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WHO, 2010. Avian influenza – situation in Vietnam- update 8.

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Average Working Length of Maxillary Central Incisor- A Single-Centre Study in Bangladesh

Abdullah Al Mahmud ^{*1}, Farhad Farzana², Md. Atiqul Islam Rabby³, Iffat Ara Ferdoushi⁴

Abstract

Introduction: The permanent maxillary central incisor is the most visible tooth in the mouth and endodontic treatments are frequently performed in maxillary incisors. Over-instrumentation may cause periradicular inflammation, postoperative pain, and inhibition of the healing process. Working length (WL) determination and maintenance is therefore of major importance. **Materials and Methods:** This prospective study was conducted in Dhaka Dental College & Hospital, Dhaka from May 2013 to November 2013. A total of 39 cases were included in this study. For electronic method of WL determination iPex NSK (Japan) was used. The radiographic working length was determined by evaluating the position of the end of the file in the canal on the radiograph and it was 0.5 to 1.0 mm short of radiological apex. **Results:** Pain (94.9%) and trauma (56.4%) were the most common history among the study population. In clinical findings, caries was the most common (56.4%) than swelling was present in 35.9% cases and discoloration was in 30.8% cases. In all cases we found single root of maxillary central incisors. Mean working length (WL) of our study population by apex locator was 21.423 ± 1.259 and by radiograph it was 21.397 ± 1.176 ; there was no statistically significant difference in WL between these two methods ($p=0.743$). **Conclusion:** According to radiographic method working length of our study population was 21.39 mm. WL of our study population was found to be less than the values found by the other studies population like Caucasians, African, Sinhalese, Mongolian and Korean.

Keywords: Maxillary central incisor, working length, Bangladesh.

Number of Tables:05; Number of Figures: 03; Number of References: 25; Number of Correspondences: 02.

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Introduction:

The prime concern of endodontic treatment is cleaning, disinfecting, shaping & obturation of the root canal system. Root canal preparation and obturation should be within the tooth canal, it should not extend beyond the apical constriction of the root canal¹. Over biomechanical preparation may cause several types of side effect likes periradicular inflammation, postoperative pain and inhibition of healing pathway². So, accurate working length (WL) determination and maintenance is therefore of key importance. The WL is "the distance from a coronal reference point to the point at which canal preparation and filling should terminate"³. Apical constriction coincides with the narrowest diameter of the root canal, anatomically it indicates the apical boundary for the extinction of endodontic treatments⁴, and as it often helps in WL determination³. In clinical setting locating of the AC is critical. In relation to the apical foramen the location of the CDJ is varied⁵. It is commonly accepted as being 0.50-0.75 mm coronal to the apical foramen⁶. The maxillary central incisor (MCI) is the most visible tooth in the mouth. Principle functions of MCI are included incising, speech, articulating providing lip support, maintaining aesthetics and guiding the mandible posteriorly in the final phase of closure and occlusion of posterior teeth⁷. It is so vital in maintained in the dental arch⁷. This is sometimes hard as because the tooth is one of the frequent traumatized tooth⁸; that's why it is the most endodontically treated tooth⁹.

Generally incidents of trauma to this tooth occur between the ages of 11-23 years^{8,10} and more frequently in male¹¹; hence MCI is the most endodontically treated tooth in the dental arch^{12,13}. The majority of the accessible study findings are on Caucasian population of Europe & USA, there is no plenty of information supporting for the use of tooth length in non-Caucasian; especially Bangladeshi people. A review of literature exposed that there is a lack of information on average endodontic working length reference for permanent maxillary central incisors in Bangladeshi. The accessible reference information on known tooth length is based on Caucasians¹⁴ and Asian¹⁵ studies; which are the solitary references for endodontic treatment for Bangladeshi. Open literature shows a difference in dental anatomy based on sex, race and genetics¹⁶⁻¹⁸. This study is to establish an average working length for the permanent maxillary central incisor in the Bangladeshi population and explore the similarity and dissimilarity with other populations; and to identify any gender variation.

Materials and Methods:

This study was a Prospective study, conducted in the department of Conservative Dentistry & Endodontic of Dhaka Dental College & Hospital, Dhaka, Bangladesh. The study was conducted from May 2013 to November 2013. A total of 39 patients were taken as sample population for this study came to the department. The sampling method was purposive sampling. The central limit theorem¹⁹ suggest that at least 30 cases are required for calculating mean with an assumption of normal distribution. Reviewing the previous similar studies, this sample size appeared as a well acceptable sample size for this study.

Patients of 15 to 60 years old regardless of sex and race were included in this study. Patients, who were aged above 60 years and below 15 years, tooth with open apices or blunderbass canal, apical resorption, calcification in the root canal, Fractured or broken tooth, patient with cardiac prosthesis were excluded from this study.

Working length was the distance from a coronal reference point to the point at which canal preparation and obturation should terminate. Working length was estimated by the electronic method first and then by the radiographic method. For electronic method of working length estimation apex locator of Fourth generation named iPex from NSK(Japan) was used. Working length determination was began first with apex locator (iPEX) according to the device's manufacturer instruction. Then the same file in the same length that was obtained by electronic method was again inserted into the canal and a radiograph was taken. Then the radiographic working length was determined by evaluating the position of the end of the file in the canal on the radiograph and it was 0.5 to 1.0 mm short of radiological apex. And this value was then documented as estimated working length by radiographic method. Finally, the acquired values by these two methods were compared statistically.

Ethical clearance was obtained from the Ethical Committee of Dhaka Dental College. Written informed consent was taken from the patient's or legal guardian. Patient confidentiality was strictly maintained. No names, addresses or contact details of the patients were divulged.

Statistical analysis using descriptive statistic was done. All quantitative values were presented as mean $\pm$ SD for continuous data and as percentages for categorical data. Qualitative data were presented as frequency and percentage. Quantitative data was analyzed by student's t-test. All tests were two-tailed and statistically significant results will be considered when p value < 0.05. All statistical operations were analyzed by SPSS version 20 and Micro-soft Excel 10.

Results:

A total of 39 patients, aged 15 to 60 years were included in this study. Among them 20(51.3%) were male and 19(48.7%) were female, with M:F ratio of 1:1.05 (Figure 1). Majority (53.9%) of the patients were within 21-30 years of age, mean age of our study population was 29.51 ± 10.05 (Table I). Pain was the most common (94.9%) history among the study population. History of trauma was in 22(56.4%) cases. In clinical findings, caries was the most common (43.6%) than swelling was present in 35.9% cases; discoloration was in 30.8% cases and sinus in 20.5% cases (Figure 2). In our study 100% cases we found single root of maxillary central incisors (Table II). Mean working length (WL) of our study population by apex locator was 21.423 ± 1.259 and by radiograph it was 21.397 ± 1.176 ; there was no statistically significant difference of WL between these two methods ($p=0.743$) (Table III). Distribution of mean working length in male and female is shown in figure 3. The mean WL of female was significantly less than male ($p < 0.5$) (Table IV). Table V shows working length of maxillary central incisor in different ethnic population. The overall variation of the WL of different populations from our study population were ranged from +0.61 to +4.41 mm. So WL of our study population was found to be less than the values found by the other researchers in different countries.

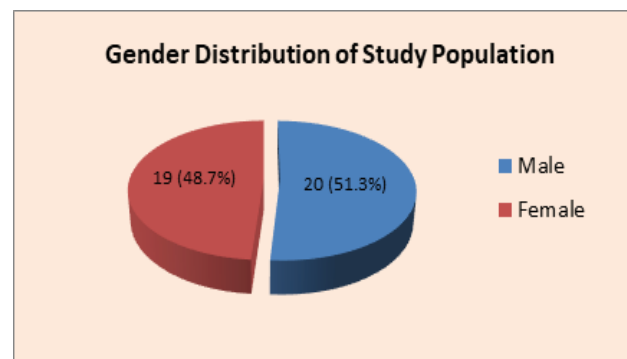
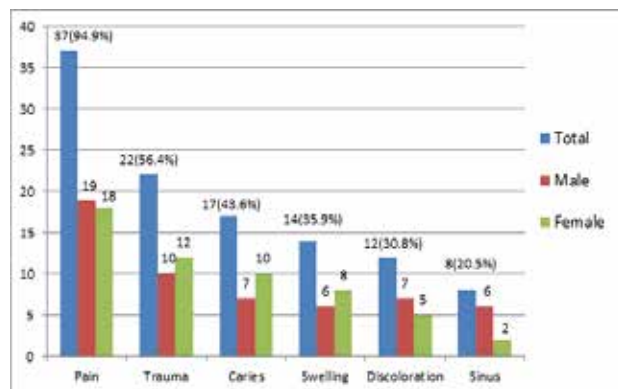
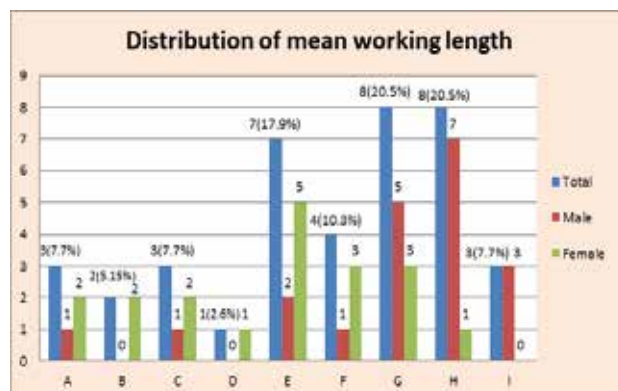


Figure 1: Gender distribution of the study population

Table I: Age with sex distribution of the study population

Age	Male n (%)	Female n (%)	Total n (%)
15-20	1(2.6)	4(10.3%)	5(12.8%)
21-25	5(12.8)	7(17.9%)	12(30.8%)
26-30	6(15.4)	3(7.7%)	9(23.1%)
31-35	2(5.1)	2(5.1%)	4(10.3%)
36-40	3(7.7)	3(7.7%)	6(15.4%)
41-45	0	0	0
46-50	1(2.6)	0	1(2.6)
51-55	1(2.6)	0	1(2.6)
56-60	1(2.6)	0	1(2.6)
Total	20(51.3%)	19(48.7%)	39(100.0%)
Min-Max			
15-60	32.4±11.4	26.47±7.46	29.51±10.05
P	0.065		

**Figure 2: Clinical history & findings of study population****Figure 3: Distribution of mean working length in male and female**

Key: A=19mm, B= 19.5mm, C=20mm, D=20.5mm, E=21mm, F=21.5mm, G=22mm, H=22.5mm, I=23mm

Table II: The percentage of the number of maxillary incisor root

Number of Roots	n (%)
Single root	39 (100%)
>1 (More than one)	-

Table III: Measured working length (WL) of the study population

WL by Apex locator	WL by Radiograph	P
21.423±1.259	21.397±1.176	0.743

Table IV: Working length by Apex locator Vs Radiograph in Male & Female

Method	WL in male	WL in female	P
Apex Locator	21.95±1.05	20.87±1.25	0.0057
Radiograph	21.95±1.02	20.82±1.06	0.0016

Table V: Working length of maxillary central incisor in different ethnic population

Principle Author & year of publication	Study country/ Ethnic group	Method of length measurement	Length in mm	Variation from our study population (in mm)
Harries EF 2006 ²⁵	UAS (White American)	CBCT	25.8	+4.41
Sede MA, 2013 ²⁰	Nigeria (African)	Both Apex locator & radiograph	25.0	+3.61
Kim E 2005 ²²	USA (Caucasian)	Both Apex locator & radiograph	23.5	+2.11
JayawardenaCK 2009 ²³	Sri Lanka (Sinhalese)	Digital calipers on extracted tooth	23.12	+1.73
Chi SH 2017 ²⁴	South Korea (Korean)	CBCT	22.8	+1.41
Carrotte P 2004 ¹⁴	UK, USA (Caucasian)	Radiograph	22.5	+1.11
Kartika Dewi, 2017 ²¹	Indonesia (Mongoloid)	Radiograph (with digital caliper)	22.03	+0.64
Kim E, 2005 ²²	South Korea (Korean)	Both Apex locator & radiograph	22.0	+0.61

Discussion:

Working length is the distance from a coronal reference point to the point at which canal preparation and obturation should terminate³. Working length was estimated by the electronic method first and then by the radiographic method. The apical foramen is the main apical opening of the root canal. It is frequently eccentrically located away from radiological apex. The apical constrictor is the apical portion of the root canal having the narrowest diameter, this position may vary but it is usually 0.5 to 1.0 mm short of the apical foramen. The determination of the working length and its maintenance during cleaning and shaping procedures are key factors for successful endodontic treatment.

This study has shown that electronic measurements, in general, tend to be same with radiographic measurements. The mean working lengths by electronic method and by radiographic method were 21.42 mm and 21.39 mm with standard deviation of 1.26 and 1.17 respectively. In Paired sample test, mean difference between electronic and radiographic working length at 5% level of significance was 0.0256 mm. Correlation was 0.923. Here, $t = 0.33$, this calculated t value is less than the critical t value. And here $p = 0.74$ at 95% confidence interval, that is $p > 0.05$. So, statistical analysis and comparison revealed that the differences between two measured values are not significant and statistically there is no significant difference between electronic measurement and radiographic measurement in working length determination. So the average tooth length of upper central incisor was founded to be approximately 22 mm. The mean WL of female (20.82 ± 1.06) was significantly less than male (21.95 ± 1.02) ($p = 0.0016$).

To access the tooth & working length of maxillary central incisor, several studies have been done on different ethnic groups in different countries around the world by using different methods^{14,20-25}. Sede MA et al. conducted his study in Nigeria on African population with both apex locator & radiograph²⁰. His study revealed a value of 25.0 mm as the average working length of permanent maxillary central incisor in Nigerian adult. By using same type of methods Kim E et al. founded 23.5 mm as the average working length of maxillary central incisor of Caucasian²². He conducted his study in Philadelphia in USA. In another study by Carrotte P et al. reported 22.5mm was the average length of Caucasian maxillary central incisor. With cone beam computed tomography (CBCT) Harries EF et al. conducted his study among white American people; in his study he found average tooth length of maxillary central incisor was 25.8mm²⁵.

According to Jayawardena CK et al. the mean tooth length of maxillary central incisors of Sri Lankan Sinhalese populations was 23.12; the method was direct measurement with digital calipers on extracted teeth²³. In 2005 Kim E et al. conducting a comparative study of root canal length between Asian (Korean) and Caucasians (USA), in that study it was found that root canal length of maxillary central incisor of Korean people was 20.0mm²². In his study Kim uses both apex locator and radiograph methods. But in another research among Korean by Chi SH it was seen that the mean length of maxillary central incisors was 22.8mm²⁴. Chi SH used cone beam computed tomography (CBCT) in his research. In Indonesia, Kartika Dewi conducted research on Mongoloid race by using periapical radiography. From her study it has been known that the length of maxillary central incisors of Indonesian Mongoloid race was 22.03mm²¹. The overall variation of the WL of different populations from our study population were ranged from +0.61 to +4.41 mm. So WL of our study population was found to be less than the values found by

the other researches^{14, 20-25}.

In our study there was no significant difference in male (51.3%) and female (48.7%) proportion, where male (63.6%) were predominant in African population²⁰ and female (79.0%) were predominant in Korean population²⁴. Majority (53.9%) of our study patients were within 21-30 years of age, that was similar with the study of Sede MA. In our study 100% cases we found single root of maxillary central incisors. Similar finding was reported by Kartika Dewi²¹. Pain was the most common (94.9%) history among the study population; history of trauma was in 56.4% cases and in clinical findings, caries was the most common (56.4%). In African population trauma (61.4%) was the common indication for root canal treatment of maxillary central incisor²⁰.

As our study design and the sample size did not represent the whole community of Bangladesh, a study with larger scale which will represent our whole community, should be carried out to verify the real picture of the average tooth length of upper central incisor in our community.

Conclusion:

According to radiographic method of working length of our study population was 21.39 mm. so the average tooth length of upper central incisor was founded approximately 22 mm. WL of our study population was found to be less than the values found by the other studies population like Caucasians, African, Sinhalese, Mongolian and Korean.

Conflict of Interest: None.

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ST Segment Score on Initial Electrocardiogram (ECG) as a Predictor of In-Hospital Outcome of ST-Elevated Myocardial Infarction (STEMI) Patients

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Abstract :

Introduction : The process of myocardial infarction progresses over several hours and therefore most patients present when it is still possible to salvage myocardium. ECG is usually a sensitive and specific way of confirming diagnosis. ST segment score (STSS) in myocardial infarction is emphasized but not often quantified. HJ Wellens gave cutoff for STSS in anterior wall MI (AWMI) of 12 mm and inferior wall MI (IWMI) of 7 mm. In this study the predictive value of ST Segment Score (STSS) with patients of STEMI on admission ECG & after thrombolysis had been assessed.

Objectives: Identify patients at higher risk early in the course of their hospital admission & correlation of initial ECG and post thrombolysis ECG regarding clinical outcome. **Materials and Methods:** Considering inclusion and exclusion criteria 112 patients admitted in CCU, DMCH during October 2007 to September 2008 were studied of which 64 were inferior STEMI and 48 were anterior STEMI. Like admission ECG, after 90 minutes of starting thrombolytic, another ECG was recorded and calculated. Echocardiography was done for each patient before discharge. Data was collected in a pre-designed form. **Results:** The mean age of Group-I was 55.2 ± 12.2 years and that of Group-II 56.9 ± 14.1 years, Group-III 59.2 ± 11.7 years, Group-IV 55.0 ± 12.6 years. Of the 30 patients studied in Group-I 76.7% was male and 23.3% female. Smoking was the most prevalent (60% in Group I, 58.8% in Group II) risk factor. In post thrombolytic ECG shows that in Group-I mean sum of ST elevation decreased to 3.9 ± 1.1 mm from 4.8 ± 1.2 mm. which was approximately (45+14)% of ST resolution, in Group-II (50+19%), in Group-III (55+19%), in Group-IV (45+23)%. **Conclusion:** Significant differences were seen in chest pain, killip class, arrhythmia, echocardiographic LVEF, duration of hospital stay in patients with AWMI & STSS above 12 mm and IWMI & STSS above 7 mm in comparison with below these level even after use of thrombolytics.

