cases, exposed tendon 9 (29%) cases, pulp 7(22.6%) cases, stump cover 2 (6.5%) cases, exposed joint 1 (3.2%) cases [15].

In this study, defects mean length was 27.1 (12-50) mm and mean width is 15.43 (7-30) mm. In the study of Chao C et al. (2010), mean length was 3.5 (2.6-4.6) cm and mean width is 2.0 (1.8-2.2) cm [12]. In the study of Ibrahim Ahmed mentioned that defects dimensions ranged between 3x4 cm and 4.5x6 cm [14].

The dimensions of the flap mean length is 28.2 mm (14 mm-52 mm) and mean width is 15.57 mm (8 mm -25 mm). In the study of Shun-Cheng et al, flap size ranged from 3 x 1.5 cm to 5 x 3 cm [7]. In the study of Samir et al, the mean flap size was 33.3×17.7 mm [9].

Out of 30 cases, flap donor site of all cases were covered by FTSG. In Samir et al. (2009), all cases were covered by FTSG taken from groin [9]. Among the 30 case there were no complication of donor site observed. All skin grafts take 100%. Mahesh et al. [2013], who covered all the 8 donor site with STSG, shows two cases had donor site complication as a form of unstable scar, which required excision, grafting and pressure garment [13].

Regarding outcome of the study, according to pre-set criteria among 30 cases, 26 (86.67%) cases were excellent, 04 (13.33%) cases were good. There was no case of satisfactory or poor outcome according to pre-set criteria. Overall post-operative complication rate was 13.34%. Among them, epidermal loss was found in 3 cases and marginal necrosis in one case. That may be due to the flaps were compromised due to venous congestion. All the cases were managed conservatively by secondary intension healing. Cheng et al. (2004) described no flap loss or any other complication. Only complaint from the patients was graft discoloration [7]. In the study of Waheduzzaman et al (2020), 9 flap have minor complication with 6 flap had epidermis loss and rest 3 had marginal tip necrosis of about 1 mm which healed secondarily and did not required any further intervention [15].

Conclusion

First dorsal metacarpal artery flap offers a reliable coverage for small to moderate sized thumb defects caused by electric burn. Moreover, it provides good functional outcomes with no donor site morbidity. It is a simple, effective and uncomplicated surgical technique.

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Original Article

Maternal Health in Pregnancy as Revealed by Anthropometry and Pregnancy Outcome

Kamrunnahar Sheuli[1], Sankar Prosad Biswas[2], Mst. Rahima Khatun[3], Farhana Hossain[4], Kaniz Fatema[5], Shammi Sultana Ferdousi[6], Joyanta Kumar Das[7], Md. Marufuzzaman[8]

Abstract

Background: The nutritional status of a woman before and during pregnancy is critical to both her infant's and her own health and survival. It determines her well-being and that of the fetus and child, and in turn the health and reproductive capacity of the next generation's mothers. Anthropometric assessment of nutritional status during the reproductive cycle, particularly during pregnancy, is a widely used, low-technology procedure that has seldom been rigorously evaluated. **Aims:** To find out the relationship of the maternal anthropometry status and pregnancy outcome. **Methods:** This retrospective cohort study was carried out on the patients admitted in the Obstetrics and Gynaecology department of Sir Salimullah Medical College and Mitford Hospital, Dhaka, Bangladesh during April 2015 to March 2016. A total of 155 pregnant women admitted for their delivery in the above mentioned hospital were included in this study. **Results:** Most (71.0%) of the subjects belonged to age 21-30 years and 64.5% multigravida. Mean weight at the time of delivery was 56.5±5.7 kg, Mean BMI kg/m² was 23.09±2.3 and MUAC 23.0±0.88 cm. Statistically significant change was found with mode of delivery when compared with different BMI group. Statistically significant change was also found only in maternal prolonged labour in different BMI group but no statistical significant change was found in maternal outcome when compared with different MUAC group. A significant positive correlation (r=0.107; p=0.033) was found between BMI and birth weight and also a significant positive correlation (r=0.353; p=0.001) was found between MUAC and birth weight. There were statistically significant change found in neonatal birth weight, birth asphyxia and neonatal ICU admission when compared with different maternal BMI group but no significant change was found in neonatal birth weight, birth asphyxia and neonatal ICU admission when compared with maternal different MUAC group. **Conclusion:** Overweight have shown strong association with pregnancy complications and outcome. Underweight women appear to have better maternal outcome than even women with BMI within normal range, but increase risk of LBW baby which have long term physical and psychological developmental effect on the baby. So every women must be maintained ideal BMI to get better pregnancy outcome.