Keywords: ST segment score, STEMI, LVEF.

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Introduction:

Ischemic heart disease (IHD) is a major health problem throughout the world¹. Myocardial infarction is one of the leading cause of death in Bangladesh mostly in the fourth decade of life main cause of death was pump failure (53%) and ventricular fibrillation (27%)^{2,3}. Myocardial infarction (MI) is almost always due to the formation of occlusive thrombus at the site of rupture or erosion of an atheromatous plaque in a coronary artery⁴. The process of infarction progresses over several hours and therefore most patients present when it is still possible to salvage myocardium⁵. Diabetes Mellitus, hypertension, high cholesterol, smoking, male sex, family history, old age are major and homocysteine, inactivity etc. are minor risk factors⁶. Clinical presentation of MI ranges from mild chest pain to sudden severe chest pain⁷. The ECG is usually a sensitive and specific way of confirming the diagnosis of MI⁸. Myocardial necrosis is associated with the release of diagnostic markers for AMI. An absolute level of CK-MB-2 isoform greater than 1.0 U/L or a ratio of CK-MB-2/CK-MB-1 greater than 2.5 has a sensitivity for diagnosing AMI of 46.4% at 4 hours & 91.5% at 6 hours⁹. Ideally, an early prognostic indicator in patients with acute myocardial infarction should be simple, quick, noninvasive and easy to use in all patients. An assessment by ECG criteria would fulfill all of these claims¹⁰. The ST segment score (STSS) in myocardial infarction is emphasized but not often quantified. HJ Wellens gave cutoff for STSS in anterior wall

MI (AWMI) of 12 mm and inferior wall MI (IWMI) of 7 mm. The outcomes may be worsen in patients with STSS above this value¹¹. Total ST- segment elevation on the initial ECG can also predict the final acute myocardial infarct size^{8,12,13}. Reperfusion strategies in the early phase of treatment of acute myocardial infarction aim to rapidly normalise and maintain tissue perfusion. Primary angioplasty is probably the best current treatment but it can only be applied to a minority of patients. A number of methods are available to identify patients of failed thrombolysis and although they are imprecise, a convenient and easy- to- use method is to examine the ST segments on the standard 12 lead ECG. The amount of ST segment resolution within 90 minutes after the start of thrombolytic therapy conveys very useful information about the outcome¹⁴. In this study the predictive value of ST Segment Score (STSS) with patients of STEMI on admission ECG & after thrombolysis had been assessed and correlated with other variables like ejection fraction, in-hospital complication etc¹¹. Actually STSS is a simple and useful index to risk stratify STEMI and to identify the patients at higher risk early in the course of their admission.

Objectives:

a) Risk stratification of STEMI patients on the basis of ST segment score on initial ECG. b) Identify patients at higher risk early in the course of their hospital admission. c) Correlation of initial ECG and post thrombolysis ECG regarding clinical outcome.

Materials and Methods:

This study was prospective non-randomize observational study. All patients admitted in CCU, DMCH during october 2007 to september 2008, with the diagnosis of ST elevation myocardial infarction were included. Considering inclusion and exclusion criteria 112 consecutive patients were studied of which 64 were inferior wall acute STEMI and 48 were anterior wall acute STEMI. Among inferior wall AMI patients, 30 were ST segment score ≤ 7 mm (Group-1) & 34 were ST segment score > 7 mm. Again ,among anterior wall AMI 22 patients were ST segment score ≤ 12 mm (Group-3) & 26 were ST segment score > 12 mm(Group-4)¹¹. Like admission ECG, after 90 minutes of starting thrombolytic, another ECG was recorded and calculated in the same way. Echocardiography was done for each patient before discharge. Data was collected in a pre-designed form Data obtained was expressed in frequency, percentage, mean or standard deviation as applicable. Comparison between groups was done by Chi-square test, students t test, and Fisher's exact test as applicable. A discussion was made after results were obtained and P value of < 0.05 was considered statistically significant.

Results:

Inferior wall myocardial infarction patients were subdivided into Group-I & Group- II and anterior wall

myocardial infarction patients into Group-III & Group-IV. The mean age of Group-I was 55.2 ± 12.2 years and that of Group-II was 56.9 ± 14.1 years. The mean age of Group-III was 59.2 ± 11.7 years and that of Group-IV was 55.0 ± 12.6 years. Analysis revealed no statistically significant age difference between the groups($P=0.239$).

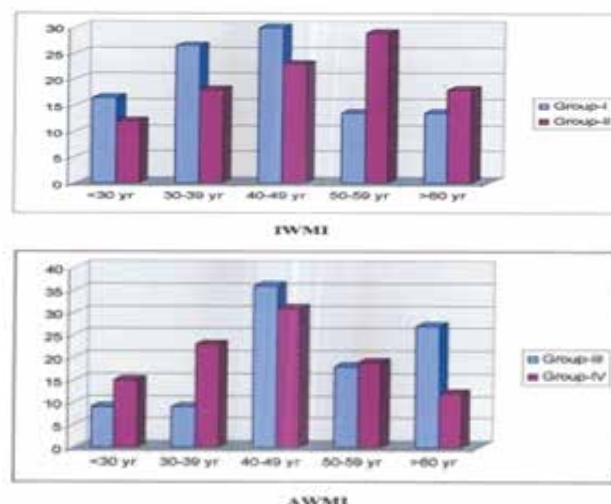


Figure 1: Distribution of study population by age

Of the 30 patients studied in Group-I 76.7% was male and 23.3% was female. In Group-II 76.5% was male and 23.5% was female. Among Group-III 72.7% was male and 27.3% was female. In Group-IV 73.1% was male and 26.9% was female. The difference in sex distribution between the groups were not statistically significant ($P=0.985$).

Table-I(a): Sex distribution among study population of IWMI

Table I (a): Sex distribution among study population of IWMI.								
Sex		Study subjects						P value
		Group I(n=30)		Group II(n=34)		Total(n=64)		
No		No		No				
Male	23	76.7	26	76.5	49	76.6	0.985 ^{NS}	
Female	7	23.3	8	23.5	15	23.4		
Total	30	100	34	100	64	100		

Table-I(b): Sex distribution among study population of AWMI.

Table I (b): Sex distribution among study population of AWMI.								
Sex		Study subjects						P value
		GroupIII(n=22)		Group IV(n=26)		Total(n=48)		
		No	%	No	%	No	%	
Male	16	72.7	19	73.1	35	72.9		
Female	6	27.3	7	26.9	13	27.1		
Total	22	100	26	100	48	100		

According to the study smoking was the most prevalent risk factor in Group-I (60%) and in Group-II (58.8%). Out of 48 patients of anterior wall myocardial infarction,

63.6% were smoker in Group-III and 69.2% were in Group-IV.

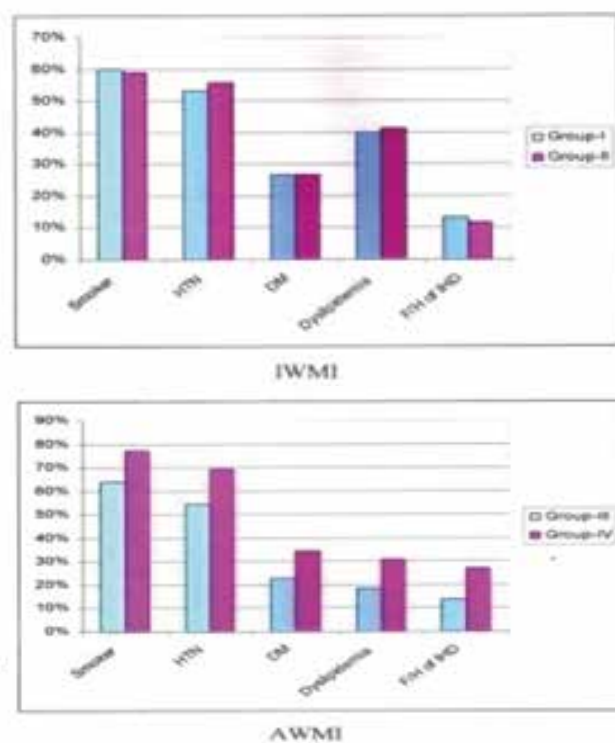


Figure 2: Distribution of study population by risk factor

In post thrombolytic electrocardiographic findings shows that in Group-I mean sum of ST elevation decreased to 3.9 ± 1.1 mm from 4.8 ± 1.2 mm. which was approximately (45+14)% of ST resolution and in Group-II. In Group-III mean sum of ST elevation decreased to 3.2 ± 2.2 mm from 9.3 ± 1.5 mm. which was approximately (55+19)% of ST resolution and in Group-IV ST elevation decreased to 12.0 ± 4.0 mm from 22.8 ± 6.3 mm which was (45+23)% of ST resolution.

Table II(a): Post thrombolytic ECG findings of the study population of IWMI.

Characteristics	Study Population		P value
	Group I (n=30)	Group II (n=34)	
Sum of ST elevation before thrombolysis(mm)	Mean $\pm$ SD (Range)	Mean $\pm$ SD (Range)	
	4.8 ± 1.2 (3 - 7)	15.4 ± 5.6 (7.5 - 24)	0.001*
Sum of ST elevation after thrombolysis(mm)	Mean $\pm$ SD (Range)	Mean $\pm$ SD (Range)	
	3.9 ± 1.1 (2 - 6)	9.6 ± 1.4 (3 - 12)	0.001*
% of ST Resolution	45+14 (0 - 75)	50+19 (0 - 70)	0.226 ^{ns}

Table II(b): Post thrombolytic ECG findings of the study population of AWMI.

Characteristics	Study Population		P value
	Group III (n=23)	Group IV (n=26)	
Sum of ST elevation before thrombolysis(mm)	Mean $\pm$ SD (Range)	Mean $\pm$ SD (Range)	
	9.3 ± 1.5 (7 - 12)	22.8 ± 6.3 (13 - 35)	0.001*
Sum of ST elevation after thrombolysis(mm)	Mean $\pm$ SD (Range)	Mean $\pm$ SD (Range)	
	3.2 ± 2.2 (3 - 7)	12.0 ± 4.0 (6 - 20)	0.001*
% of ST Resolution	55+19 (0 - 70)	45+23 (0 - 60)	0.058 ^{ns}

Discussion:

The present study was a prospective non-randomized observational study conducted in Dhaka Medical College, Dhaka. The aim of the study was identification of the high risk patients on the basis of electrocardiographic study by ST segment score on initial ECG and to see it as a predictor of the in-hospital outcomes of STEMI patients. A total of 112 patients were studied, among them 64 were inferior wall and 48 were anterior wall acute myocardial infarction. On the basis of ST segment score that is sum of ST elevation, inferior wall myocardial infarction patients were again subdivided into Group-I & Group-II with a cutoff point at 7mm and anterior wall myocardial infarction patients into Group-III & Group-IV with a cutoff point at 12mm^{1,11}. Mean age of the patients in Group-I was 55.2 ± 12.2 years and those with Group-II was 56.9 ± 14.1 years. Among anterior wall mean age was 59.2 ± 11.7 and 55.0 ± 12.6 years respectively in Group-III & Group-IV. These findings are consistent with the findings of Haque et al (2001)¹⁵. Highest number of patients was in the age group 40-49 years in all groups except Group-II where it was 50-59 years^{15,16,17}. In both the inferior and anterior wall myocardial infarction groups male patients were found to be higher. In Group-I & Group-II female patients were 23.3% & 23.5% respectively while it were 27.3% & 26.9% in Group-III & Group-IV respectively¹⁸. Study of common risk factors showed that smoking was the commonest one followed by hypertension, dyslipidemia, diabetes mellitus and family history. Data were almost similar to those of the study done in Bangladesh and abroad^{17,19}.

Analysis of presenting complaints showed highest percentage of the patients had chest pain (96.7%) followed by shortness of breath (33.3%), sweating (26.7%) & nausea or vomiting (16.7%)^{3,7}. Regarding haemodynamics there were no difference in mean pulse rate and mean diastolic blood pressure in the groups. Lower mean systolic blood pressure in Group-II & Group-IV indicate more myocardial damage in these groups of higher ST elevation.

The Group-I and Group-II patients had same no. of leads with ST-elevation but Group-II patients had a greater sum of ST elevation. It was statistically significant ($p < 0.05$). Again in Group-III & Group-IV the sum of ST elevation were 9.3 ± 1.5 mm & 22.8 ± 6.3 mm respectively and also was statistically significant. These higher sum of ST elevation in Group-II and Group-IV patients indicate more myocardial damage. In general it is true that patients with ST deviation in many leads and greater magnitude of ST deviation have a larger final infarct size than patients with ST deviation in a small number of leads or low sum of ST deviation¹⁸. Regarding post-thrombolytic ECG findings, it

showed sum of ST elevation after thrombolysis in Group-I was 3.9 ± 1.1 mm and it was $(45 \pm 14)\%$ resolution of ST elevation and in Group-II it was 9.6 ± 1.4 mm which was $(50 \pm 19)\%$ resolution.

Again in Group-III & Group-IV the sum of ST elevation after thrombolysis were 3.2 ± 2.2 mm & 12.0 ± 4.0 mm and those were $(55 \pm 19)\%$ & $(45 \pm 23)\%$ ST resolution respectively. This finding was also statistically significant¹⁴.

Left ventricular ejection fraction (LVEF) was determined on every patient by 2D echo by Teichholz method before discharge from hospital. There were more patients with LV systolic dysfunction (24.1% vs 41.9%) in Group-II than Group-I of inferior wall myocardial infarction. The mean left ventricular ejection fraction in Group-III and Group-IV were $52.9 \pm 7.0\%$ and $47.2 \pm 9.4\%$ respectively which was also statistically significant²⁰. Most frequent complications were chest pain, arrhythmia and conduction disturbances, heart failure and cardiac death. This study showed that 35.3% patients from Group-II complaints chest pain in comparison with only 6.7% from Group-I which was statistically significant ($p < 0.05$). But in cases of anterior wall myocardial infarction, more patients from Group-IV complaints chest pain (58.3%) than from Group-III (18.8%) which was also statistically significant^{17,21}.

Out of 30 patients from Group-I only 6 (20%) developed Killip class-II and 2 (6.7%) developed class-III heart failure. But in Group-II 12 (35.3%) patients developed class-II, 3 (8.8%) class-III heart failure out of 34 patients. Out of 22 patients from Group-III, 5 (22.7%) developed class-II, 2 (9.1%) class-III & 1 (4.6%) class-IV heart failure. But in Group-IV more patients developed heart failure like 12 (46.2%) developed class-II, 2 (7.7%) developed class-III, 3 (11.5%) developed class-IV^{20,22}. Among the study population different arrhythmias and heart block were developed during hospital stay. In Group-I 40% developed arrhythmia of which PVC was the most frequent (16.7%). In 34 patients of acute inferior wall MI of Group-II showed that 67.6% developed arrhythmia and heart block. Again in Group-III, 54.5% developed arrhythmia and heart block. In Group-IV as much as 84.6% developed arrhythmia and heart block. In our current study there were eight death, three from Group-II of inferior wall, one from Group-III and four from Group-IV of anterior wall.

Hospital stay was 5.2 ± 0.6 days for Group-I and 6.9 ± 0.7 days for Group-II. The difference in hospital stay between groups was statistically significant ($p < 0.05$). For Group-III and Group-IV mean duration of hospital stay were 7.0 ± 0.7 days and 9.9 ± 0.7 days respectively, the difference of which was also statistically significant ($p < 0.05$). These represent hospital outcome worse in Group-II & Group-IV.

Conclusion:

Significant differences were seen in chest pain, killip class, arrhythmia, echocardiographic LVEF, duration of hospital stay in patients with AAMI & STSS above 12 mm and IWMI & STSS above 7 mm in comparison with below

these level even after use of thrombolytics. This study may be the base of further clinical controlled studies with larger population to validate our finding.

Conflict of Interest: None.

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Tibial Plateau Injury: Mechanical Implantation with Plates and MIPO Approach Tertiary Level Hospital in Bangladesh

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Abstract

Introduction: Proximal tibial injuries are challenging to treat because of articular surface involvement, frequent congestion, and precarious soft tissue conditions, particularly after high-energy traumas. The treatment is intended to restore the unity of the joint surfaces that supports the typically depressed tibial plateau cartilage, use a strong device to stabilize the fracture and prevent further damage, to enable early recovery. We describe our treatment approach, using closed or open decrease and internal fixation, polyaxial plates, automatic bone-gloss, or other osteoconductive material enhanced by autologous platelet gel, where required. Surgery depends on the timing of the soft tissue and is typically done directly or under the guidance of a skilled surgeon using tissue-sparing techniques as much as feasible.

Materials and Methods: A prospective analysis of all (n=58) proximal tibial fractures at the Islamic Bank Medical College Hospital and multicentral tertiary level hospital, Rajshahi, Bangladesh, from January 2019 to June 2021. Patient data were collected by evaluating hospital diagrams, office records, preoperative and after operative radiograph. Fractures were classified in the classification of OTA/AO. In 78 % of the 12-month post-surgery group, the Rasmussen score's evaluation of functional outcomes found positive to outstanding results. **Results:** Total Number of patient n=58 tibial proximal (intra-articular) fractures have been identified. The mean age was 43 years (range 19–79) at surgery, whereas women and 39 men were 19. The most frequent injury mechanism was linked to traffic accidents (RTA), representing 75% of cases. 09 (18.4%) AO/OTA types A, 31 (53.5%) AO/OTA type B and 18, (31.1%) AO/OTA type C fractures have been identified. Most (90 %) cases (44) were treated with open reduction and internal fixation, using polyaxially anatomical angular stability locking Plates. **Conclusions:** Internal fixing using locking plates, following the MIPO principles (Minimally Invasive Percutaneous Osteosynthesis), offers an acceptable reduction of fractures with excellent outcomes for the medium-term clinical results.

Keyword: MIPO Approach, Tibial Plateau Fracture, Islami Bank Medical College Hospital.

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Introduction:

The proximal tibia contains tibial plateau fractures in its joint and meta-epiphysis regions. Due to the considerable movement of the pieces, the associated depression and the effects of the cellular sub-chondral bone, and the inevitable cartilage injury, their administration is problematic. Often, the following consequences are catastrophic: identification of the compartment, cartilage loss, damage to the soft tissue envelope, postoperative disease, knee instability/stability, early and late post-traumatic arthritis¹. These fractures are generally uncommon and bimodal in distribution for men and women. They result from high-energy traumas among young people, while they usually unintentionally fall into low energy in old individuals. Conservative treatment for very simple unreplaced fractures is reserved to represent a small proportion of the overall population of tibial plateau fractures or people with severe co-morbidities with very low demand. For little infants with this kind of injury, operational treatment must be conducted to decrease the anatomy, repair it and move early. Despite the presence of osteoporosis/osteopenia, coexisting health problems, or degenerative joint disorders, these surgical indications and goals continue to grow in patients beyond 55 years². The open reduction and the internal attachment with plates and screws are currently considered the standard gold treatment method. The main pillars of today's clinical practice are the modern locking systems with improved corner stability, reduced

implantation profile, better design for the surface of the periarticular bone, or compatibility with least-invasive processes-MIPO³.

In some cases, specific authors propose arthroscopic reduction and internal fixation (pure depression fractures). The substantial risk of compartmental syndrome development due to drainage of irrigation fluids in the tibia compartments and an expansion of the operational time and operating room logistics restrict the extension of the module⁴. Circular ring fixators are a feasible alternative therapy for high-energy fractures and substantial soft tissue damage followed by large intra-articular comminution (AO/OTA category C3)⁵.

In treating people with a tibial plateau fracture, a comprehensive assessment of the degree of the local injury is essential. The method and Outcome of the therapy are strongly connected to the soft tissue envelope condition. Temporary stabilization is frequently required via a knee stretching external fixator, allowing for resuscitation of the soft tissue, relief of discomfort, further data on fracture structure (usually CT scanning), and definitive therapy at the optimal time⁷. Other key variants include aging, competing health problems, smoking history, occupation, functional abilities, and personal goals in forecasting immediate and long-term results⁶. This research aims to assess the perioperative and functional results after surgical treatment of tibial board fractures utilizing locking plates and the MIPO technology of a single institute.

Materials and Methods:

A prospective analysis of all proximal tibial fractures at the Islamic Bank Medical College Hospital, Rajshahi Bangladesh, from January 2019 to June 2021. Patient data were collected by evaluating hospital diagrams, office records, preoperative and after operative radiographs. The pathological, pediatric, and extraarticular tibial (AO/OTA type 41. A) proximal fractures have all been eliminated. In each instance, demographics, mechanisms, and circumstances at the time of the accident, information about the hospitalization, surgical description, post-operational rehabilitation, complications, clinical and functional outcomes over a period of 12 months after the surgery were gathered. AO/OTA⁷ classified the fracture, and Gustilo-Anderson⁸, and the Rasmussen score⁹, was utilized to quantify functioning at the previous visit. Follow-up evaluation was carried out at fixed times, including 4, 8, and 12 weeks, 5–7 months, and 12–13 months post-operation. The range of mobility of the knee using a goniometer was measured. In extension and 20° (degree) of knee flexion, Varus and Valgus instability were evaluated compared to the normal side. The grade of joint depression and frontal angulation was assessed using radiographs. The decrease was considered good if the remaining depression was 2 mm or less, acceptable if 2 to 5 mm, and bad if more than 5 mm. Malalignment was defined as angulation of more than 58 on the frontal or sagittal planes. Descriptive statistical techniques were utilized to present our findings in detail.

Results:

Over three and a half years, 58 tibial proximal (intra-articular) fractures have been identified. The mean age was 43 years (range 19–79) at surgery, whereas women and 39 men were 19. The most frequent injury mechanism was linked to traffic accidents (RTA), representing 75% of cases, Table I.

Table-I: Patients' demographicss.

	Frequency	% Age
Male	39	22.62
Female	19	11.02
Age	Mean 43 years	(Range 19–79)
Follow-up	Mean 18 months	(Range 12–18)
Mechanism of injury		
Automobile collision	19	33%
Motorcycle collision	16	28%
Fall	12	21%
Pedestrian	8	14%
Sport-related injury	3	5%

Table I. Nine (18.4%) AO/OTA types A, 31 (53.5%) AO/OTA type B and 18, (31.1%) AO/OTA type C fractures have been identified (Table II). Only those instances with articular extension fractures (49 cases type B–C) were further analyzed. Three fractures were open, two grade I and one grade II. Three were open. One patient had a closed injury caused by concomitant popliteal artery disruption.

Table-II: The case distribution according to the AO/OTA fracture classification.

AO/OTA classification	Number, %	Surgical treatment
41 B1	5, 10.2%	2 CRIF with screws 3 ORIF with a single plate
41 B2	7, 14.3%	3 ARIF with screws 4 ORIF with a single plate
41 B3	19, 38.8%	ORIF with a single plate
41 C1	6, 12.2%	ORIF with a single plate
41 C2	7, 14.3%	ORIF with a single plate
41 C3	5, 10.2%	2 ORIF with single plate 3 ORIF with double plate

ORIF: open reduction and internal fixation.

ARIF: arthroscopic reduction and internal fixation.

CRIF: close reduction and internal fixation.

All patients' standard radiography controls were conducted in the tibia (anteroposterior and lateral) and the knee (anteroposterior, side, and oblique views). A CT scan with 3-dimensional (3D) reconstruction was performed to determine articular fragments' size, position, and extent for additional examination. 40 All patients were operatively treated. Routine given is perioperative intravenous antibiotics and prevention against deep-venous thrombosis. A

temporary external fixation was used in one patient, while 12 were temporarily immobilized with a splint during the monitoring period. The time between the accident and operation varied from 4 to 14 days¹⁰.

Most (90 %) cases (44) were treated with open reduction and internal fixation, using polyaxially anatomical angular stability locking Plates. Nine of these patients additionally received grafting (both autologous and synthetic) to maintain subchondral bone and articular surface depression¹¹. The aside hockey stick approach was utilized for open reduction and internal fixation in all patients; in 29 instances, a MIPO method was feasible using a 5 cm proximal incision (Fig. 1).

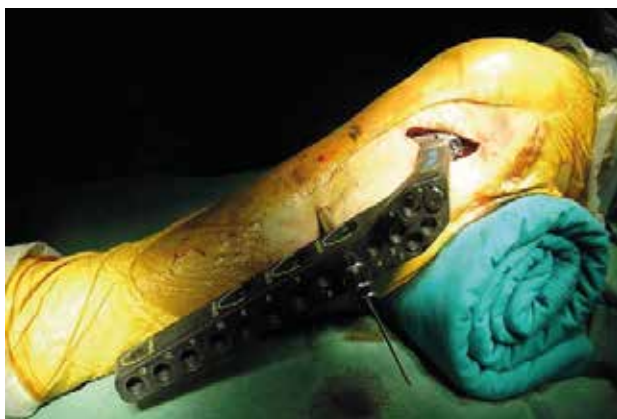


Fig. 1. Clinical picture demonstrating intra-operative placement of a lateral locking plate utilizing minimum invasive percutaneous osteosynthesis methods.

In three instances (type C3), a medial approach was used to reduce and further fix the medial condyle¹². Five fractures (10%) were subjected to cannulated screw-mini-osteosynthesis. Three of them were arthroscopic operations (type B2 fractures). A standard intro-lateral portal and an antero-medial for the instruments were used for the arthroscope. Indirect reduction of the depressed joint surface via a lower Trans osseous tunnel was reached, checked by arthroscopy, and cancellous screwed 6.5 mm cancellations were fixed. In the initial postoperative phase, passive movement of the operated knee began for all patients. For the first 8 weeks, toe-touch weight-bearing with two crutches was permitted. Following this time, progressive weight-bearing was allowed, based on the development of healing on the X-ray control. In most of these instances, full weight-bearing was permitted after 9–12 weeks. These patients' mean follow-up after surgery was 18 months (range 9–36). Two follow-up patients have been lost. Those others for a physical and radiographic examination, 47 individuals were contacted and evaluated using the clinical score of Rasmussen. 44 patients (94%) were advanced to the bone union during an average period of 4.2 months (range 3–7) (Figs. 2a–c, 2b—c, 3a, and b). The other three patients experienced a non-union: in one instance, the non-union was made more difficult by breaking down the implants utilized (double plating).

Nevertheless, this union was cured with a polyaxially sealed plate and autologous bone grafting following re-plating. The two other instances were replaced by the implanted initially and unincorporated synthetic bone substitute with an autologous bone graft and an overhaul of osteosynthesis with a new polyaxially plate. Three months following the revision operation, these patients were healed. In a high-energy fracture, 5 months later, the first treatment using an external fastener was transforming into a plate fixation.

Three patients developed superficial infections which retarded wound healing and required a brief course of antibiotics. An instance of severe wound drainage infection developed four months following surgery. It was created by deposition, plate removal, and nailing, and bone healing lasted three months. In MIPO-treated individuals, no infections occurred. Two months after surgery, one patient suffered a pulmonary embolism and had deep vein thrombosis.



Fig. 2. (a) A high-energy bicondylar fracture of the right tibial plateau anteroposterior radiograph coronal (b) and sagittal (c) CT-scan reconstruction graphics.

Table III shows the median knee bending and extension range for each follow-up visit. There have been three patients with significant postoperative rigidity. One recovered a complete range of motion after 1 year of intense physiotherapy; two underwent an anesthetic manipulation, which was unsuccessful in one of them who had 58 flexure and 958 knees bending 2 years after the procedure.

Table-III: The progress of the range of knee motion (ROM) following surgery of tibial plateau fractures.

Follow-up (weeks)	Mean loss of extension(°)	Mean range of flexion
Discharge	6	79
4	3	87
8	1	112
12	0	123
26	0	127
54	0	131

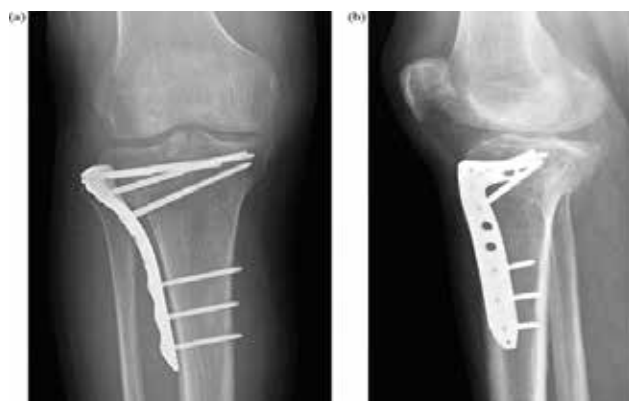


Fig. 3. (a) After open reductions postoperative x-ray with locking plate and internal fixations. (b) Lateral X-ray taken 2 years after surgery lateral tibial plateau has a residual deformity.

The average Rasmussen score was 25 after 6 months (range 14-30), whereas 27 in 1 year after the operation (range 19-30). The maximum score in this scoring system is 30. Of the 47 patients surveyed in the final follow-up, 41 patients (87 %) at 6 months and 44 patients (94 %) at 1 year were successful to outstanding. In three instances, malediction was found in five residual joint depression (>5 mm) and residual split depression in the other two after immediate postoperative radiography. In 68 of varus, one patient healed. In the 41 other instances (87 %), the final X-ray evaluation achieved an excellent or good reduction without any indication of degenerative surface alterations¹⁷.

Discussion:

Significant early and late secondary complications result in severe damage to the tibial plateau. Prompt diagnosis, comprehensive preoperative evaluation of the damage of the ossic and soft tissue,¹³ appropriate soft-tissue monitoring and revival, anatomical reduction, and early sound fixation, and rigorous rehabilitation typically over one-year post-harm. For excellent clinical outcomes¹⁴, are essential¹⁵. The inherent limitations of this retrospective study relate not only to their design but also to their absence of randomization between different treatment methods, their small numbers, the short one-year follow-up (Fig: 3). The accuracy and replicability of radiographic measures are mainly made for articular congruity.

Nevertheless, it reflects the patients treated with a single institution's systematic treatment, rehabilitation, and follow-up procedure. The overwhelming majority of instances have been fixed using modern placing methods, enabling steady angling through MIPO procedures. As a cornerstone to determining definitive fixation and as a significant predictor for some problems such as infections and delayed wound healing, careful soft tissue conditions were assessed. In this series and by other writers, both the utility of a stage method and a delayed fixation until local circumstances are optimized. The external tension provides temporary fixation but may become permanent if ligamen-

totaxis and manipulation can reduce satisfactorily¹⁶.

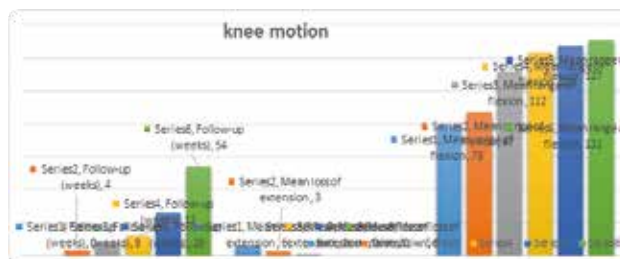


Fig 4: Progress of the knee (ROM).

Due to the complicated knee structure joints and the necessity of anatomical degradation as for all intraarticular fractures, the open reduction combined with bone grafting is considered as a gold standard approach for the last decades, in any case with a cancellous bone depression and rigid internal fixation with plate and screws¹⁷. However, in 1971, Lucht and Pilgaard 25 reported that 78 % of their patients had a favorable result, although joint depression was up to 10 mm. Contemporary reduction methods and new implant products enable the surgeon to secure fastening without damaging the soft tissue. As in previous comparable studies¹⁸, minimally invasive methods with bone fixation and soft tissue sparing systems provided an excellent combination in our research group (Fig: 3).

However, problems still arise in many instances, compromising the healing of the fractures and the final functional result. This study's accumulative rate of local and systemic issues was 19,1% (9/44 cases). Many writers describe infection/wound dehiscence/malunion-non-early arthritis, which reaches 20–50 % in high-energy instances in particular¹⁹. A number of authors²⁰ found radiological evidence for osteoarthritis in the 20-37% of young patients, aged 42-57 years, 3-7 years, after surgery. In elderly individuals²¹, comparable alterations in 60% of patients, of whom only 8% were jointly replaced.

Conclusions:

The result of the challenging majority of tibial plateau fractures mainly depends on threefold criteria. Initially, the soft tissues typically need a staggered approach to renewing the soft tissue, minimally invasive surgical methods, and careful handling when open reduction is carried out, secondly, by restoring the congruity of the joint surface and, where applicable, by utilizing autografts and bone substitutions as structural supports and void fillers. Finally, through the stability of the mechanical environment, via fixation and reinforcement of tibial bone proximal metaphysical, utilizing early joint mobility implants and devices.

Conflict of Interest: None.

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PMid:15123954

Seroprotection of Hepatitis B in Children with Steroid Sensitive Nephrotic Syndrome

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Abstract

Introduction: Children with Steroid sensitive nephrotic syndrome is associated with lower seroconversion of hepatitis B vaccine due to prolonged period of proteinuria, prolonged period of steroid therapy **Objective:** The primary aims of this study was to assess the seroconversion rate in children with steroid sensitive nephrotic syndrome (SSNS) who were previously vaccinated against hepatitis B and to compare with the titre of vaccinated healthy children. The secondary aims was to study the association of antiHBs titre in different clinical types of diseases and comparison of persistent antibody titre after prolonged post vaccinal duration in both nephrotic syndrome and control group. **Materials and Methods:** This cross sectional study was carried out in the department of Paediatric Nephrology, Bangabandhu Sheikh Mujib Medical University, Dhaka from July 2014 to June 2015. A total of 75 vaccinated Children against hepatitis B aged 1 to 12 years of both sex suffering from steroid sensitive nephrotic syndrome were included in this study. Seventy five healthy children against hepatitis B were taken to compare the immunogenicity of hepatitis B vaccine as comparison group. **Result:** Out of seventy five children with steroid sensitive nephrotic syndrome (SSNS) 51(68%) were male and 24 (32%) were female. Most of the patients belonged to 2-4 year group (39.6%) and of them 42% had 1st attack. In comparison group most of the healthy children belonged to 2-4 year age group 22(28.2%). In nephrotic syndrome group, majority(57.3%) of the patients with nephrotic syndrome had antibody titre <10 mIU/ml (not seroprotected). On the contrary 78.7% healthy control were seroprotected (antibody titre >10 mIU/ml) and this difference was significant (p value = <0.001). In nephrotic syndrome group significant titre was present in 2-4 years post vaccinal duration which also declined after 9-10 years post vaccinal duration group. In healthy control group significant titre was present in 2-4 years post vaccinal duration group which also declined gradually after increasing post vaccinal duration. **Conclusion:** In nephrotic syndrome group significant titre was present in 2-4 years post vaccinal duration which also declined after 9-10 years post vaccinal duration group. In healthy control group significant titre was present in 2-4 years post vaccinal duration group which also declined gradually after increasing post vaccinal duration.

Keywords: Hepatitis B vaccine, Seroconversion, Nephrotic syndrome.