Keywords: Maternal anthropometry, Body Mass Index (BMI), Mid Upper Arm Circumference (MUAC)

1. Assistant Professor, Department of Gynae & Obs, Satkhira Medical College, Satkhira, Bangladesh
2. Associate Professor, Department of Gynae & Obs, Satkhira Medical College, Satkhira, Bangladesh
3. Assistant Professor, Department of Gynae & Obs, Satkhira Medical College, Satkhira, Bangladesh
4. Assistant Professor, Department of Gynae & Obs, Satkhira Medical College, Satkhira, Bangladesh
5. Senior Consultant (Gynae), Satkhira Medical College Hospital, Satkhira, Bangladesh
6. Assistant Professor, Department of Gynae & Obs, Institute of Child and Mother Health, Dhaka, Bangladesh
7. Assistant Professor, Department of Gynae & Obs, Khulna Medical College, Khulna, Bangladesh
8. Assistant Professor, Department of Pediatrics, Satkhira Medical College, Satkhira, Bangladesh

Address of Correspondence: Dr. Kamrunnahar Sheuli, Assistant Professor, Dept. of Gynae and Obs, Satkhira Medical College, Satkhira, Bangladesh. Email: kamrunnahar.sheuli1969@gmail.com

Introduction

Maternal height and maternal pre-pregnancy weight have been shown to be independently related to infant birth weight [1, 2]. Maternal height reflects both the mother's genetic potential for growth and her early environmental experience, whereas maternal pre-pregnancy weight reflects both the mother's nutritional status and her height. On the other hand Garn and Pesick [2] suggest that weight adjusted for height has no advantage over unadjusted pre-pregnancy weight in predicting infant birth weight. Methods of adjusting weight for height have received considerable attention in chronic disease epidemiology [3, 4] but have been little examined for Hispanic women or in epidemiologic studies of pregnancy outcome [5].

There is general agreement that maternal obesity is associated with an increased risk of medical and pregnancy complications, including hypertension, pre-eclampsia, gestational diabetes mellitus, thrombophlebitis, labor abnormalities (including prolonged second-stage labor and shoulder dystocia), delivery after 42 weeks of gestation, and caesarian delivery [6].

The nutritional status of women as proxy by Mid Upper Arm Circumference (MUAC) a strong predictor of LBW [7]. Other studies conducted in African countries also reached on similar conclusion [8, 9]. Assefa et al. (2012) [7] showed the significant determinants identified for LBW were maternal MUAC under 23 cm increased 1.5 times LBW with 95CI 1.14 - 2.01 ($p<0.05$). Even though either acute or chronic maternal malnutrition has direct effect on the birth weight of a baby, acute maternal malnutrition has more pronounced effect. To proxy maternal nutritional status MUAC was used. A MUAC of less than 23cm was considered to be a sign of poor nutrition. MUAC doesn't vary much during pregnancy and is therefore an appropriate measure of nutritional status than BMI or weight [10, 11]. Persson et al. (2014) [12] reported in their population-based cohort study from Sweden, which clearly demonstrates increased risks of perinatal asphyxia-related complications with increasing maternal BMI in infants delivered at term.

According to National low birth weight (LBW) survey (2003-2004) low birth rate is quite high (36%) in Bangladesh. Infants are born with low weight either because they are premature (<37 weeks gestation at birth) and/or because they suffered intrauterine growth retardation (IUGR). The majority of LBW infants in developing countries are IUGR [13]. It is generally acknowledged that the etiology of LBW is multifactorial [14, 15].

Identifying determinates of LBW and preventing them helps in reducing early childhood morbidity and mortality resulting from LBW. On the basis of available evidence this study will highlight selected independent factors of LBW of Bangladesh and that will contribute in reducing the incidence of low birth weight in Bangladesh by evaluating the various options addressing this major public health problem. Different studies have revealed that significant risk factors for birth weight of a newborn varies according to the geographical location and the study population. Changing lifestyles, increasing urbanization, high calorie food consumption and reduced physical activity are responsible for increasing obesity in developing countries like Bangladesh. Research has shown that obesity is associated with a higher rate of perinatal complications.

Therefore, we assumed that, maternal anthropometry (BMI and MUAC) is associated with an increased risk of medical and pregnancy complications like hypertension, pre-eclampsia,

gestational diabetes mellitus, thrombophlebitis, labor abnormalities, postdated pregnancy and caesarian delivery. Hence, this study was undertaken to find out the association between maternal anthropometry status with maternal and neonatal outcome.

Methods

It was a retrospective cohort study carried out in the department of Obstetric and Gynaecology, Sir Salimullah Medical College and Mitford Hospital, Dhaka, Bangladesh from April 2015 to March 2016. A total of 155 pregnant women attending in-patient department of Obstetrics and Gynaecology, Satkhira Medical College and Mitford Hospital, Dhaka, Bangladesh for their delivery during the study period but who received 1st ANC with documented body weight were selected by using convenient sampling.