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Introduction:

Nephrotic syndrome is a common renal disease in children. It is 15 times more common in children than adult¹. There is epidemiological evidence of higher incidence in south Asia where incidence is 9-10 per 100,000 population². A study in on Asian children in two cities of united kingdom has reported 9 and 16 per 10,000 population respectively³. It is characterized by massive proteinuria (urinary total protein >1gm/m²/24 hours), hypoalbuminemia (serum albumin < 2.5 gm/dl), edema and hypercholesterolemia (serum cholesterol >250mg/dl). Nephrotic syndrome is typically seen in children in the age group 2-6 years⁴. The disease is uncommon in the first year of life. Eighty percent of children with nephrotic syndrome are less than six years old at presentation with median age at diagnosis being 2.5 years for minimal change nephrotic syndrome (MCNS) and 6 years for focal segmental glomerulosclerosis^{5,6}. The initial event in the pathophysiology of nephrotic syndrome is a derangement in the glomerular capillary walls resulting in increased permeability to plasma proteins resulting in massive proteinuria. This heavy proteinuria leads to depletion of albumin mainly, but also lipoproteins & globulins. The loss of immunoglobulin & low IgG levels make the child vulnerable to infections⁷. About 2 billion people are infected with hepatitis B virus all over the world. Rate of new infection acute disease are higher among adult but chronic infection is more likely to occur in person infected as infant or young children. India is an intermediate endemicity for Hepatitis B with a HBsAg positivity prevalence between 2-7% of the population studied⁸. Hepatitis B infection acquired in childhood has higher chance of chronicity and can lead to chronic hepatitis, cirrhosis & hepatocellular carcinoma⁹. These outcome are all preventable by early childhood immunization. In Bangladesh prevalence of hepatitis B is scarce and few sporadic data are available. Considering the alarming situation a pilot project of HBV vaccine started incorporated with EPI in 6 districts in 2005. The vaccine is safe & well tolerated. The classical schedule is 0,1,6 months. The vaccine is highly immunogenic & seroconversion rates are greater than 95% after a 3 doses schedule in healthy infants, children & adolescents¹¹. Seroconversion rates are lower in elderly, immunocompromised, & those with renal failure. Four doses at 0,1,2 & 12 months of double dose may be given in these patients¹². Grzesiowski et al shows that efficacy of standard dose of vaccine versus double dose, in both group seroprotection rate is similar (standard dose 96%, double dose group 93%). However, anti HBs antibody level was significantly higher in double dose

group during a three months observation period. Mantan M et al showed that children with nephrotic syndrome were less likely to seroconvert to HBV vaccination. The study shows 48% children are seroprotected (value >10mIU/ml antibody titres) and 52% in the group studied were unprotected (value <10mIU/ml antibody titres). 63.6% of children with SSNS & 35.7% of children with SRNS were found to have protective level of titres in the study. La Manna A et al compared the seroconversion rate between steroid sensitive nephrotic syndrome with the control group which showed 66% and 100% seroconversion accordingly.

Materials and Methods:

This is a Prospective observational study was conducted in the Department of Paediatric Nephrology, BSMMU, Dhaka from July 2014 to June 2015 where Seventy five children with steroid sensitive nephrotic syndrome were included in this study of both sexes between age group of 1-12 years both admitted and attended in the OPD during study period whose parents agreed to participate (by written informed consent) and who met the inclusion criteria as vaccinated with vaccine at least 6 weeks before enrollment. Healthy children vaccinated against hepatitis B were included as comparison group. For seropositivity rates of 65-73% with 95% confidence interval & precision of 10%, we need a sample size of 75 children. Children aged 1-12 years of both sexes having nephrotic syndrome of 1st episode and relapse (IFRNS, FRNS). Steroid dependent nephrotic syndrome is included in FRNS. Children with a negative test for Hepatitis B surface Antigen (HBsAg), Children with a completed course of HBV vaccination with EPI or classical schedule at least 6 months before onset of the disease were included as inclusion criteria. Children with Congenital NS (onset of nephrotic syndrome < 3 months of age), Children with steroid resistant nephrotic syndrome and children known to have other associated immunosuppressive diseases such as chronic kidney disease (CKD), chronic liver disease (CLD), congenital heart disease (CHD), Secondary nephrotic syndrome like SLE, HSP etc and those parents/patients who will refuse to participate were excluded from the study. The following variable was noted in the study group as age, gender, clinical type of nephrotic syndrome, vaccination schedule, AntiHBs antibody titre (quantitative vaccine response against hepatitis B and Clinical history noted including age of onset of 1st attack of nephrotic syndrome, duration of disease, number and type of relapse. Drug history like immunosuppressant and immunomodulating agent with dose and duration was included. Vaccination history such as EPI schedule

(0,1,2 month) or classical schedule (0,1,6 month), dose of HBV vaccination , timing of HBV vaccination was included. After providing informed written consent 6 ml of venous blood collected from each patient, the sample divided into sample of 3 ml each. One sample for determining biochemical parameter & other sample used to determine HbsAg positivity. AntiHBs assay is a chemiluminescence immunoassay (CMIA) in fully automated analyser for quantitative determination of antibody to HBsAg. After collecting data by structured questionnaire including all the variables data were checked and edited and analysed using statistical package for social science (SPSS). The chi square test used to compare the categorical data and antibody titre between two group, in different clinical type of steroid sensitive nephritic syndrome. Analysis of variance (ANOVA) test were done for comparison of biochemical parameters. For all comparison, the 5% probability level ($p < 0.05$) was considered significant. Prior to commencement of this the research protocol was approved by Institutional review board (IRB) and procedure to guardian in easily understandable local language and with written consent from patient guardians and healthy comparison.

Results:

A total of 75 children of both male and female included in this study. Most of the case (39.6%) were in 2-4 years group and of them 42% had 1st attack. In comparison group most (28.3%) healthy children belongs to 2-4 year age group. In nephritic group M:F was 2.2:1 but in comparison group M:F=1.4:1

Table I shows there was significant statistical difference in, antiHBs between nephrotic syndrome group and comparison group.

Table I : Comparison of antiHBs titre between nephrotic syndrome group and comparison group.

Antibody titre (miu/ml)	Group		p value*
	Nephrotic syndrome group (N=75)	Comparison group (N=75)	
Mean±SD	74.29±193.85	161.54±295.07	0.034
Median	6.4	37.70	
Range(min-ma)	3-1000	5-1005	
Total	75 (100.0)	75(100.0)	

Mann whitney test was done to measure the level of significance.

Table II shows, in 1st attack 66.7% patient were seroprotective. The difference was statistically significant ($p=0.002$).

Table II : Comparison of antiHBs titre between different clinical types nephrotic syndrome group

Antibody titre (miu/ml)	Group				p value*
	1st	IFRNS	FRNS	SDNS	
<10	8 (33.3)	8(44.4)	15 (78.9)	12(85.7)	0.002
≥10	16 (66.7)	10(55.6)	4(21.1)	2(14.3)	
Total	24 (100.0)	18(100)	19(100.0)	14(100)	

*Chi-square test was done to measure the level of significance.

Table III shows, in 1st attack 66.7% patient were seroprotective, where in FRNS 21.1% patient were seroprotective. The difference was statistically significant ($p=0.003$).

Table III : Comparison of antiHBs titre between 1st attack of nephrotic syndrome group and FRNS.

Antibody titre (miu/ml)	Group		p value*
	1st attack	FRNS	
<10	8 (33.3)	15 (78.9)	0.003
≥10	16 (66.7)	4(21.1)	
Total	24 (100.0)	19(100.0)	

*Chi-square test was done to measure the level of significance.

Table IV shows in nephrotic syndrome group significant titre was present in 2-4 years post vaccinal duration group which also declined after 9-10 years post vaccinal duration group.

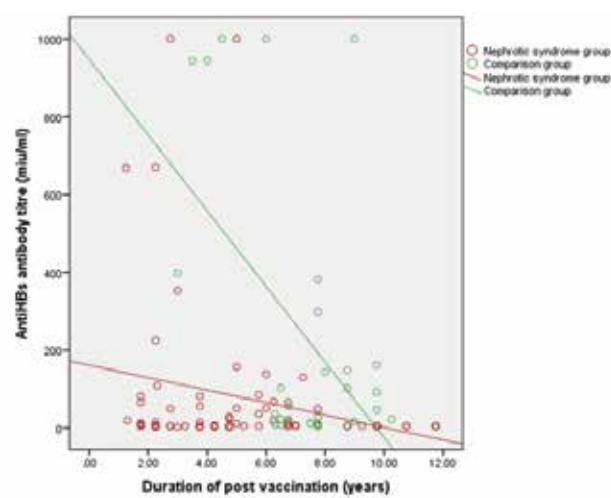
Table IV: AntiHBs titre following post vaccination duration in nephritic syndrome

Post vaccinal duration	>10mIU/ml n(%)	<10mIU/ml n (%)	P value
2-4 years	15(46.9)	14(32.2)	0.094
5-6 years	10(31.3)	8(18.6)	
7-8 years	7(21.9)	5(11.6)	
9-10 years	0(0.0)	11(25.6)	
11-12 years	0(0.0)	5(11.6)	
Total	32(100.0)	43(100.0)	

Table V shows in healthy control group significant titre was present in 2-4 years post vaccinal duration group which also declined gradually after increasing post vaccinal duration.

Table V: AntiHBs titre following post vaccination duration in healthy group

Post vaccinal duration	>10mIU/ml n(%)	<10mIU/ml n (%)	P value
2-4 years	22(37.3)	2(12.5)	0.045
5-6 years	13(22.0)	2(12.5)	
7-8 years	14(23.7)	4(25.0)	
9-10 years	8(13.6)	5(31.3)	
11-12 years	2(3.4)	3(18.8)	
Total	59(100.0)	16(100.0)	

Figure -1**Figure 1: Correlation of AntiHBs with duration of post vaccination in Nephrotic syndrome and comparison groups.**

Pearson's correlation test was done to measure the level of significance. AntiHBs reduced with the increase of duration of post vaccination. Nephrotic syndrome group: $r = -0.243$ and $p = 0.035$ Comparison group: $r = -0.391$ and $p = 0.004$.

Discussion:

Though HBV infection is a significant health problem around the world, fortunately it is one of the oncoviruses that is vaccine preventable. HB vaccine induces anti-HBs response that can prevent HBV infection. Prevention of primary infection by vaccination is an important strategy to decrease the risk of chronic HBV infection and its subsequent complications like liver failure and hepatocellular carcinoma¹³.

Nephrotic syndrome being an immune mediated disease and its treatment with steroids and other

immunosuppressant drugs have a tendency to reduce the seroprotection against HBV. Various published studies have demonstrated that seroprotection after a routine immunization in children with nephrotic syndrome is lower than that of healthy children. In this study, 75 steroid sensitive nephrotic syndrome patient was enrolled. Most of our patient received hepatitis B vaccination through EPI schedule as hepatitis B included in EPI in 2005 in our country. Here we consider antiHBs titre >10 mIU/ml to be seroprotective which is described in our studies. Out of the 75 vaccinated SSNS patient, 42.7% patient had seroprotective level of antiHBs titre, whereas it was 83.3% in healthy vaccinated children. Similar study done by Mantan M et al showed that among 75 enrolled children, 44% was SSNS and 56% was SRNS. Total 48% patient were seroprotected where 63.6% was SSNS patient and 35.4% was SRNS patient respectively. Another study, La manna et al (1992) compared boys with SSNS ($n=18$) and controls ($n=21$) for their response to hepatitis B vaccination which shows 66% seroprotection against hepatitis B in SSNS patients compared to 100% seroprotection among the control group. In our study children with initial episodes of nephrotic syndrome had significantly increased seroprotection than relapse case (66.7% vs 36.9%) respectively. The cause of this lower seroconversion due to longer period of disease and longer exposure of immunosuppressive therapy. Steroid therapy inhibit CD4 cell activity which is necessary for optimal antibody response and contribute to lower antibody titre. Shams Shahemabadi A et al¹⁴ showed that antiHBs antibody titre of previously hepatitis B vaccinated children who completed standard chemotherapy at least for 6 months, 80.8% patient was non seroprotective where 2.94% of healthy control was non seroprotective. Allegra V et al¹⁵ showed that comparing between maintenance haemodialysis (MHD) patient and healthy control that seroprotection rate were lower in MHD group (52.9%) then control 98.4% after a booster dose. Maritsi D et al¹⁶ shows markedly decreased antibody titre against hepatitis B in previously immunized children presented with juvenile immune arthritis shows 55% seroconversion compared with 92% in control group.

In this study, Pearson's correlation test showed that antiHBs antibody level reduced with the increase duration of post vaccination time in both steroid sensitive nephrotic syndrome group and comparison group. Agladioglu et al¹⁸ showed that delaying the first dose of Hepatitis B vaccine until 2 month after birth produce higher immune response and provide longer term protection. AntiHBs in infant compared in two different schedule 0.2.9 months

(group I) & 2.4.9 months (group II) were analysed 14 months of 3rd dose. GMT were 95.00 and 379.51 mIU/ml and rate more than 100 mIU/ml were 57.7 % & 94.9 % compared in two vaccination group. Karaoglu L et al¹⁹ showed that immune response of 1-3 years child to hepatitis B vaccination during infancy, 95% shows high seroprotection rate and no difference by sex, anthropometry, time after 3rd dose and place of vaccine administered. Teoharov et al¹⁹ show that presence of immune memory and protection 5-15 years after the initial course of newborn immunization with recombinant vaccine against hepatitis B. Gilca V²⁰ et al show that three dose of low dose (2.5 microgram) recombinant Hep B vaccine of 8-10 years old children induce a 10 years long lasting immunity. Nese Saltoglu et al²¹ show that three week hepatitis B vaccination schedule (Day 0,10,21) provide immediate and protective immunity within a short time compared to the classic schedule (months 0,1,2) Duval B et al²² show that there is no significant difference of protective antibody titre and long term immunogenicity of two recombinant hepatitis B. Yildiz et al²³ demonstrated 41 children with SSNS and 30 control were vaccinated with hepatitis B and patient were divided into 3 subgroup: full dose steroid users, alternate day steroid users and steroid non user. Seroconversion rate was lower in steroid users than nonusers at 6th ($p=0.005$) and 12th ($p=0.036$) months. At the 15th month the seroconversion rate was significantly lower in the full dose steroid users compared to the controls ($p=0.009$). In our study children with initial episodes of nephrotic syndrome had significantly increased seroprotection than relapse case (66.7% vs 36.9%) respectively. In treatment of NS, type of therapy received significantly influenced the seroprotective titres. In nephrotic syndrome group significant titre was present in 2-4 years post vaccinal duration group which also declined after 9-10 years post vaccinal duration group and in healthy control group significant titre was present in 2-4 years post vaccinal duration group which also declined gradually after increasing post vaccinal duration, mean antibody titre was declining with the duration of post vaccination period which is not statistically significant in both nephrotic syndrome group and control group. The cause of this lower seroconversion due to longer period of disease and longer exposure of immunosuppressive therapy. Steroid therapy inhibit CD4 cell activity which is necessary for optimal antibody response and contribute to lower antibody titre.

Agakhani A et al (2011) showed that in low hepatitis B endemic area, vaccination in infant protective antibody titre which was 65% after 1 year of vaccine gradually decline

in 30%, 29%, 24% in 5,10,15 years of vaccination. Hepatitis B infection has plagued human kind since the beginning of the recorded history. Though HBV infection is a significant health problem around the world, fortunately it is one of the oncoviruses that is vaccine preventable. HB vaccine induces anti-HBs response that can prevent HBV infection. Prevention of primary infection by vaccination is an important strategy to decrease the risk of chronic HBV infection and its subsequent complications. Harpaz R (2000) Studies have shown that childhood vaccination significantly reduced the rate of chronic HBV infection. Various published studies have shown that seroprotection against hepatitis B observed after a routine immunization in children with nephrotic syndrome is lower than that of healthy children. In this study 75 children enrolled, of them 4 patient is SRNS and 71 patient SSNS. Most of our patient received hepatitis B vaccination through EPI schedule as hepatitis B included in EPI in 2005. Here we consider anti-HBs titre >10 mIU/ml to be seroprotective which is describe in our studies. Out of the 75 children enrolled in our study, 57.3% (42) patient are sero negative and 42.7% (35) patient are seroprotective. We also found that majority of patient and healthy control vaccinated according to EPI schedule. We found a significant association between different type of nephrotic syndrome and proportion of children who had seroprotective titre with the proportion of children with seroprotective titre being higher in SSNS 42.7% (66.7 vs 55.6 vs 20.7 %) with SRNS (0.00%) respectively ($p=0.001$). And in comparison group 83.3% had significant antibody titre. Mantan et al. (2013) show that among 75 cohort steroid sensitive and steroid resistant are 44% and 56% respectively and 36 patient (48%) were seroprotected where 63.6 % in SSNS patient and 35.7% in SRNS subjects (Mantan et al. 2013). Another study (La manna et al 1992) compared boys with SSNS ($n=18$) and controls ($n=21$) for their response to hepatitis B vaccination which shows 66% seroconversion against hepatitis B in SSNS subject compared to 100% among the control. Jafarzedah A et al (2005) shows that after 10 years of primary vaccination 47.9% had protective level of antibody with geometric mean titre 68.12 IU/ml who were vaccinated at birth, with no gender difference. Agladioglu et al 2010 show that delaying in the first dose of HB vaccine until 2 month after birth produce higher immune response and provide longer term protection showing GMT for anti-HBs were 95.00 & 379.51 IU/ml and rate more than 100 IU/ml were 57.7 % & 94.9 % vaccinated compared in 0,2,9 month and 2,4,9 month group. Agakhani A et al (2011) show that in low hepatitis B endemic area, vaccination in infant protective

antibody titre which was after 1 year of vaccine 65% of children gradually decline in 30%,29%,24% in 5,10,15 years of vaccinated. Karaoglu L et al shows immune response of 1-3 years child to hepatitis B vaccination during infancy 955 shows high seroprotected rate and no difference by age, sex, anthropometry, time after 3rd dose and place of vaccine administered. Maritsi D et al (2013) shows markedly decreased antibody titre against hepatitis B in previously immunized children presented with juvenile immune arthritis shows 55% with 92% in control group. Most person with normal immune function who respond adequately with three dose of hepatitis B vaccination probably remain protected indefinitely. Steroid therapy inhibit CD4 cell activity which is necessary for optimal antibody response and contribute to lower antibody titre. The European consensus group guidelines on hepatitis B immunity concluded that there was no need of booster dose in healthy children previously vaccinated against hepatitis B. However in children who were immunocompromised there is a need to assess antibody titre every 6-12 months for antiHBs antibody level and a booster dose should be given if the titre <10miu/ml. The effect of booster dose is usually seen after 4 week of vaccination. Gilca V et al show that three dose of low dose (2.5microgram) recombinant Hep B vaccine of 8-10 years old children induce a 10 years long lasting immunity. Duval B et al (2005) show that there is no significant difference of protective antibody titre and long term immunogenicity of two recombinant hepatitis B vaccine and effect of booster dose given after five years. Before the booster dose antibody titre was detected in 94.7% in Engerix B group and 95.2% in recombivax group, after booster dose detectable antiHbs titre 97.9 and 98.5% respectively.

Conclusion:

It can be concluded from present study that children with steroid sensitive nephrotic syndrome previously vaccinated against hepatitis B had lower seroconversion rate in FRNS. In healthy control group significant seroconversion than nephrotic syndrome group. In nephrotic syndrome group significant titre was present in 2-4 years post vaccinal duration group which also declined after 9-10 years post vaccinal duration group in healthy control group significant titre was present in 2-4 years post vaccinal duration group which also declined gradually after increasing post vaccinal duration.

Conflict of Interest: None.

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Role of Maternal & Fetal Factors in Relation to Low Birth Weight

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Abstract

Introduction: Low birth weight (LBW) continues to remain a major public health problem worldwide. There are numerous factors contributing to LBW both maternal and fetal. The mortality of low birth weight can be reduced if the risk factors are detected early and managed by simple techniques. **Objective:** To identify the maternal and fetal factors associated with low birth weight. **Materials and Methods:** This case control study was conducted in Department of Pediatrics, Khulna Medical College & Hospital from January 2019 to June 2019. After delivery of the baby weight of the newborn was measured with digital weighing scale. Mothers of babies with birth weight <2500 gm were enrolled as cases and mothers of babies with birth weight ≥2500 gm were enrolled as controls. **Results:** Total 96 mothers were enrolled in this study and 48 mothers in each group. All the information was recorded in a pretested questionnaire. Statistical analysis was done by SPSS. Primipara mother had 3.153 times more likely to deliver LBW baby. Patients having anemia had 3.316 times more likely to deliver LBW baby. Patients having hypertension had 4.120 times more likely to deliver LBW baby. Preterm delivery had 28.927 times more likely to deliver LBW baby. Primipara, anemia, hypertension and preterm delivery were significantly associated with LBW. In multivariate analysis, preterm had 20.619 times more likely to deliver LBW. **Conclusion:** Primipara, anemia, hypertension and preterm delivery were significantly associated with LBW.

Keywords: Neonatal mortality, Preterm delivery, Primipara.

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Introduction:

Low birth weight (LBW) is defined by World Health Organization (WHO) as birth weight less than 2,500 gm at birth, irrespective of the region, community or culture¹.

LBW is a major public health problem worldwide especially in the developing countries. According to WHO, the prevalence of low birth weight is 15.5% globally & 96.5% of low birth weight infants are born in developing countries².

Despite consistent efforts to improve the quality of maternal and child health, more than twenty million low birth-weight babies are born every year throughout the world. Though, the health situation of developing country has improved substantially over the years, the low birth-weight rate is still high³.

Regardless of gestational age, LBW is a multifaceted public health problem with significant individual and societal impact worldwide, especially in developing countries⁴. LBW infants are at a disproportionately higher risk of poor growth, and impaired psychomotor and cognitive development⁵. These LBW infants are also disadvantaged when they become adults, as they are more susceptible to hypertension, type 2 diabetes mellitus and coronary heart disease⁶.

Considering the implications for child mortality significant reduction in prevalence of LBW is necessary to achieve Sustainable Developmental Goal (SDG) which is a major concern of health policy makers².

Substantial research effort is needed to assess and identify the

determinants of LBW⁷. The objective of this study is to identify the maternal and fetal factors associated with low birth weight by taking relevant history regarding maternal risk factors & by examining the studied newborns for identifying fetal factors associated with LBW in KMCH.

Materials and Methods:

It was a Case control study conducted in Department of Pediatrics, Khulna Medical College Hospital, from January 2019 to June 2019. Study population constituted of mothers who delivered at the Gynecology & Obstetrics department of Khulna Medical College Hospital during the study period, taken by purposive sampling. Total 48 cases and 48 controls were included in this study.

Inclusion criteria

Mothers who delivered at KMCH during the study period & their babies were included in this study.

Exclusion criteria

Deliveries with incomplete records, Still births & Diabetic mothers were excluded from the study.

All data were collected by using a questionnaire. The questionnaire included the variables: gestational age, maternal weight and height, parity, tobacco consumption, socioeconomic and socio-demographic factors like maternal education and household income, mother's health and nutrition status. The interviews were carried out within 12 hours after delivery. Clinical records were also reviewed to verify information given by the mothers. The newborns were examined to identify congenital anomalies. The information obtained from the clinical records & examinations were used to fill in the questionnaire forms. After delivery of the baby weight of the newborn was measured with digital weighing scale. Mothers of low birth weight babies were enrolled as cases and mothers of normal birth weight babies were taken as controls. Then comparisons of all parameters were done between cases and controls.

Data was processed and analyzed using SPSS software version 23. Continuous data was presented as mean standard deviation and Categorical data was presented as number percentage. The summarized data was presented in the table and chart. The chi-square test and student "t" test was used to identify statistical significance. Univariate and multivariate logistic regression analysis was performed for risk factors. P value < 0.05 is considered to be significant.

Before starting this study, ethical clearance was taken from Institutional Review Board (IRB) of KMCH. Data taken from the participants were coded and regarded as confidential. Due respect was given to all the subjects.

Results:

Mean birth weight was found 1677.5 ± 447.1 gm in case group and 2959.4 ± 354.1 gm in control group. Mean age of the mother was found 25.7 ± 5.6 years in case group and 26.8 ± 4.9 years in control group. According to pregnancy related factor wanted pregnancy was 41(85.4%) in case group and 42(87.5%) in control group. Mother's pregnancy weight gain 6-9 kg was found 24(50.0%) in case group and 20(41.7%) in control group. Most of the mothers received antenatal care 3-5 times. Bad obstetric history was found 10(20.8%) in case group and 8(16.7%) in control group. Two third (66.7%) mothers were primipara in case group and 16(33.3%) in control group. Majority mothers received iron & folic acid supplementation in both groups. Primipara was significantly ($p < 0.05$) higher in case group than control group. According to pregnancy related complication majority 28(58.3%) mothers had anemia in case group and 17(35.4%) in control group. Nineteen (39.6%) mothers had hypertension in case group and 7(14.6%) in control group. Eleven (22.9%) mothers had urinary tract infection in case group and 3(6.3%) in control group. Anemia, hypertension and urinary tract infection were significantly higher in case group than control group. Smoking or tobacco exposure was found same 4(8.3%) mothers in case and control groups. Parental disharmony & parental separation was found in 5(10.4%) & 1(10.4%) mothers respectively in case group and not found in control group. Thirteen (27.1%) mothers did heavy physical work in case group and 18(37.5%) in control group. These differences were not statistically significant ($p > 0.05$) between two groups. In case group more than half 26(54.2%) babies were male and in control group 22(45.8%). More than three fourth (77.1%) babies were preterm in case group and 5(10.4%) in control group. Ten (20.8%) babies were multiple pregnancy in case group and 3(6.3%) in control group. Preterm delivery and multiple pregnancy were significantly higher in case group than control group.

In univariate analysis, patients having primipara had 3.153 (95% CI 1.134 to 8.764) times more likely to develop LBW. Patients having anemia had 3.316 (95% CI 1.188 to 9.258) times more likely to develop LBW. Patients having hypertension had 4.120 (95% CI 1.328 to 12.782) times more likely to develop LBW. Patients having preterm had 28.927 (95% CI 9.207 to 90.888) times more likely to develop LBW. Primipara, anemia, hypertension and preterm delivery were significantly associated with LBW.

In multivariate analysis, preterm had 20.619 (95% CI 6.141 to 69.228) times more likely to develop LBW. Preterm delivery was significantly associated with LBW.

Table - I: Distribution of the study patients on pregnancy related factors (n=96)

Pregnancy related factors	Case group (n=48)		Control group (n=48)		P value
	n	%	n	%	
Type of pregnancy					
Wanted	41	85.4	42	87.5	0.500
Unwanted	7	14.6	6	12.5	
Pregnancy weight gain					
<6 kg	10	20.8	7	14.6	0.318
6-9 kg	24	50.0	20	41.7	
>9 kg	14	29.2	21	43.8	
Antenatal care					
<3	8	16.7	5	10.4	0.654
3-5	27	56.3	30	62.5	
>5	13	27.1	13	27.1	
Bad obstetric history					
Present	10	20.8	8	16.7	0.601
Absent	38	79.2	40	83.3	
Parity					
Primi para	32	66.7	16	33.3	0.001 (significant)
Multi para	16	33.3	32	66.7	
Iron & folic acid supplementation					
Received	46	95.8	43	89.6	0.218
Not received	2	4.2	5	10.4	

Table - II : Distribution of the study patients according to complications (n=96)

Complications	Case group (n=48)		Control group (n=48)		P value
	N	%	n	%	
Anemia	28	58.3	17	35.4	0.020 (significant)
Per vaginal bleeding	6	12.5	5	10.4	0.566
Hypertension	19	39.6	7	14.6	0.005 (significant)
Urinary tract infection	11	22.9	3	6.3	0.020 (significant)
Malaria	0	0.0	1	2.1	0.500
Febrile illness	8	16.7	7	14.6	0.500

Table - III: Distribution of the study patients according to other factors (n=96)

Other factors	Case group (n=48)		Control group (n=48)		P value
	N	%	n	%	
Smoking or tobacco exposure	4	8.3	4	8.3	1.000
Parental disharmony	5	10.4	0	0.0	0.071
Parental separation	1	2.1	0	0.0	0.500
Heavy physical work	13	27.1	18	37.5	0.191

Table - IV: Distribution of study patients according to fetal factors (n=96)

Fetal factors	Case group (n=48)		Control group (n=48)		P value
	N	%	n	%	
Infant sex					
Male	26	54.2	22	45.8	0.270
Female	22	45.8	26	54.2	
Gestational age					
Preterm (<37 weeks)	37	77.1	5	10.4	0.001 (significant)
Term (≥37 weeks)	11	22.9	43	89.6	
Multiple pregnancy					
Present	10	20.8	3	6.3	0.035 (significant)
Absent	38	79.2	45	93.8	

Table - V: Univariate regression analysis for risk factors of low birth weight

	OR	95% Confidence Interval		P value
		Lower	Upper	
Primipara	3.153	1.134	8.764	0.028(significant)
Anemia	3.316	1.188	9.258	0.022(significant)
Hypertension	4.120	1.328	12.782	0.014(significant)
Urinary tract infection	4.035	0.849	19.179	0.079
Preterm	28.927	9.207	90.888	0.001(significant)
Multiple pregnancy	2.339	0.486	11.269	0.289

Table - VI: Multivariate regression analysis for risk factors of low birth weight

	OR	95% Confidence Interval		P value
		Lower	Upper	
Primipara	2.325	0.745	7.255	0.146
Anemia	3.075	0.970	9.752	0.056
Hypertension	2.150	0.571	8.098	0.258
Preterm	20.619	6.141	69.228	0.001(significant)

Discussion:

The study was carried out with an aim to identify the maternal and fetal factors associated with low birth weight in KMCH which is the main referral center in southern part of Bangladesh.

In this study it was observed that mothers age is not significantly associated with LBW. And it is similar to other studies^{8,9,10,11,12}.

The difference of wanted & unwanted pregnancy was not statistically significant between two groups. But in a Taiwanese study unwanted pregnancy was significantly associated with LBW¹⁸.

In my study most of the mothers received antenatal care 3-5 times. It was not a significant risk factor. But in some studies, unbooked status of mother was a significant risk factor for LBW babies^{19,20}.

Bad obstetric history was not found statistically significant

between two groups. But other studies found bad obstetric history as a significant contributory factor towards LBW babies^{8,20}. Perhaps genetic factors and socioeconomic factors were the reasons for this phenomenon leading to repeat adverse obstetric outcome.

In this current study primipara was significantly higher in case group than control group. Other studies also found primipara as a significant risk of delivering LBW babies^{12,21}. Birth weight increase with parity up to 4-5 births but declines thereafter¹¹. This may be attributed to unprepared & inexperienced pregnancy in primipara²⁰.

Iron & folic acid supplementation was not found as a protective factor in this study Rizvi et al.¹⁰, Khan et al.¹³ reported that intake of iron supplements during pregnancy have a protective effect with respect to LBW. Iron supplementation prevents anemia because the required amounts may not be supplied from dietary intake during this period.

Anemia, hypertension and urinary tract infection were significantly higher in case group than control group. Substantial iron deficiency anemia is associated with an increased incidence of LBW. The mechanism by which anemia could produce this effect is unknown, but other nutrient deficiencies are important contributing factors^{16,22}. Rizvi et al.¹⁰ also stated a strong relationship between anemia and LBW. Coutinho et al.⁹ and Pawar et al.¹² found that hypertension is significantly associated with LBW. Hypertension in pregnancy may be associated with IUGR as a result of vasospasm which leads to a decrease in utero-placental perfusion²³. Preterm delivery can result from an attempt to save the life of the mother with severe pregnancy induced hypertension²⁴. Acute or chronic infections such as urinary tract infection during pregnancy result in direct intrauterine growth restriction leading to LBW¹³.

Exposure to smoking or tobacco, parental disharmony, marital separation, heavy physical work during pregnancy are not significant risk factors. But one study showed smoking during pregnancy leads to low birth weight. It may be due to decreased oxygen transport capacity of carboxyhemoglobin, vasoconstriction, decreased plasma volume, increased need for vitamin B^{12,23}. In a study, heavy physical work was significantly associated with LBW²⁵.

This study showed that sex of the baby is not a risk factor & it is consistent with Choudhary et al.¹⁴ But Ndu et al.²¹, Tshotetsi et al.²⁶ found incidence of LBW with a female preponderance. It is hypothesized that the activity of androgen causes difference, or genetic material on the Y chromosome carries genetic material for fetal growth. Preterm gestational age and multiple pregnancy was significantly higher in case group than control group. It is

consistent with other studies^{15,25,26}.

Regarding univariate analysis primipara, anemia, hypertension and preterm delivery were significantly associated with LBW. In multivariate analysis, preterm delivery was significantly associated with LBW.

Conclusion:

In conclusion parity, anemia, hypertension, urinary tract infection, preterm delivery, multiple pregnancy was significantly associated with low birth weight compared to normal birth weight. Further studies can be undertaken by including large number of mothers & mothers delivering at home.

Conflict of Interest: None.

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Comparison of Lipid Profile in Different Types of Steroid Sensitive Idiopathic Relapsing Nephrotic Syndrome in Children during Active Disease and Remission

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Abstract

Introduction: Nephrotic syndrome is a disease of relapse and remission. Relapse rate is more than 80%. Hyperlipidemia and hypoalbuminemia are important characteristic of nephrotic syndrome. Hyperlipidemia persist even after remission of disease in frequent relapse nephrotic syndrome possibly due to frequent attack of disease and frequent use of steroid. Hyperlipidemia causes premature atherosclerosis, progressive renal injury leading to chronic renal failure, cardiac complications (myocardial infarction, hypertension), cerebrovascular disease and frequent relapse of nephrotic syndrome. **Objectives:** The aim of study was to see the lipid profile and comparison of lipid profile among different types of steroid sensitive idiopathic relapsing nephrotic syndrome during active disease and in remission. **Materials and Methods:** A cross sectional study included 120 (40 in each group) children aged 2-16 years with steroid sensitive idiopathic relapsing nephrotic syndrome patients who were admitted or attended in out patients department (OPD) in paediatric nephrology department Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh, during December 2014 to December 2015. They were clinically examined and fasting lipid profile was done in each case during active disease and after one month of urinary remission. The study population were divided into three groups- Infrequent relapse nephrotic syndrome (IFRNS), frequent relapse nephrotic syndrome (FRNS) and steroid dependent nephrotic syndrome (SDNS) based on clinical response. **Results:** Total patients were 120 (40 in each group). The study showed a male predominance with a male to female ratio 2.24:1, male patients were 69%, female 31%. In all cases, there were increased mean total cholesterol, low density lipoprotein (LDL), triglyceride (TG) and high density lipoprotein (HDL) was normal during active disease, more raised in FRNS and SDNS. There was significant decrease in the mean level of total cholesterol, LDL and triglyceride during remission ($p < 0.001$). Cholesterol became normal but triglyceride and LDL remained elevated even after one month of urinary remission in FRNS and SDNS. **Conclusion:** Hyperlipidemia persist during remission of steroid sensitive relapsing nephrotic syndrome. Children with FRNS and SDNS should be addressed with lipid lowering medication, healthy foods and healthy life style. Multicenter prospective studies with larger sample are needed for validating the findings of the present study.

Keywords: Hyperlipidaemia, Serum albumin, Nephrotic syndrome.