Inclusion criteria

- Term pregnancy (38-42 weeks of gestational age)
- Patients who have received first antenatal visit

Exclusion criteria

- Maternal chronic disease like diabetes, hypertension, thyroid disorder, multiple pregnancies
- History of previous pre-eclamsia
- Major congenital anomaly of the fetus

Procedure

The body weight was measured on bare footed. The average weight (0.5kg) of the clothes was later substracted from the measured weight. The measurement of weight done after the bladder has been emptied and before a meal. Heights of the subjects were measured barefooted in the standing position with meter scales. MUAC was measured in right arm at the level midway between acrimion and olecranon process in cm. Body mass index was determined by measuring weight (kg) divided by height square (meter).

Data Analysis

Statistical analysis was performed using Statistical Program for social science (SPSS of 20.0 version, Inc., Chicago, IL, USA). The observations were presented by frequencies and percentages. The continuous variables were expressed as mean ± SD (standard deviation). Chi-Square test was used to analyze the categorical variables, shown with cross tabulation and Pearson's correlation coefficient was used to test the relationship between anthropometric parameters with birth weight. P values <0.05 was considered as statistically significant.

Ethical consideration

Prior to the commencement of this study, the research protocol was approved by the Ethical review committee of Satkhira Medical College and Mitford Hospital, Dhaka, Bangladesh. The aims and objectives of the study along with its procedure, risks and benefits of this study was explained to the patients in easily understandable local language and then informed consent was taken from each patient.

Results

Table 1: Baseline parameters of the study subjects (n=155)

Baseline Parameters		Frequency n (%)
Age (year)	<20	28 (18)
	21-30	110 (71)
	>30	17 (11)
	Mean ± SD Range (min, max)	25.0 ± 4.3 (18, 35)
Gravida	1 (Primi)	55 (35.5)
	≥2 (Multi)	100 (64.5)

Table 1 shows baseline parameter of the study subject, it was observed that age 21-30 years (71.0%), multigravida (64.5%) were predominant.

Table 2: Distribution of the study subjects by maternal anthropometric measurement (n=155)

Maternal anthropometric measurements		Frequency n (%)
Height (meter)	≤1.52	82 (52.9)
	>1.52	73 (47.1)
	Mean±SD	1.55 ± 0.04
	(range)	(1.47, 165)
Weight at 1st trimester (kg)	≤50	13 (8.4)
	51-60	90 (58.1)
	61-70	47 (30.3)
	>70	5 (3.2)
	Mean ± SD	56.5 ± 5.7
	(range)	(44, 72)
BMI at 1st trimester (kg/m²)	<18.5	18 (11.6)
	18.5-24.9	122 (78.7)
	25.0-29.9	15 (9.7)
	Mean±SD	23.09 ± 2.3
	(range)	(18, 28)
MUAC (cm)	≤23	122 (78.7)
	>23	33 (21.3)
	Mean±SD	23.0 ± 0.88
	(range)	(22, 26)

Table 2 shows maternal anthropometric measurement of the study patients, it was observed that mean height was found 1.55±0.04 meter. The mean weight at the time of delivery was found 56.5±5.7 kg. Mean MUAC was found 23.0±0.88 cm. Mean BMI was found 23.09±2.3 kg/m².

Table 7: Correlation of neonatal birth weight with different sub groups of BMI.

Categories of BMI (kg/m²)	**Neonatal birth weight** Correlation co-efficient (r value)	***p* value**
Underweight (n=18)	0.308	0.152^{ns}
Normal weight (n= 122)	0.740	0.001^{s}
Overweight (n=15)	0.351	0.352^{ns}
Total patients (n=155)	0.107	0.033^{s}

Table 7 shows correlation of neonatal birth weight with different sub groups of BMI of the study subjects. Correlation co-efficient BMI was 0.308 in underweight, 0.740 in normal weight and 0.351 in overweight. Birth weight was positively correlated with BMI. The correlation between BMI with normal birth weight was statistically significant (p<0.05).

Discussion

This retrospective cohort study was carried out with an aim to compare the mode of delivery according to maternal BMI and MUAC and to list the maternal outcome in relation to maternal BMI and MUAC and also to list the neonatal outcome in relation to maternal BMI and MUAC.

Table 3: Association of BMI with mode of delivery (n=155)

Mode of delivery	**BMI** (kg/m²) **<18.5 (Underweight)** (n=18) (n %)	**18.5-24.9 (Normal)** (n=122) (n %)	**25.0-29.9 (Over weight)** (n=15) (n %)	***p* value**
Normal Vaginal delivery	14 (77.8)	80 (65.6)	5 (33.3)	0.021^{s}
Caesarean section	4 (22.2)	42 (34.4)	10 (66.7)	

p values reached from chi square test

Statistically significant (p<0.05) change was found with mode of delivery when compared with different BMI group.

Table 4: Association of MUAC with mode of delivery (n=155)

Mode of delivery	MUAC (cm) ≤23 (n=123) (n %)	MUAC (cm) >23 (n=133) (n %)	*p* value
Normal Vaginal delivery	85 (69.7)	17 (51.5)	0.051[ns]
Caesarean section	37 (30.3)	16 (48.5)	

ns = not significant, p value reached from chi square test

Statistically not significant (p>0.05) change was found with mode of delivery when compared with different MUAC group.