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Introduction:

Nephrotic syndrome (NS) is a common renal disease in children. It is characterized by massive proteinuria (urinary total protein $>1\text{gm}/\text{m}^2/24$ hours), hypoalbuminemia (serum albumin $>250\text{mg}/\text{dl}$)¹. The incidence of idiopathic nephrotic syndrome (INS) varies with age, race and geography. The incidence in children in the USA and Europe is 2 to 2.7 per 100000 children below 18 years². The incidence of idiopathic nephrotic syndrome (INS) is six fold in Asians than in European children³. INS is less frequent in Africa⁴. In Indian subcontinent incidence is higher (90-100/million population). There is a male preponderance in children, with a male: female ratio of 2:1. Ninety percent childhood nephrotic syndrome are idiopathic, 85% of them are minimal change nephrotic syndrome (MCNS). Idiopathic nephrotic syndrome are two types such as steroid sensitive and steroid resistant. According to clinical response steroid sensitive nephrotic syndrome divided into infrequent relapse nephrotic syndrome (IFRNS), frequent relapse nephrotic syndrome (FRNS) and steroid dependent nephrotic syndrome (SDNS). Eighty to ninety percent of children with idiopathic nephrotic syndrome are steroid sensitive and rest 10-20% nephrotic syndrome are steroid resistant⁵. Ninety five percent of children with minimal change nephrotic syndrome (MCNS) are responsive to steroid therapy with complete clinical and biochemical remission and have excellent long term prognosis⁶. Idiopathic nephrotic syndrome is a disease of relapse and remission. Frequency of relapse is highly variable². Hyperlipidemia has long been

recognized as a frequent metabolic abnormality in patients with nephrotic syndrome, having first been documented in 1917⁷. Hyperlipidemia is an important characteristic of idiopathic nephrotic syndrome in children. Hyperlipidemia occurs as a results of increase hepatic synthesis of lipoprotein due to hypoalbuminemia and decreased catabolism of individual lipid fraction due to loss of lipoprotein lipase and lipoprotein lipase receptor and due to drugs used (steroid, cyclosporine, tacrolimus) in the treatment of nephrotic syndrome. Hyperlipidemia is usually observed during the active phase of the disease and disappear with resolution of proteinuria³. The plasma concentrations of total cholesterol (CH), triglyceride (TG), low density lipoprotein (LDL), very low density lipoprotein (VLDL), apolipoprotein-b and lipoprotein(a) are increased during active phase of the disease. High density lipoprotein (HDL) has been reported as low⁸, normal or elevated¹⁰ during active disease. Persistent hyperlipidemia after remission can be found in frequent relapse nephrotic syndrome and steroid resistant nephrotic syndrome¹¹. Elevated plasma lipids are potential risk factors for premature atherosclerosis and progression of glomerular injury⁶. Hyperlipidemia is also responsible for cardiovascular disease and progressive glomerular damage leading to renal failure¹². The persistence and severity of lipid changes in serum correlates well with the duration and frequency of the relapses, even during the remission which leads to increased risk of atherosclerosis in later life and the development of progressive renal injury¹³. Hence close monitoring of lipid levels during remission of nephrotic syndrome is necessary to select high risk patients. The intensity of hyperlipidemia is usually related to the severity of proteinuria and hypoalbuminemia¹⁴. Hyperlipidemia may be possible to control by using lipid lowering drugs¹⁵. Lipoproteins play an important role in the transport of plasma lipids, their increase or alteration in various fractions may be responsible for hypercholesterolemia in nephrotic syndrome. In addition to these quantitative changes, the lipoprotein composition is markedly changed, with a higher ratio of cholesterol to triglycerides in the (apo-B containing) lipoproteins and an increase in the proportion of cholesterol, cholesterol ester, and phospholipids compared with proteins.

Materials and Methods:

This is a Prospective observational study conducted in the Department of Paediatric Nephrology, BSMMU, Dhaka from December 2014 to December 2015. One hundred twenty (120) children with steroid sensitive nephrotic syndrome of both sexes between age group of 2-18 years (both admitted and attended in the OPD) were included. During study period whose parents agreed to participate (by written informed consent) and who met the inclusion criteria were enrolled. For incidence of disease 80% with 95% confidence interval & precision of 10%, we needed a sample size of 345 children. Due to financial constrain and short duration of study period 120 patients were taken in this study. Children aged 2-18 years of both sexes having nephrotic syndrome of 1st episode and relapse- Infrequent relapse nephrotic syndrome (IFRNS) and frequent relapse nephrotic syndrome (FRNS). Steroid dependent nephrotic syndrome (SDNS), Children with Congenital NS (onset of nephrotic syndrome < 3 months of age), Children with steroid resistant nephrotic syndrome, Children already on lipid

lowering drugs, Patients who do not follow the dietary advice, Secondary nephrotic syndrome like SLE, HSP etc and those parents/patients who refused to participate were excluded from the study.

The following variable was noted in the study group as a. Demographic variable: i) Age and ii) gender Both male and female patients. b. Biochemical variables: i) Serum Total Cholesterol (CH) ii) Serum Triglyceride (TG) iii) Serum Low Density Lipoprotein (LDL) iv) Serum High Density Lipoprotein (HDL) v) Serum Albumin vi) Serum creatinine vii) 24 hours Urinary Total protein (UTP) and clinical type of nephrotic syndrome. Clinical history was noted including age of onset of 1st attack of nephrotic syndrome, duration of disease, number and type of relapse. On follow up (after one month of remission) complete blood count, urine for routine and microscopic examination, serum albumin, spot urinary protein creatinine ratio, serum fasting lipid profile, were evaluated during remission of disease. After taking informed written consent, 6 ml of venous blood collected from each patient, the sample divided into two- sample of 3 ml each. One sample for determining biochemical parameter & other sample used to determine serum lipid profile. The patients were followed up after one month of remission. Proper dietary history, physical examination and fasting lipid profile was done in all group (IFRNS; FRNS and SDNS). After collection, all the data were checked and edited. Then data were entered into computer with the help of software SPSS for windows programmed version 16. After frequency run, data were cleaned and frequencies were checked. An analysis plan was developed keeping in view with the objectives of the study. Chi-square, paired t-test and ANOVA test was done whenever required. Proportion was expressed as percentage and between groups comparison of fasting lipid profile was done expressed with p value. p value < 0.05 was statistically significant. Prior to commencement of this the research, protocol was approved by the Institutional review board (IRB). Study procedure was elaborated to guardian in easily understandable local language and written consent from guardians of patient were obtained.

Results:

A total of 120 children with nephrotic syndrome of both male and female included in this study. Maximum patients were in age groups 5 – 10 years in all three groups. In the present study, most of the patients were of 5-10 year (53.2%) age group followed by 2-5 years age group (30.8%) and more than 10 years age group 25%. Among 120 patients male were 83 (69.2%) and female were 37 (30.8%). Male female ratio was 2.24 : 1. Male were predominant than female in each groups. Male female ratios were 2.07:1, 1.85:1 and 3.0:1 in IFRNS, FRNS and SDNS groups respectively.

Table I: Comparison of lipid profile (Mean values) among different groups of study subjects during active disease (n=40 in each group).

Parameters	Mean ± SD	p value
Cholesterol (mg/dl)		
IFRNS (a) (n=40)	388.9 ± 88.1	
FRNS (b) (n=40)	481.1 ± 108.7	
SDNS (c) (n=40)	441.2 ± 86.2	
Statistical analysis		
a vs b vs c		<0.001***

Parameters	Mean $\pm$ SD	p value
a vs b		<0.001***
a vs c		0.046 *
b vs c		0.169 ^{ns}
Triglyceride (mg/dl)		
IFRNS (a) (n=40)	272.0 $\pm$ 67.0	
FRNS (b) (n=40)	372.5 $\pm$ 147.5	
SDNS (c) (n=40)	331.4 $\pm$ 83.2	
Statistical analysis		
a vs b vs c		<0.001***
a vs b		<0.001***
a vs c		.039*
b vs c		.248 ^{ns}
LDL (mg/dl)		
IFRNS (a) (n=40)	282.9 $\pm$ 88.7	
FRNS (b) (n=40)	353.3 $\pm$ 100.5	
SDNS (c) (n=40)	335.4 $\pm$ 87.5	
Statistical analysis		
a vs b vs c		0.003**
a vs b		0.003**
a vs c		0.038*
b vs c		1.000 ^{ns}
HDL (mg/dl)		
IFRNS (a) (n=40)	52.6 $\pm$ 17.0	
FRNS (b) (n=40)	54.6 $\pm$ 17.9	
SDNS (c) (n=40)	56.8 $\pm$ 12.8	
Statistical analysis		
a vs b vs c		.505 ^{ns}
a vs b		1.000 ^{ns}
a vs c		0.730 ^{ns}
b vs c		1.000 ^{ns}

ANOVA test was done to measure the level of significance among groups and Bonferroni test between groups.

Table I showing comparison of lipid profiles among groups and between groups during active disease. There were significant differences among groups and between IFRNS & FRNS and IFRNS & SDNS in total cholesterol during active disease but no significant difference between FRNS & SDNS. There were significant differences among groups and between IFRNS & FRNS and IFRNS & SDNS in triglyceride during active disease but no significant difference between FRNS & SDNS. There were significant differences among groups, between IFRNS & FRNS and IFRNS & SDNS in LDL during active disease but no significant difference between FRNS & SDNS. There were no significant differences among groups and between groups in HDL during active disease.

Table II: Comparison of lipid profile (Mean values) among study groups during remission (n=40 in each group).

Parameters	Mean $\pm$ SD	p value
Cholesterol (mg/dl)		
IFRNS (a) (n=40)	194.0 $\pm$ 44.0	
FRNS (b) (n=40)	236.8 $\pm$ 48.4	
SDNS (c) (n=40)	230.0 $\pm$ 55.7	
Statistical analysis		
a vs b vs c		<0.001***
a vs b		0.001**

Parameters	Mean $\pm$ SD	p value
a vs c		0.005**
b vs c		1.000 ^{ns}
Triglyceride (mg/dl)		
IFRNS (a) (n=40)	126.9 $\pm$ 40.8	
FRNS (b) (n=40)	194.2 $\pm$ 62.5	
SDNS (c) (n=40)	188.2 $\pm$ 56.3	
Statistical analysis		
a vs b vs c		<0.001***
a vs b		<0.001***
a vs c		<0.001***
b vs c		1.000 ^{ns}
LDL (mg/dl)		
IFRNS (a) (n=40)	115.8 $\pm$ 38.8	
FRNS (b) (n=40)	153.2 $\pm$ 43.9	
SDNS (c) (n=40)	141.2 $\pm$ 46.7	
Statistical analysis		
a vs b vs c		0.001**
a vs b		0.001**
a vs c		0.030*
b vs c		0.657 ^{ns}
HDL (mg/dl)		
IFRNS (a) (n=40)	52.9 $\pm$ 18.3	
FRNS (b) (n=40)	48.9 $\pm$ 11.7	
SDNS (c) (n=40)	50.3 $\pm$ 14.4	
Statistical analysis		
a vs b vs c		0.476 ^{ns}
a vs b		0.690 ^{ns}
a vs c		1.000 ^{ns}
b vs c		1.000 ^{ns}

ANOVA test was done to measure the level of significance among groups and Bonferroni test between groups.

Table II showing comparison of lipid profiles among groups and between groups during remission of disease. There were significant differences among groups and between IFRNS & FRNS and IFRNS & SDNS in total cholesterol during remission of disease but no significant difference between FRNS & SDNS. There were significant differences among groups and between IFRNS & FRNS and IFRNS & SDNS in triglyceride during remission of disease but no significant difference between FRNS & SDNS. There were significant differences among groups, between IFRNS & FRNS and IFRNS & SDNS in LDL during remission of disease but no significant difference between FRNS & SDNS. There were no significant differences among groups and between groups in HDL during remission of disease.

Table III: Comparative analysis of serum Lipid profile (Mean values) during active disease and remission in each group of study subjects (n=40 in each group)

Parameters	During active disease (Mean $\pm$ SD)	During remission of disease (Mean $\pm$ SD)	p value
Cholesterol (mg/dl)			
• IFRNS (n=40)	388.9 $\pm$ 88.1	194.0 $\pm$ 44.0	<0.001***
• FRNS (n=40)	481.1 $\pm$ 108.7	236.8 $\pm$ 48.4	<0.001***
• SDNS (n=40)	441.2 $\pm$ 86.2	230.0 $\pm$ 55.7	<0.001***

Parameters	During active disease (Mean $\pm$ SD)	During remission of disease (Mean $\pm$ SD)	p value
Triglyceride (mg/dl)			
• IFRNS (n=40)	272.0 $\pm$ 67.0	126.9 $\pm$ 40.8	<0.001***
• FRNS (n=40)	372.5 $\pm$ 147.5	194.2 $\pm$ 62.5	<0.001***
• SDNS (n=40)	331.4 $\pm$ 83.2	188.2 $\pm$ 56.3	<0.001***
LDL (mg/dl)			
• IFRNS (n=40)	282.9 $\pm$ 88.7	115.8 $\pm$ 38.8	<0.001***
• FRNS (n=40)	353.3 $\pm$ 100.5	153.2 $\pm$ 43.9	<0.001***
• SDNS (n=40)	335.4 $\pm$ 87.5	141.2 $\pm$ 46.7	<0.001***
HDL (mg/dl)			
• IFRNS (n=40)	52.6 $\pm$ 17.0	52.9 $\pm$ 18.3	0.923 ^{ns}
• FRNS (n=40)	54.6 $\pm$ 17.9	48.9 $\pm$ 11.7	0.008**
• SDNS (n=40)	56.8 $\pm$ 12.8	50.3 $\pm$ 14.4	0.007**

Paired t test was done to measure the level of significance

Table III shows comparison of lipid profile between active disease and remission of disease in each group of study subjects. There were significant differences between active disease and remission of disease in total cholesterol in each group. There were significant differences between active disease and remission of disease in triglyceride in each group. There were significant differences between active disease and remission of disease in LDL in each group. There were significant differences between active disease and remission of disease in HDL in FRNS and SDNS groups.

Table IV: Comparison of mean serum albumin level in relapsing nephrotic syndrome during active disease and remission.

Albumin (gm/L)	During active disease	During remission of disease	p value
IFRNS	16.8 $\pm$ 8.8	33.8 $\pm$ 5.2	<0.001***
FRNS	15.1 $\pm$ 5.5	30.7 $\pm$ 4.1	<0.001***
SDNS	14.5 $\pm$ 4.1	34.0 $\pm$ 3.8	<0.001***

Paired t test was done to measure the level of significance

Table IV shows comparison of serum albumin between active disease and remission of disease. The difference between serum albumin level during active disease and in remission was highly significant ($P < 0.001$) in each group of relapsing nephrotic syndrome.

Discussion:

This study analyzed fasting lipid profile of 120 (40 in each group) children with steroid sensitive idiopathic relapsing nephrotic syndrome (NS) during active disease and after one month of urinary remission. The current study showed a male predominance with a male to female ratio 2.24:1. In this study, male patients were 69%, female 31%. Denison et al were also observed male predominance in their studies. Also found male and female ratio 2:1¹⁴ which was similar to present study. Balgopal et al¹⁵ and Shah et al¹⁷ found 2-6 years were common age for childhood nephrotic syndrome, 60.6% and 61.7%

respectively. Hyperlipidemia is an important feature of nephrotic syndrome. Present study showed, significantly raised level of total cholesterol during active disease in each study group. Among groups which was statistically significant ($p < 0.001$). During remission of nephrotic syndrome serum cholesterol became normal. Arije et al¹⁸ also observed raised level serum cholesterol during active disease. Present study showed there was normal serum cholesterol after one month of urinary remission. Banarejee et al¹⁹ found elevated level of cholesterol even after remission of disease. In the present study there was significantly raised level of serum triglyceride (TG) during active disease in each study group, among groups which was statistically significant ($p < 0.001$). Matsuda et al²⁰ observed that some patients were normo triglyceridemic but others show a moderate hypertriglyceridemic picture which although not uniformly expressed. Present study also showed serum triglyceride was persistently raised in the study subjects even after one month of urinary remission, more in FRNS and SDNS. Zilleurelo et al¹⁰ also observed significantly persistent high level of TG in relapsing nephrotic syndrome even during remission. Adu E M²¹ also found elevated triglyceride during active disease and remained raised after remission of disease ($P < 0.05$). Present study also showed low density lipoprotein (LDL) was significantly elevated during active disease among study groups and remained raised even after one month of urinary remission of disease. LDL level was more raised in FRNS and SDNS, which was statistically significant among study groups ($p < 0.003$). Metha et al²² studied 22 cases of nephrotic syndrome and observed LDL level was elevated in 100% cases during active disease and remission. Chowdhury et al²³ studied 25 cases of nephrotic syndrome reported that 96% cases had elevated level of cholesterol, 100% had raised LDL level. Present study showed mean serum high density lipoprotein (HDL) was within normal range during active disease and during remission in the study groups. All study subjects were on steroid therapy during remission. In this study, we can not evaluate hyperlipidemia whether due to disease or steroid. Alexander et al²⁴ found that HDL was low in nephrotic syndrome and Appel et al¹² and Joven et al²⁵ observed normal level of HDL during active disease and remission of disease. Hypoalbuminemia is an important finding of idiopathic relapsing nephrotic syndrome in children due to loss of albumin in the urine. Albumin level decreases during active disease and increases during remission of disease. In the present study, there was an inverse correlation between albumin and cholesterol, triglyceride and low density lipoprotein. Present study showed, there was significant difference of serum albumin in each group of study subjects during active and remission ($p < 0.001$). Thomas et al²⁶ found no correlation between the development of hyperlipidemia and hypoalbuminemia and postulated that the severity of hyperlipidemia is related to the amount of nephrotic kidney tissue

present. Thomas et al²⁶ found inverse correlation between serum cholesterol and albumin. Hypoalbuminemia causes hyperlipidemia. Mallik et al.²⁷ observed a direct correlation between serum albumin and HDL. When albumin was low the HDL was also low.

Conclusion:

The present study concluded that hyperlipidemia were associated with childhood idiopathic nephrotic syndrome during active disease. Serum cholesterol, triglyceride and low density lipoprotein were elevated during active disease. Serum cholesterol became normal after one month of urinary remission but triglyceride and LDL level remained elevated even after one month of urinary remission. Serum cholesterol, triglyceride and low density lipoprotein were more elevated in FRNS and SDNS during active disease, probably due to frequent attack of disease and use of steroid. High density lipoprotein remained within normal range in both active disease and during remission.

Conflict of Interest: None.

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Combination of Thyroxine with Vitamin B₁₂ on Motor Nerve Conduction Study of Ulnar Nerve in Newly Diagnosed Hypothyroid Female

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Abstract

Introduction: Combination of thyroxine with vitamin B₁₂ can improve the motor nerve conduction study of ulnar nerve in newly diagnosed hypothyroid female. **Objectives:** To observe the combined effects of thyroxine with vitamin B₁₂ on motor nerve conduction study of ulnar nerve of newly diagnosed hypothyroid female. **Materials and Methods:** This prospective interventional study was carried out in the Department of Physiology, Sir Salimullah Medical College (SSMC) between July' 2015 to June' 2016 on 40 newly diagnosed hypothyroid female. Among them, 20 hypothyroid patients received only thyroxine (HT-T₄) and another 20 hypothyroid patients received combined therapy of thyroxine with vitamin B₁₂ (HT-C) for 90 consecutive days. Motor 2 nerve conduction study of ulnar nerve was studied to observe the electrophysiological status and vitamin B₁₂ level was also estimated to observe its level by using standard method. The statistical analysis was done by ANOVA test, paired, independent sample 't' test and Chi-square (χ^2) test as applicable. **Results:** In this study, latency was significantly decreased, amplitude and NCV were significantly increased in motor functions of ulnar nerve of hypothyroid patients after 90 days supplementation of combined therapy of thyroxine with vitamin B₁₂ in comparison to those of their pre-supplemented state and also to those of patients with only thyroxine treatment. **Conclusion:** The combination of thyroxine with vitamin B₁₂ can reduce the symptoms of hypothyroid neuropathy and accelerate the nerve conduction velocity of motor functions of ulnar nerve more efficiently than the treatment with thyroxine alone.