Table 5: Association between BMI with maternal outcome (n=155)

Maternal outcome		BMI (kg/m²) <18.5 (Underweight) (n=18) (n %)	BMI (kg/m²) 18.5-24.9 (Normal) (n=122) (n %)	BMI (kg/m²) 25.0-29.9 (Over weight) (n=15) (n %)	*p* value
Prolonged labour	Yes	3 (16.7)	22 (18)	10 (66.7)	0.001[s]
	No	15 (83.3)	100 (82)	5 (33.3)	
Shoulder dystocia	Yes	0 (0)	1 (0.8)	1 (6.7)	0.145[ns]
	No	18 (100)	121 (99.2)	14 (93.3)	
PPH	Yes	1 (5.6)	33 (27)	2 (13.3)	0.083[ns]
	No	17 (94.4)	89 (73)	13 (86.7)	
Perineal tear	Yes	0 (0)	5 (4.1)	2 (13.3)	0.164[ns]
	No	18 (100)	117	13 (86.7)	

s= significant, ns= not significant, p value reached from chi square test

Statistically significant (p<0.05) change was found only with prolonged labour when compared with different BMI group.

Table 6: Association between MUAC with maternal outcome (n=155)

Maternal outcome		MUAC (cm) ≤23 (n=123) (n %)	MUAC (cm) >23 (n=133) (n %)	*p* value
Prolonged labour	Yes	20 (16.4)	13 (39.4)	0.223[ns]
	No	102 (83.6)	20 (60.6)	
Shoulder dystocia	Yes	1 (0.8)	0 (0)	0.601[ns]
	No	121 (99.2)	33 (33)	
PPH	Yes	30 (24.6)	9 (27.3)	0.752[ns]
	No	92 (75.4)	24 (72.7)	
Perineal tear	Yes	4 (3.3)	3 (9.1)	0.153[ns]
	No	118 (96.7)	30 (90.9)	

ns=not significant, p value reached from chi-square test

Statistically not significant (p>0.05) change was found in maternal outcome when compared with different MUAC group.

Table 8: Association between BMI with neotantal outcome (n=155)

Neonatal outcome		BMI (kg/m²) <18.5 (Underweight) (n=18) (n %)	18.5-24.9 (Normal) (n=122) (n %)	25.0-29.9 (Over weight) (n=15) (n %)	*p* value
Birth weight (kg)	<2.5	2 (11.1)	2 (1.6)	0 (0)	0.048[s]
	2.5-4	16 (88.9)	120 (98.4)	15 (100)	
	>4	0 (0)	0 (0)	0 (0)	
Birth asphyxia	Yes	1 (5.6)	4 (3.3)	9 (60)	0.001[s]
	No	17 (94.4)	118 (96.7)	6 (40)	
Neonatal ICU admission	Yes	1 (5.6)	4 (3.3)	9 (60)	0.001[s]
	No	17 (94.4)	118 (96.7)	6 (40)	

ns=not significant, *p* value reached from chi-square test

Statistically significant (p<0.05) change was found in neonatal birth weight, birth asphyxia and neonatal ICU admission when compared with maternal different BMI group.

Table 9: Association between MUAC with neotantal outcome (n=155)

Neonatal outcome		MUAC (cm) ≤23 (n=122) (n %)	>23 (n=33) (n %)	*p* value
Birth weight (kg)	<2.5	2 (1.6)	1 (3.1)	0.606[ns]
	2.5-4	120 (98.4)	32 (96.9)	
	>4	0 (0)	0 (0)	
Birth asphyxia	Yes	2 (1.6)	2 (6.1)	0.155[ns]
	No	120 (98.4)	31 (93.9)	
Neonatal ICU admission	Yes	2 (1.6)	2 (6.1)	0.155[ns]
	No	120 (98.4)	31 (93.9)	

ns=not significant, *p* value reached from chi-square test

Statistically significant (p<0.05) change was found in neonatal birth weight, birth asphyxia and neonatal ICU admission when compared with maternal different MUAC group.

In this present study it was observed that more than almost three fourth (71.0%) subjects belonged to age 21-30 years. The mean age was found 25.0±4.3 years with range from 18 to 35 years. Similarly, Noor et al. (2015) [16] observed that mean maternal age of mother at the time of delivery was 23.9 ± 4.0 years with ranged from 18-40 years. Around 17.5% women were below the age of 20 years and 5.1% were above 35 years. In another study, Khatun and Rahman [17] mentioned that most of the mother of LBW babies in their study belonged to the under 19 years and more than 30 years whereas it was 20-29 years for the mother with normal birth weight babies. Thus the maternal age of 20-29 years has found to be the most suitable age group for giving birth to normal weight babies reported by the authors, Rafati et al. [18], Demir and Demir [19], Matin et al. [20], Jha et al. [21] and Roy et al. [22].