Key words: Nerve conduction velocity, Distal latency, Amplitude, Thyroxine, Vitamin B₁₂.

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Introduction:

Hypothyroidism is a clinical condition resulting from reduced circulating levels of free thyroxine (FT₄) and triiodothyronine (FT₃)¹. However, the thyroid hormones increase the metabolic activities of almost all tissues of the body. The basal metabolic rate can increase 60 to 100 percent above normal when large amount of hormones are secreted². The thyroid gland is not essential for life, but its absence or hypo function during fetal and neonatal life results in severe mental retardation and dwarfism³.

The prevalence of primary hypothyroidism is 10/1000 but increases to 50/1000 if patients with sub-clinical hypothyroidism (normal FT₄, raised TSH) are included and the female: male ratio is approximately 6:1⁴.

However, Hypothyroidism might be reversible at early stages; on the other hand irreversible cases might have longer duration of diseases or might present etiologies other than hypothyroidism. Long term accumulation of mucinous tissue is the possible cause of irreversibility⁵. In hypothyroidism, delayed distal latencies with lower nerve conduction velocities were observed in median and ulnar nerves for both motor and sensory conduction, in peroneal nerves for motor conduction and in sural nerve for sensory conduction in nerve conduction study by using electromyogram machine⁶. Majority of the hypothyroid female patients with a diagnosis of polyneuropathy had electrophysiological evidence of prominent sensory neuropathy involving the median nerve⁷.

Most of the hypothyroid patients complain some sensory symptoms like tingling sensation, numbness, paraesthesia, burning pain and some

motor symptoms like weakness, muscle fatigability, stiffness and cramp⁸. Again, decreased tendon reflexes, decreased muscle strength, positive Phalen's test and Tinel's sign at the wrist (test for clinical diagnosis of carpal tunnel syndrome) were also found in some hypothyroid female⁹. Some investigator revealed that, sensory and motor sign/symptoms such as tingling sensation, numbness, loss of vibration, pain, decreased muscle strength and delayed tendon reflexes were still persisted in hypothyroid patients even after 1 year of thyroxine replacement therapy¹⁰. However, For clinical diagnosis of peripheral neuropathy, elicitation of reflexes, assessment of strength of major muscle groups on both side to evaluating motor system and fine/crude touch, two point discrimination test, pin prick, vibration sense to evaluating sensory system were observed in some study and they found the significant alteration in maximum newly diagnosed hypothyroid patients⁹. After thyroxine therapy, the central and peripheral nerve conduction velocities returned to normal limits, whereas the abnormalities in amplitude were still persisted¹¹. In a follow-up study, some researchers demonstrated that abnormalities related to entrapment neuropathy and polyneuropathy in hypothyroid patients can be reversed within 3 months of thyroid hormone replacement therapy. But the researchers also found that, 13.8% of the patients still had carpal tunnel syndrome after 3 months of thyroxine replacement therapy and were subjected to surgical decompression⁷.

Materials and Methods:

The present interventional study was carried out in the Department of Physiology, SSMC, Dhaka from 1st July 2015 to 30th June 2016. In this study, 40 newly diagnosed hypothyroid female patients with abnormal nerve conduction parameters (delayed distal latency, decreased amplitude and NCV) of motor functions of ulnar nerve, age ranged from 20-45 years were selected. All the study subjects were selected from out patients department of SSMC and BSMMU belonged to middle socioeconomic status. Subjects with hypertension, diabetic Mellitus, heart disease, kidney disease, hyperthyroidism, past history of neuropathy or neuromuscular diseases, use of drugs known to cause neuropathy or myopathy, malignancy or other serious diseases, pregnancy or lactation, history of gastric or ileal resection were excluded from the study. Among them, 20 hypothyroid patients (HT-T_{4b}) received only thyroxine at a dose of 50 µg per day for 3 wks, 100 µg per day for the next 3 wks and finally to a maintenance dose of 150 µg per day for the remaining day of the study period (upto day-90). Another, 20 hypothyroid patients (HT-C_b) received combined therapy of thyroxine (as above mentioned dose) with vitamin B₁₂ (500µg 8 hourly orally) for 90 consecutive days. All the patients were studied two times; on day 1 and on day 90. Furthermore, 20 euthyroid female subjects (ET) with normal electrophysiological status were taken for comparison and were studied only on day 1.

Results:

In this study, the mean (±SD) serum TSH level was higher and FT₄, FT₃ and vitamin B₁₂ levels were significantly lower in group HT-T_{4b} and HT-C_b in the comparison to those of group ET. Whereas, the levels were almost similar and differences were not significant between group HT-T_{4b} and HT-C_b (Table-I). Again, TSH level was decreased, whereas FT₄ and FT₃ levels were increased in group HT-T_{4a} and HT-C_a in comparison to those of group HT-T_{4b} and HT-C_b respectively and vitamin B₁₂ level was increased only in group HT-C_a in comparison to that of group HT-C_b and HT-T_{4b} respectively (Table-I). However, FT₄ level was almost similar and the difference was not significant between groups HT-T_{4a} vs HT-C_a, ET vs HT-T_{4a} and ET vs HT-C_a. Again, TSH level was lower, whereas FT₃ level was significantly ($P < 0.05$) higher in group HT-T_{4a} and HT-C_a in comparison to those of group ET (Table-I). But, these levels were almost similar and the differences were not significant between groups HT-T_{4a} vs HT-C_a. Again, Vitamin B₁₂ level was reached towards the level of group ET, though this level still showed difference between ET vs HT-C_a (Table-I). In this study, the U d latency was significantly ($p < 0.01$) higher whereas, U amplitude and UNCV were significantly ($p < 0.001$) lower in group HT-T_{4b} and HT-C_b when compared to those of group ET. However, these levels were almost similar and the differences were not statistically significant between group HT-T_{4b} and group HT-C_b (Table-II). Again, U d latency was significantly ($p < 0.01$) decreased and U amplitude was significantly ($p < 0.01$) increased in group HT-T_{4a} and HT-C_a in comparison to those of HT-T_{4b} and HT-C_b respectively. However, these levels in group HT-T_{4a} and HT-C_a projected towards the levels of group ET, though the differences among them were still statistically significant ($p < 0.05$, $p < 0.01$). Whereas, these levels were almost similar and the differences were not statistically significant between HT-T_{4a} and HT-C_a (Table-II). Moreover, UNCV was significantly ($p < 0.01$) increased in group HT-C_a when compared to that of groups HT-C_b and T_{4a}. However, this level in group HT-T_{4a} projected towards the level of group ET, though the differences between ET vs HT-C_a was still statistically significant ($p < 0.05$) (Table-II).

Table I: Serum Thyroid Stimulating Hormone (TSH), free Thyroxine (FT₄), free Triiodothyronine (FT₃), and Vitamin B₁₂ levels in different groups (n=60)

Groups	n	TSH (µIU/ml)	FT ₄ (pmol/L)	FT ₃ (pmol/L)	Vitamin B ₁₂ (pg/ml)
EC	20	1.28±0.8 (0.3-2.6)	13.87±1.53 (12.2-14.5)	3.2±0.44 (2.2-4.4)	275±4.2 (261-285)
HT-T _{4b}	20	8.99±1.74 (5.9-11.4)	9.8±1.5 (7.4-13.4)	1.4±0.4 (1-1.9)	235±4.6 (220-245)
HT-T _{4a}	20	4.06±0.5 (3.3-4.9)	13.6±0.9 (12.4-14.5)	2.3±0.6 (1.8-2.7)	235± 3.7 (230-240)
HT-C _b	20	9.56±2.1 (5.8-13.2)	10.67±3.05 (6.5-16.2)	1.5±0.4 (1.0-2.2)	234±5.2 (230-238)
HT-C _a	20	4.32±0.6 (3.4-5.5)	12.92±0.53 (11.52-13.8)	2.2±0.4 (1.5-3.1)	250±5.4 (244-256)

Data were expressed as mean $\pm$ SD. Figures in parentheses indicate ranges.

Group ET: euthyroid subjects

Group HT: hypothyroid patient (HT- T_{4b} : before treatment with thyroxine, HT- T_{4a} : after treatment with thyroxine, HT- C_b : before treatment with thyroxine and vitamin B_{12} , HT- C_a : after treatment with thyroxine and vitamin B_{12}).

Table II: Nerve conduction parameters for motor function of ulnar nerve in different groups (n=60)

Groups	n	U d latency (msec)	U amplitude (mv)	U NCV (m/sec)
A	20	2.04 $\pm$ 0.6 (1.2-3.1)	23.37 $\pm$ 2.8 (20.2-27.5)	59 $\pm$ 3.8 (55-65)
B _{1b}	20	3.1 $\pm$ 1.1 (2.1-4.2)	10.6 $\pm$ 5.7 (8-13.4)	47 $\pm$ 3.5 (44-49)
B _{1a}	20	2.4 $\pm$ 1.2 (1.7-3.0)	16.9 $\pm$ 4.2 (13-19.5)	47.5 $\pm$ 3.8 (45-51)
B _{2b}	20	3.3 $\pm$ 0.8 (2.1-4.8)	9.5 $\pm$ 4.6 (7.5-11.2)	48 $\pm$ 4.3 (44-52)
B _{2a}	20	2.5 $\pm$ 0.7 (1.8-3.8)	16.89 $\pm$ 4.2 (12.6-20.5)	55 $\pm$ 2.8 (48-61)

Statistical analysis

Groups	U d latency (p value)	U amplitude (p value)	U NCV (p value)
A vs B _{1b} vs B _{2b}	0.001**	0.000***	0.000***
A vs B _{1b}	0.021*	0.000***	0.000***
A vs B _{2b}	0.042*	0.000***	0.000***
B _{1b} vs B _{2b}	0.201 ^{ns}	0.101 ^{ns}	0.105 ^{ns}
B _{1a} vs B _{2a}	0.522 ^{ns}	0.416 ^{ns}	0.001**
B _{1b} vs B _{1a}	0.011*	0.007**	0.242 ^{ns}
B _{2b} vs B _{2a}	0.031*	0.001**	0.001**
A vs B _{1a}	0.714 ^{ns}	0.003**	0.001**
A vs B _{2a}	0.613 ^{ns}	0.005**	0.016*

Data were expressed as mean $\pm$ SD. For statistical analysis, one way ANOVA, paired 't' test and independent sample 't' test were done. Figures in parentheses indicate ranges.

Group A: euthyroid subjects

Group B: hypothyroid patients

B_{1b}: before treatment with thyroxine

B_{1a}: after treatment with thyroxine

B_{2b}: before treatment with thyroxine and vitamin B_{12}

B_{2a}: after treatment with thyroxine and vitamin B_{12}

***= Significant at $P < 0.001$ **= Significant at $P < 0.01$ *= Significant at $P < 0.05$

^{ns} = not significant n= total number of subjects

U d latency=Ulnar Distal Latency, U Amplitude=Ulnar Amplitude, U NCV=Ulnar Nerve Conduction Velocity

Discussion:

In the present study, the mean ($\pm$ SD) serum TSH level was higher and FT_4 and FT_3 levels were lower in both groups of hypothyroid female in the comparison to those of ET group. However, after supplementation, TSH level was decreased, whereas FT_4 and FT_3 levels were increased in both groups of HT female patients on day 90 in comparison to those of their pre-supplemented states on day 1. However, these levels were almost similar and the differences were not significant between these two groups on day 90. Again, FT_4 level reached to the level of ET group after 90 days supple-

mentation with combined therapy of thyroxine along with vitamin B_{12} .

Electrophysiological Status:

Motor function of ulnar nerve:

In this study, the mean distal latency of ulnar nerves (U d latency) was significantly decreased ($p < 0.001$) and ulnar amplitude (U amplitude) and nerve conduction velocity (UNCV) were significantly ($p < 0.01$) increased in newly diagnosed HT female patients after supplementation with combined therapy of thyroxine along with vitamin B_{12} in comparison to those of their pre-supplemented state (HT- C_b) and also of only thyroxine group (HT- T_{4b}). Again, significant decreased value of U d latency and significant increased value of U amplitude with no significant change of UNCV were observed in only thyroxine group (HT- T_{4a}) in comparison to those of their presupplemented state (HT- T_{4b}). Almost similar type of findings was observed by some others researchers in patients who suffered from uremic neuropathy and supplemented with only vitamin B_{12} for 6 months¹⁹. Different investigators have suggested some mechanism responsible for defective motor nerve conduction in HT patients. The mechanism involved in the development of neuropathy in hypothyroidism still remains unclear. Some investigator suggested that the weight gain in HT may be the contributory factors for the nerve conduction abnormalities¹². The increased body weight and BMI in HT might be due to accumulation of mucopolysaccharide, hyaluronic acid and chondroitin sulphate in the interstitial spaces which, because of their hydrophilic nature retain water along with them resulting in weight gain⁴. In addition, decreased rate of basal metabolism also causes increased body weight in HT². On the other hand, an overall slowness in all metabolic pathways is seen in HT. Due to the reduction of the carbohydrate metabolism, glycosaminoglycan cannot be broken down; instead accumulate in the entrapment regions leading to entrapment neuropathy¹³. HT produces alteration of fluid balance and peripheral tissue edema, which may lead to carpal tunnel syndrome (CTS) development¹⁴. It has been suggested that CTS in hypothyroidism develops as a result of the mucinous infiltration in the perineurium and endoneurium of median nerve. The increased pressure as results of this infiltration is transferred to the median nerve and causes focal demyelination^{15, 20}. However, long term accumulation of mucinous tissue is a possible cause of irreversibility of CTS to replacement therapy⁵. Again, the cause of irreversibility to replacement therapy in hypothyroid patients may be related to duration and severity of illness and also to treatment regimens⁵. Moreover, some researchers also explained that, deposition of glycosaminoglycan in nerves and soft tissues surrounding them with resultant axonal degeneration and segmental demyelination forms the pathological basis of alteration in peripheral nerve function in thyroid hormone deficiency¹⁶. HT may affect the multiple peripheral nerves of our body. Depresses the gene activation for synthesis of myelin basic protein, required for myelination thereby causes impairment of nerve conduc-

tion velocities as well as loss of tendon reflexes¹⁷. In HT, most frequent cause of peripheral nerve damage is median nerve entrapment at wrist but sensory-motor polyneuropathy such as ulnar, common peroneal and sural neuropathy can also be seen¹⁸. However, the mononeuropathy i.e. involvement of single nerve may be secondary to compression due to deposition of myxedematous tissue and the polyneuropathy i.e. involvement of more than one nerve may be due to either a demyelinating process or the axonal degeneration. The combination of both these two factors results in the development of the peripheral neuropathy^{19, 21}.

Conclusion:

From the result of the study, it can be concluded that, peripheral neuropathy along with deficiency of vitamin B_{12} was observed in newly diagnosed hypothyroid female before starting their treatment. However, after treatment with T_4 alone can improve peripheral nerve conduction parameters to some extent in newly diagnosed hypothyroid. But, combined therapies of T_4 with vitamin B_{12} have synergistic effects on motor functions of ulnar nerve by improving all the parameters of electrophysiological study.

Conflict of Interest: None.

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Evaluation of Extra-Cranial Carotid Arteries by Digital Subtraction Angiogram (DSA) in Stroke Patients in a Tertiary Care Hospital

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Abstract

Introduction: Carotid artery stenosis is one of the important causes of ischemic stroke. This may be diagnosed by Doppler Ultrasound and Digital Subtraction Angiogram (DSA) both of which have some advantages and disadvantages. **Objective:** The aim of this study was to assess extra-cranial carotid artery with the help of DSA among patients of ischemic stroke and transient ischemic attack (TIA). **Materials and Methods:** This observational cross sectional study was conducted in the Department of Neurology in Bangabandhu Sheikh Mujib Medical University (BSMMU) Dhaka from July 2013 to June 2015 for a period of two years. This study included a total of 50 patients. Diagnostic performance test of DSA was done at 50%, 50-69%, 70-99%, 100% cut off point of stenosis of right internal carotid artery (RICA) and Left internal carotid artery (LICA). **Results:** The mean age of cases was 61 ± 11.42 years. Out of 50 vessels, maximum cases were diagnosed as <50% stenosis of carotid artery (26 cases of RICA, 23 cases of LICA). Out of 50 vessels, 50%-69%, 70 but $\leq$ less than near occlusion and total occlusion were found among 10, 10, 4 vessels in RICA and 10, 9, 8 vessels in LICA respectively. The present study showed that 50 vessels of RICA was measured by DSA and diagnosed 28 (56%), 10 (20%), 7 (14%) and 5 (10%) carotid vessels as $\leq$ 50%, 50-69%, $\geq$ 70% but less than total occluded and total occluded cases respectively. This study also showed that 50 vessels of LICA was measured by DSA and diagnosed 23 (56%), 12 (24%), 8 (16%), 7 (14%) carotid vessels as $\leq$ 50%, 50-69%, $\geq$ 70% but less than total occluded and total occluded cases respectively. **Conclusion:** DSA as the gold standard has amply been performed in most diagnostic circumstances of carotid artery stenosis. So, the present study was done to evaluate extra cranial carotid arterial system by DSA in stroke patients in Bangladesh.

Keywords: Stroke, Transient ischemic attack, Digital subtraction angiogram, Color doppler sonography, Internal carotid artery.

Number of Tables: 06; Number of References: 20; Number of Correspondence: 03.

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Introduction:

Stroke stands second among the leading causes of death in the developed world¹. Even in Bangladesh, stroke is a significant cause of mortality, morbidity and disability². About 85% of stroke is ischemic stroke (infarct) and 15% is hemorrhagic stroke. There are many risk factors for ischemic stroke. Atheromatous carotid artery stenosis is one of the important causes of ischemic stroke. This is responsible for 10% of all ischemic strokes events³.