In this series it was observed that almost two third (64.5%) subjects were multigravida. Parity significantly influences birth weight reported by the researchers Lawoyin and

Oyediran [23]. Khatun and Rahman [17] mentioned that primiparity and multiparity are independent predictors of LBW in some studies. Azhar et al. [24] found that maternal Body Mass Index (BMI) is an important factor for birth weight of the newborn and incidence of LBW among the newborn was 0% for the maternal BMI >25 before conception and >30 before delivery. Mohanty et al. [10] and Janjua et al. [25] reported that women who had low Body Mass Index (BMI) is more likely to give birth to LBW babies than their counterparts. In this study it was observed that mean height was found 1.55±0.04 meter. The mean weight at the time of delivery was found 56.5±5.7 kg. Mean MUAC was found 23.0±0.88 cm. Similarly, Noor et al. [16] found the mean height and weight was 152.9 ± 6.3 cm and 46.7 ± 8.2 kg, respectively. Bhattacharya et al. [26] found 11.7% were underweight, 58.1% had normal BMI, 21.9% were overweight, 7.7% were obese and 0.6% were morbidly obese.

In this present study according to different BMI, it was observed that 14 (77.8%) subjects had normal vaginal delivery in <18.5 kg/m² (underweight) BMI group, 80 (65.6%) in 18.5-24.9 kg/m² (normal) BMI group and 5 (33.3%) in 25.0-29.9 kg/m² (over weight) BMI group. On the other hand only 4 (22.2%) subjects had underwent cesarean section in <18.5 kg/m² (underweight) BMI group, 42 (34.4%) in 18.5-24.9 kg/m² (normal) BMI group and 10 (66.7%) in 25.0-29.9 kg/m² (over weight) BMI group, which indicates that caesarian section more common in over weight. Similarly, Sherrard et al. [27] mentioned that pregravid obesity increased the likelihood of primary caesarean delivery before (OR=2.01, 95% CI 1.39-2.90) and after (OR=2.12, 95% CI 1.86-2.42) the onset of labour. Kiran et al. [28] found blood loss was significantly greater in the group of women with increased BMI, but the secondary postpartum haemorrhage [1.9% vs 1.5%] and blood transfusion [4% vs 3.0%] rates and number of women need to evacuation of uterus [0.4% vs 0.7%] were not significantly different. Apart from an increased risk of urinary tract infection, these women were not prone to any other postnatal complications. In those who underwent caesarean section, the wound infection rates were not significantly different.

In this present study it was observed that statistically significant ($p<0.05$) change was found only in prolonged labour when compared with different BMI group. Kiran et al. [28] noted a statistically increased risk of prolonged labour, failed trail of instrumental delivery in the raised BMI group, although this was potentially clinically less significant.

In this current study it was observed that statistically no significant ($p>0.05$) change was found in maternal outcome when compared with different MUAC group. Kruger and Pharm [29] reported that MUAC <22 cm are considered to be at risk of adverse pregnancy outcomes.

In this study it was observed that a significant positive significant correlation ($r=0.107$; $p=0.033$) was found between BMI and birth weight, which is closely resembled with Mohanty et al. [10] study, where the authors found a significant positive correlation ($r=0.30$; $p<0.05$) between BMI and birth weight. Similarly, Jananthan et al. [30] also observed a significant positive correlations with birth weight (BW) and BMI ($r=0.24$; $p<0.05$).

In this study it was observed that a significant positive correlation ($r=0.353$; $p=0.001$) was found between MUAC and birth weight. Similarly, Mohanty et al. [10] found a significant positive correlation ($r=0.30$; $p<0.05$) between MUAC and birth weight.

In this series it was observed that statistically significant ($p<0.05$) change was found in neonatal birth weight, birth asphyxia and neonatal ICU admission. Low birth weight was more common at the two extreme ends of the BMI categories, this remained significant after adjusting for confounders, only in underweight women who had an Odds Ratio 1.7 (95% CI 1.2, 2.0) compared to normal. It was observed that statistically no significant ($p>0.05$) change was found in neonatal birth weight birth asphyxia and neonatal ICU admission when compared with maternal different MUAC group. Similarly, Azhar et al. [24] found highest (55.3%) incidence of LBW when maternal MUAC was <22.0cm and lowest (16.9%) when it was between 26.1-28cm. Incidence of inadequate birth weight was 50.0% when maternal MUAC was >29cm and 31.6% when it was <22.0cm. The incidence of adequate birth weight was highest (50.0%) when maternal MUAC was >29cm and lowest (13.2%) when MUAC was <22.0cm. The finding is statistically highly significant. The difference in mean birth weight was found to be 563.16g between the highest and lowest MUAC group of mothers ($P<0.05$), which was also significant. The nutritional status of women as proxy by MUAC was also a strong predictor of LBW. Even though either acute or chronic maternal malnutrition has direct effect on the birth weight of a baby, acute maternal malnutrition has more pronounced effect [8, 31].

Conclusion

Increasing obesity in reproductive age group in developing country like Bangladesh is now a major public health concern. Overweight have shown strong association with pregnancy complications and outcome. So prevention of excessive weight gain must begin in the pre-conception period. Obstetrical care providers must counsel their obese patients regarding the risks and complications conferred by obesity and the importance of weight loss. Underweight women appear to have better meternal outcome than even women with BMI within normal range, but increase risk of LBW baby which have long term physical and psychological developmental effect on the baby. So every women must be maintained ideal BMI to get better pregnancy outcome. Further studies can be undertaken by including large number of patients from different socio demographical aspect.

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Original Article

Urinary Tract Infection: Clinical Presentation and Antibiotic Sensitivity Pattern of Culture Positive Cases: Our Experience

Md. Marufuzzaman[1], Md. Shamsur Rahman[2], Md. Hafizur Rahman[3], Md. Iqbal Hossain[4], Muhammad Solaiman Mollah[5], Mohammad Kabirul Islam[6], S. M. Abdur Rashid[7], Kamrunnahar Sheuli[8], Md. Miraz Ali[9], Tamanna Mohiuddin[10]

Abstract

Background: Urinary tract infection (UTI) is defined as bacterial colonization of portions of the urinary tract that are normally sterile (i.e., kidneys, ureters, bladder, proximal urethra). It is the most common bacterial infection in childhood. It is associated with less mortality but significant morbidity if not treated properly. **Objectives:** This study was conducted to evaluate the clinical presentations, laboratory findings of UTI and antibiotic sensitivity patterns of culture positive cases of UTI, attending OPD of Satkhira Medical College Hospital and non-government clinics/ hospitals in Satkhira district of Bangladesh. **Methods:** This prospective study was conducted in Satkhira Medical College Hospital and non-government clinics/ hospitals in Satkhira district of Bangladesh with a total of 63 urine culture positive cases, both boys and girls with symptoms of UTI. The study period was April 2022 to October 2022. Convenient purposive sampling was the sampling method. **Results:** Among 63 cases, 40 girls and 23 boys were found and female to male ratio was 1.74. Highest number of cases belonged to age group of 0-5 years (52.4%). The most common symptom was fever (52.4%). Among all cases *Escherichia coli* was the commonest isolated organism (85.7%). Nitrofurantoin (95%), Ceftriaxone (81%), Cefuroxime (71.4%) and Ciprofloxacin (71.4%) were found highly sensitive and on the other hand Cefixime (88.2%) and Nalidixic acid (85.7%) were found highly resistant among the tested antibiotics. **Conclusion:** UTI is more common in girls than boys and majority victims are of under 5 years children. E.coli is the commonest organism responsible for UTI. Nitrofurantoin, Cefuroxime and Ciprofloxacin can be used empirically for treating UTI after sending urine for culture and sensitivity testing.

Keywords: UTI, culture positive, antibiotic sensitivity.

1. Assistant Professor, Department of Pediatrics, Satkhira Medical College, Satkhira, Bangladesh
2. Assistant Professor, Department of Pediatrics, Satkhira Medical College, Satkhira, Bangladesh
3. Senior Consultant (Pediatrics), Satkhira Medical College Hospital, Satkhira, Bangladesh
4. Assistant Professor, Department of Pediatrics, Jashore Medical College, Jashore, Bangladesh
5. Assistant Professor, Department of Pediatrics, Sylhet MAG Osmani Medical College, Sylhet, Bangladesh
6. Assistant Professor, Department of Pediatrics, Khulna Medical College, Khulna, Bangladesh
7. Assistant Professor, Department of Pediatrics, Khulna Medical College, Khulna, Bangladesh
8. Assistant Professor, Department of Gynae & Obs, Satkhira Medical College, Satkhira, Bangladesh
9. Assistant Professor, Pediatrics, Netrokona Medical College, Netrokona, Bangladesh
10. Junior Consultant, Pediatrics, Upazila Health Complex, Dighalia, Khulna, Bangladesh

Address of Correspondence: Dr. Md. Marufuzzaman, Assistant Professor & Head, Department of Pediatrics, Satkhira Medical College, Satkhira, Bangladesh. Email: maruf.z@gmail.com

Introduction

Urinary tract infection (UTI) is the most common bacterial infection in childhood [1]. It causes significant illness in children [2]. About 1/3 of infants and children experience recurrent infections during the 1st 6-12 month after initial UTI [3, 4]. Symptoms of childhood UTI differs among different age groups. Most of the infections are caused by *Escherichia coli* (E. coli). Other organisms responsible for are *Klebsiella pneumoniae, Enterobacter supp., Enterococcus spp., Pseudomonas* [5, 6, 7]. The

incidence of UTI varies according to age, sex and race. About 1% of boys and 3% of girls suffer from UTI during the first 10 years of age. Male children suffer more in the 1st year of life and most female children after 1 year [8].

Clinical presentations of UTI depend on age, site of infection and severity [9]. Among neonates, infants and young children, fever is the main presentation, whereas, older children present with other symptoms [10]. Dysuria, malodorous urine, increase frequency of micturition with urgency, turbid urine, urinary sedimentation, abdominal pain are the common complaints. Other non-specific symptoms are poor feeding, irritability, weight loss and not gaining weight [11, 12]. Urine culture and sensitivity is the gold standard for the diagnosis of UTI [13]. A colony count of more than 105 colony forming unit (CFU) / ml of organism of a single species in mid-stream urine of girls and more than 104 CFU/ml organism in boys urine are considered confirmatory of UTI. A pure growth of ≥ 102 CFU/ ml from catheterized urine sample or growth of any number of uropathogen from urine obtained by suprapubic aspiration is considered as significant bacteriuria [14].

UTI alone accounts significant outpatient department (OPD) visits [15]. Though there is less mortality with UTI, still it is an important cause of morbidity in children. Prompt diagnosis and early initiation of appropriate antibiotic therapy reduce the UTI associated morbidity like renal scaring and chronic kidney disease (CKD). The aim of this study therefore, was to evaluate the clinical presentations, laboratory findings and antibiotic sensitivity patterns of culture positive cases of UTI, attending the OPD of Satkhira Medical College Hospital (SMCH) and non-government clinics/ hospitals in Satkhira district of Bangladesh.

Materials and Methods

This prospective study was conducted among the patients attending the outpatient department (OPD) of Satkhira Medical College Hospital and non-government clinics/hospitals in the Satkhira district of Bangladesh. The study period was April 2022 to October 2022. A total of 63 cases, both boys and girls with symptoms of UTI and urine culture positive were included. Convenient purposive sampling was used as a method of selecting study sample. 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, Satkhira, Bangladesh.

Detailed history of symptoms was taken. General and systemic physical examination were carried out in all patients. Routine test for urine (Urinalysis), along with routine blood tests (i.e; CBC, CRP) were done. Urine samples were collected with strict aseptic measures and mid-stream urine was taken as sample. Culture and sensitivity tests were done in aerobic and microaerobic condition at 37º C for 48 hours. Pyuria was considered if ≥5 WBC/HPF in centrifuged urine or ≥10 WBC/HPF in uncentrifuged urine. A urine specimen was considered culture positive, if an single organism was cultured with ≥105 colony forming unit (CFU) per ml.

Results

There were 63 patients (aged from 1 month to 12 years) enrolled in this study from April 2022 to October 2022 attending the OPD of SMCH and non-government clinics/hospitals in Satkhira district of Bangladesh. All the cases were selected clinically and finally taken on urine culture positivity for UTI. A total number of 40 girls and 23 boys were found and female to male ratio was 1.74. Highest number of

cases belonged to age group of 0-5 years (Table 1). The most common clinical presentation was fever (52.4%), followed by increased frequency of micturition (47.6%), anorexia (33%), abdominal pain (23.8%), vomiting (14%), dysuria (14%), enuresis (14%) and constipation (14%) (Table 2). Among all 63 culture positive cases, E. coli (54 cases, 85.7%) is the most common organism isolated, followed by Enterococcus (6 cases, 9.52%) and Staphylococcus (cases, 4.76%) (Figure 1).

The higher antibiotic sensitivity pattern among all 63 cases were found with Ceftriaxone (81%), Cefuroxime (71.4%) and Ciprofloxacin (71.4%) and Nalidixic acid was found highly resistant (85.7%). Other significantly sensitive antibiotics were Nitrofurantoin, Meropenem, Gentamycin and Co-Amoxyclav. One of the widely used antibiotic, Cefixime was found highly resistant (Table 3).

Table 1: Age and sex distribution of the study subjects.

Sex	0-5 Years n (%)	5-10 Years n (%)	>10 Years n (%)	Total n (%)
Boys	13 (20.6)	7 (11.1)	3 (4.8)	23 (36.5)
Girls	20 (31.7)	16 (25.4)	4 (6.3)	40 (63.5)
Total	33 (52.4)	23 (36.5)	7 (11.1)	63 (100)

Table 2: Clinical presentation of UTI in children

Presentation	Frequency n (%)
Fever	33 (52.4)
Increase frequency	30 (47.6)
Anorexia	21 (33)
Abdominal pain	15 (23.8)
Vomiting	9 (14)
Dysuria	9 (14)
Enuresis	9 (14)
Constipation	9 (14)
Malodorous urine	6 (9.6)
Others	12 (19)

Other symptoms include hiccup, urinary sedimentation, abdominal distention and hematuria.

Table 3: Antibiotic sensitivity of isolated organisms.

Antibiotic	Sensitivity tested	Sensitive	Resistant
Amikacin	15	15 (100)	0 (0)
Cephalexin	18	15 (88.3)	3 (16.67)
Cefixime	51	6 (11.76)	45 (88.2)
Cefotaxime	12	6 (50)	6 (50)
Ceftazidime	18	6 (33.3)	12 (66.6)
Ceftriaxone	63	51 (81)	12 (19)
Cefuroxime	63	45 (71.4)	18 (28.6)
Ciprofloxacin	63	45 (71.4)	18 (28.6)
Co-Amoxyclav	54	48 (88.9)	6 (11.1)
Gentamycin	51	42 (82.3)	9 (17.7)
Imepenem	9	9 (100)	0 (0)
Levofloxacin	45	36 (80)	9 (20)
Meropenem	57	54 (94.7)	3 (5.3)
Nalidixic acid	63	9 (14.3)	54 (85.7)
Nitrofurantoin	60	57 (95)	3 (5)

Figure 1: Organism isolated.

Discussion

In our study, we found that the majority of patients belonged to age group of 0 to 5 years (Table 1). This finding is similar to other studies [2, 16]. Poor toilet training and likelihood of ascending infection could be the contributing factors [17]. In this present study female to male children ratio was 1.74, which is also another similarity found in other previous studies [15, 17, 18]. Probably short urethra in female child is another risk factor for more UTI in girls. Boys are more susceptible because of higher incidence of congenital malformation. The gender ratio usually reversed as the age

increases.

In our study, fever was the most common clinical presentation (52.4%), which is similar to other studies both in home and abroad [2, 15, 16, 18, 19]. Other complaints were increased frequency of micturition (47.6%), anorexia (33%), abdominal pain (23.8%), dysuria (14%), vomiting (14%), and constipation (14%) (Table-2). These findings are also consistent with previous other studies [2, 16, 19, 20]. Other presentations like malodorous urine, hematuria, abdominal distention, hiccup, urinary sedimentation were also been observed. All these findings indicate a wide range of symptoms and signs suggestive of UTI [1, 2, 21].

In our clinical practice, UTI is suspected mainly based on clinical presentations. Often urinalysis is also done. Bacterial pyuria is not always evident and urine culture and sensitivity is a costly test. But urine culture and sensitivity is the gold standard for diagnosing UTI [13]. Urinalysis should be done initially, so that treatment can be started early and before the result of culture and sensitivity are available. UTI is not ruled out in the absence of significant pyuria (5BC/HPF) [20]. Whenever possible, urine culture and sensitivity should be done, as children may present with complaints suggestive of UTI despite negative urinalysis.

In this present study, E.coli (54 cases, 85.7%) was the most prevalent isolated organism, like other previous studies [8, 14]. Other organisms, isolated are Enterococcus (6 cases, 9.52%) and Staphylococcus (3 cases, 4.76%). These findings were almost consistent with studies conducted by Ladhini and Gransden [22].

The sensitivity patterns of antibiotics are different among many study reports. The antibiotic sensitivity patterns of our study showed that Ceftriaxone (81%), Cefuroxime (71.4%) and Ciprofloxacin (71.4%) are highly sensitive to all isolated organisms. Other sensitive antibiotics were Nitrofurantoin, Meropenem, Gentamycin, Co-Amoxyclav and Levofloxacin (Table 3). In our country, study conducted by Nazme et al. found similar antibiotic sensitivity patterns [2]. Cefixime (88.2%) and Nalidixic acid (85.7%) showed maximum resistance to isolated organisms. This is also in close agreement with other studies [17, 23].

There are wide variations of organisms and their sensitivity patterns depending on geographical establishments. Inappropriate and injudicious use of antibiotics hamper effective treatment of UTI and pose increase risk of renal scaring and chronic kidney disease (CKD) in later life. So empirical treatment of UTI should be started with “best known’ antibiotic according to local antibiotic guideline [2, 24].

Conclusion

UTI is one of the most common infection in children. In our study girls are more sufferers and majority victims are of under 5 years children. This study evaluated common clinical presentations, patterns of cultured organisms and their antibiotic sensitivity. Fever and increase frequency of micturition are the leading complaints. Urinalysis is the primary requisite for diagnosing UTI, although absence of pyuria does not rule out UTI. Culture and sensitivity is the gold standard practice for UTI management. E. coli is the commonest isolated organism. Ceftriaxone, Cefuroxime, Ciprofloxacin, Levofloxacin, Co-Amoxyclav, Nitrofurantoin are the highly sensitive antibiotics. Cefixime and Nalidixic acid found highly resistant. Co-Amoxyclav, Ciprofloxacillin, Levofloxacillin, Nitrofurantoin can be used as first line drugs during empirical treatment of UTI and when

ever possible, urine culture and sensitivity tests should be done for proper treatment and to reduce the burden of development of renal scaring and CKD.

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