Atheroma may cause transient ischemic attacks (TIAs) and ischemic stroke as it obstructs the blood stream to the brain or generates emboli that obstruct the cerebral arteries. The first part of internal carotid artery immediately beyond the bifurcation is the most frequently involved anatomical site of stenosis in carotid system. Carotid artery stenosis may be diagnosed by various investigations like duplex USD, CT-angiogram, Magnetic resonance angiogram (MRA) but DSA is thought to be gold standard. Carotid artery stenosis has different treatment options like medical, surgical, interventional measures according to different clinical settings. Medical treatment includes - use of statin agent, aspirin, control of HTN, good glycemic control and cessation of smoking whereas surgical option is carotid end - arterectomy or stenting.

Ability to accurately assess the degree of carotid artery stenosis and its importance for management of ischemic stroke and TIA has become significant with studies like NASCET⁴ (North American symptomatic carotid end arterectomy, ECST⁵ (European carotid surgery trial. ACAS⁶ (Asymptomatic carotid atherosclerosis study), ACST⁷ (Asymptomatic carotid surgery trial).

Symptomatic Carotid stenosis was studied in the NASCET⁴ and ECST⁵ trial. Both showed a substantial benefit for surgery in patients with a stenosis >70%. In 659 patients with 70% to 90% stenosis randomized by NASCET⁴ study the cumulative risk of any ipsilateral stroke at 2 years was 26% in medically treated patients and 9% in surgically treated patients. NASCET⁴ study also showed a significant, although less robust benefit for patient with 50%-70% stenosis.

The indication for surgical treatment of asymptomatic carotid disease have been clarified by the results of the study of ACAS⁶ and ACST⁷. ACAS⁶ study randomized asymptomatic patients with >60% stenosis to medical treatment with aspirin or the same medical treatment plus carotid end-arterectomy. The surgical group had a risk over five years for ipsilateral stroke of 5.1% compared to a risk in the medical group of 11%. In both ACAS⁶ and ACST⁷ study the perioperative complication rate was higher in women, perhaps negating any benefit in the reduction stroke risk within five years. The natural history of asymptomatic stenosis is 2% per year stroke rate while symptomatic patient experience 13% per year risk of stroke.

Patients with either symptomatic stenosis >50% or asymptomatic stenosis 70% are presently considered for carotid recanalization done by endarterectomy or stenting. Before doing any of the above procedures, diagnosis of site, size and severity of extra cranial carotid artery stenosis should be confirmed.

Materials and Methods:

This observational cross-sectional study was carried out on 50 patients who had symptoms and signs of a stroke or TIAs from July 2013 to July 2015 for a period of 2 years. This study was done in Department of Neurology in Bangabandhu Sheikh Mujib Medical University (BSMMU) and National Institute of Nuclear Medicine and Allied Sciences (NINMAS), BSMMU. All patients of ischemic stroke and TIAs in outdoor and indoor of department of Neurology, BSMMU were enrolled in study population. Patients were selected using purposive sampling technique without any age, sex, ethnic, or socioeconomic discrimination. A detailed history and thorough physical examination were carried out on a questionnaire. Risk factors such as hypertension, diabetes mellitus, smoking, and ischemic heart disease were documented. The patients underwent computed tomography (CT) scan study prior to the DSA of carotid arteries and findings were documented. Cases with history, clinical and CT scan findings consistent with cerebral ischemic stroke were included in this study. Patients having symptoms suggestive of hemorrhagic stroke, vertebrobasilar insufficiency, head injuries, and those having primary and metastatic brain tumors were excluded from the study.

Patients were referred to cardiac cathlab of BSMMU for intra arterial DSA performed by two interventional neurologists blinded of USD finding. DSA included right and left CCA and ICA angiography with a 5 F H1 picard catheter and imaging in at least two planes (45° anterior oblique and 90° lateral on both side). Two to three angiographic projections were obtained per bifurcation during manual injection of 6-10 ml of contrast medium. The degree of stenosis was assessed by taking compass measurement by means of overhead projection and measured by tabulating diameters at the point of the most severe narrowing and at the distal non-stenotic segment according to the NASCET⁴ criteria.

Data was collected in a data collection sheet. Diagnostic perfor-

mance test of DSA was done at 50%, 50%-69%, 70%-99%, 100% cut off point of stenosis of RICA and LICA.

Prior ethical committee clearance was obtained to conduct this study. The collected data were analyzed with the aid of a calculator and presented in the form of tables, figures, graphs, and diagrams wherever necessary.

Results:

Table I shows among 50 patients 3 patients belonged to age group 41-50, 15 patients in 51-60, 27 in 61-70, 05 in > 70 year group. Maximum 54 % (n-27) patients were in age group 51-60. Minimum age was 50 and maximum was 74 years, with a mean of 61 ± 11.42 years. Table 1 also shows among 50 patients 38 (76%) were male and 12 (24%) were female.

Table I: Distribution of age and gender of patients (n = 50)

Age		
Age group	Number	Percentage
41 - 50	3	
51 - 60	15	30
61 - 70	27	54
>70	05	10
Total	50	100
Gender		
Male	38	76
Female	12	24
Total	50	100

Table II shows that out of fifty patients, 34 (68%) were hypertensive whereas 18 (32%) were normotensive and 19 (38%) had diabetes mellitus and 31 (62%) were non-diabetic. Table 2 also shows 29 (58%) were smoker and 21 (42%) were non-smoker.

Table II: Distribution of the risk factors of carotid artery stenosis among patients

	Number	Percentage
HTN		
Present	34	68
Absent	16	32
Total	50	100
Diabetes mellitus		
Present	19	38
Absent	31	62
Total	50	100
History of smoking		
Present	29	58
Absent	21	42
Total	50	100

Table III shows out of all patients 12 (24%) patients had family history of DM. In case of hypertension, stroke and IHD it was 20 (40%), 7 (14%), 11 (22%) respectively.

Table III: Distribution of patients' family history of different diseases by group (n=50).

Family	Number	Percentage
DM	12	24
Hypertension	20	40
Stroke	7	14
IHD	11	22

Table IV shows out of 50, number of patients of stroke were 45 (90%) and TIAs' were 5 (10%) .

Table IV : Distribution of patients by clinical diagnosis (n = 50)

Diagnosis	Number	Percentage
Stroke	45	90
TIA	5	10
Total	50	100

Table V shows distribution of patients' by diagnosis of carotid stenosis by duplex USD. Here maximum cases were diagnosed as <50% stenosis of carotid artery (26 cases of right internal carotid artery, RICA, 23 cases of Left internal carotid artery, LICA). Out of 100 vessels total occlusion was 04 in RICA and 8 in case of LICA.

Table V: Distribution of patients by diagnosis of carotid stenosis by duplex USD (n=50).

Degree of stenosis (%)	RICA (n=50)	LICA (n=50)
<50	26	23
50-69	10	10
≥ 70 but less than total occlusion	10	09
Total occlusion	04	08

Table VI showed that 50 vessels of RICA was measured by DSA and diagnosed 28, 10, 7 and 5 carotid vessels as ≤ 50%, 50-69%, ≥ 70% but less than total occluded and total occluded cases respectively. This study also showed that 50 vessels of LICA was measured by DSA and diagnosed 23, 12, 8 and 7 carotid vessels as ≤ 50%, 50-69%, ≥70% but less than total occluded and total occluded cases respectively.

Table VI: Distribution of patients by diagnosis of carotid stenosis by DSA (n=50)

Degree of stenosis	RICA (n=50)	LI CA (n=50)
<50	28	23
50 - 69	10	12
≥ 70 but less than total occlusion	07	08
Total occlusion	05	07

Discussion:

The mean age of ischemic stroke and TIA was 61 ± 11.42 years. Most of the cases belonged to 6th and 7th decade. Minimum age was 50 and maximum was 74 years. This study shows that male patients (n=38) out numbers female (n=12) with a ratio of 3.16:1. Stroke is a male predominant disease as shown in different studies in Bangladesh like Khan MRK et al study¹⁰ and Hannan MA et al study¹¹. They found M: F, 2.75:1 and 2.53:1

Niaz AS et al¹² studied on 100 patients of carotid artery stenosis in the city of Karachi of Pakistan. Of them 61% were male and 39% were female and M:F ratio was 1.56:1.

This study showed that among 50 patients 29 (59%) were smoker, 19(38%) were diabetic and 34 (68%) were hypertensive. Khan et al¹⁰ studied 162 patients with ischemic stroke and it showed HTN (n=95, 58.6%), smoking (n=64, 39.5%) and DM (n=52, 32.1%) as associated risk factors. According to Anwar Ullah AKM et al¹³ in review of 100 stroke patients' risk factors showed HTN in 65%, smoking in 44%, DM in 21% of patients.

Niaz AS et al¹² studied over 100 patients with ischemic stroke and it showed HTN (n=67, 67%), smoking (n=41, 41%) and DM (n=31, 31%) as associated risk factors.

An Indian study conducted by Sethi SK et al¹⁴ showed that among 63 patients 35 (55.5%) were hypertensive, 16 (25%) were diabetic and 10 (25%) were smoker.

Out of 50 patients 12 (24%) had a family history of DM. In case of HTN, stroke and IHD it was 20 (40%), 7 (14%) and 11 (22%) respectively. In Khan MRK⁶ series and Hannan MA⁷ series, the patients with ischemic stroke had a family history of Stroke was 23% and 26.06% respectively.

This study shows that out of 100 vessels, significant stenosis (>50%) was found in 51 (51%) vessels on colour doppler imaging. Chamarth M et al study¹⁵ found that 60(40%) vessels, out of 150 vessels had significant stenosis (>50%). Fernandes M et al¹⁶ studied 100 carotid vessels and observed that 47 (47%) vessels had significant stenosis (>50%).

This study showed that 50 vessels of RICA was measured by DSA and diagnosed 28 (56%), 10 (20%), 7 (14%), 5 (10%) carotid vessels as ≤ 50%, 50-69%, ≤ 70% but less than total occluded and total occluded cases respectively.

On the other hand, this study also showed that 50 vessels of LICA was measured by DSA and diagnosed 23 (56%), 12 (24%), 8 (16%), 7 (14%) carotid vessels as ≤ 50%, 50-69%, ≤ 70% but less than total occluded and total occluded cases respectively.

Dey SK et al¹⁷ studied 38 patients of stroke and found 32 patients as ≤ 70% and 6 cases as ≥ 70% stenosis during measuring RICA by DSA test. They also found 30 patients as ≤ 70% and 8 cases as ≥ 70% stenosis during measuring RICA by DSA. SF Maroufi et al¹⁸ studied 375 cases and he measured 202(53.8%), 105(28%), 21(5.6%), 20(7.4%), 19(5%) vessels as 0-15%, 16-49%, 50-69%, 70-99% and 100% stenosis of carotid vessels done by DSA.

HM Silvennoinen et al¹⁹ studied 37 stroke patients After performing DSA test they found that 4 (5%) carotid arteries were occluded, 20 (27%) had a high-grade stenosis (70%–99%), and 16 (22%) had a moderate- grade (50%–69%) stenosis. There were 16 (22%) mild stenoses (50%) and no

stenosis was detected in 17 (23%).

Nederkoorn et al²⁰ study measured total 313 carotid vessels by DSA. They calculated 22(7%), 19(6%), 44(14%), 167(53.5%), 61(19.5%) vessels as 0-29%, 30-49%, 50-69%, 70-99% and 100% stenosis of carotid vessels done by DSA.

Conclusion:

Doppler ultrasound of carotid vessels is safe, cheap, less sensitive- Specific and accurate than digital subtraction angiogram for evaluation of carotid stenosis. With expert hand DSA is safe and it is more sensitive, specific and accurate than USD. So before endarterectomy or carotid stenting DSA is mandatory and doppler USD is supportive to measure extracranial carotid stenosis.

Conflict of Interest: None.

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Impact of Platelet Count on Non-ST Elevation Myocardial Infarction: In-Hospital Outcome

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Abstract

Introduction: Incidence of ACS is increasing in developing countries like Bangladesh. Many factors can influence in hospital outcome of NSTEMI Patient. Platelet count is one of them. The aim of present study was by measuring platelet count to detect the severity of NSTEMI patients and their in hospital outcome. **Objective:** The aim of present study was to observe the impact of platelet counts on in hospital outcome of NSTEMI. **Materials and Methods:** The study was conducted in Shahid Sheikh Abu Naser Specialized Hospital, Khulna from January 2021 to November-2021. NSTEMI Patient Presented within 24 hours of chest pain was included in this study. Data were collected by direct interview from Patient and venous blood was drawn for platelet count. Continuous data were expressed as mean $\pm$ SD. Categorical data were analyzed with χ^2 test. Student's 't' test was used for analysis of Continuous variables. Comparison between groups was done by unpaired t-test. Multiple logistic regression analysis was done to determine the association between lower platelet counts and adverse hospital events in NSTEMI patients. P-values <0.05 were be considered statistically significant. **Results:** 100 Patients are included in this study. They are divided into two groups. Group-I having platelet count $<200000/\text{cmm}$ and Group-II having platelet count $>200000/\text{cmm}$. Bleeding, Q-wave MI, arrhythmia and heart failure were significantly ($P<0.05$) higher in group-I but stroke and death were similar in both groups. **Conclusion:** Lower platelet count in NSTEMI patient is associated with adverse in-hospital outcome.

Key words: Platelet count, Non-ST-Elevation Myocardial infarction, outcome.

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Introduction:

Incidence of ACS is increasing in developing countries including Bangladesh. With socioeconomic improvement, changes in the life style and dietary habit, smoking, decrease physical activity, increasing body weight and consequently increasing rate of diabetes mellitus, hypertension, dyslipidemia which contribute to increase coronary heart disease¹. The significance of thrombocytopenia in patients experiencing during non-ST Elevation myocardial infarction has not been examined systematically². Patient with ACS present with increased mean platelet volume, lower platelet count and decreased eosinophil counts^{3,4}. These cells become targets for new drugs and these changes may also acts as markers of myocardial damage or prognosis⁴.

As ACS is increasing in Bangladesh, platelet count has become an important health care issue to detect the severity of NSTEMI patient. By measuring platelet count we can reduce the morbidity and mortality in our population. Initial platelet count can be used as prognostic marker. It might be useful adjunct for identifying those patients who may benefit from a more intensified therapy (e.g. higher dose or prolong dual anti-platelet therapy)⁵.

Materials and Methods:

This is a prospective study of 100 NSTEMI patients presented within 24 hours of chest pain. The study was conducted in Shahid Sheikh Abu Naser Specialized Hospital, Khulna from January 2021 to November-2021.

Inclusion Criteria were Non-ST-Elevation Myocardial Infarction presented within 24 hours of chest pain.

Exclusion Criteria were: Previous documented thrombocytopenia ($<1,50,000/\text{cmm}$), Heparin therapy before admission, Patient on antiplatelet drug before admission, Patients on lipid lowering agent (statin) before admission, History of previous or current haemostatic disorder, Long-term daily need for nonsteroidal anti-inflammatory drugs, Renal insufficiency (creatinine level $>1.6\text{mg/dl}$), History of PCI, History of CABG and Acute and chronic inflammatory conditions like-Rheumatoid arthritis, SLE.

The study was conducted after informed written consent from all participants. Date were collected with all aseptic precaution. Venous blood was drawn by dry plastic syringe. The needle was detached from the syringe and the requisite amount of blood was delivered into a vessel containing EDTA (Ethylene diamine tetraacetic acid). Dilution (1 in 20) were done by adding 0.1 ml of blood to 1.9 ml of the diluents. After mixing of suspension for 10-15 minutes the Neubauer counting chamber was filled with suspension, using a stout glass capillary pipette. The counting chamber was placed in a moist Petridish and leave untouched for at least 20 minutes to give time for the platelets to settle. The preparation was examined with the $\times 40$ objective and $\times 6$ or $\times 10$ eyepieces. The number of platelets in one or more areas of 1mm^2 was counted. Continuous data were expressed as mean $\pm$ SD. Categorical data were analyzed with χ^2 test. Student's 't' test was used for analysis of continuous variables. Comparison between groups was done by unpaired t-test. Multivariate logistic regression analysis was done to determine the association between lower platelet counts and adverse hospital events in patients with NSTEMI. P values <0.05 were considered statistically significant.

Results:

The study was conducted to see the impact of platelet count on NSTEMI.

Table-I: Age distribution of the study population (N=100).

Age group (years)	Group I (n=50)		Group II (n=50)		P value
	n	%	n	%	
≤ 40	7	14.0	4	8.0	0.720 ^{ns}
41-50	11	22.0	9	18.0	
51-60	18	36.0	19	38.0	
61-70	10	20.0	13	26.0	
> 70	4	8.0	5	10.0	
Mean ±SD	56.8±12.5		55.9±10.7		0.720 ^{ns}
Range (min-max)	(38-100)		(36-78)		

Group I : Platelet count (PC) $\leq 200000/\text{cmm}$

Group II : Platelet count (PC) $> 200000/\text{cmm}$

Not significant ($p > 0.05$ with unpaired t-test)

The study included 100 subjects and they were divided into five age groups. In group I, the mean age was 56.8 ± 12.5 years ranging from 38 to 100 years. In group II, the mean age was 55.9 ± 10.7 years ranging from 36 to 78 years. Maximum number found in the age group of 51-60 years in both groups. The mean age difference was not statistically significant ($p > 0.05$) between the two groups in unpaired t-test. Results are depicted in the above table.

Table-II: Distribution of risk factors of the study population (n=100).

Risk Factors	Group I (n=50)		Group II (n=50)		P value
	n	%	n	%	
Smoking	32	64.0	29	58.0	0.538 ^{ns}
HTN	22	44.0	18	36.0	0.414 ^{ns}
DM	15	30.0	12	24.0	0.499 ^{ns}
Dyslipidaemia	15	30.0	13	26.0	0.655 ^{ns}
Obesity	13	26.0	11	22.6	0.639 ^{ns}
Family history of CAD	10	20.0	8	16.0	0.602 ^{ns}

NS=Not significant

P value reached from Chi square test

Smoking (64.0% Vs 58.0%) and HTN (44.0% Vs 36.0%) were the most common risk factor for Non-ST-Elevation Myocardial infarction in both groups, followed by diabetes mellitus, dyslipidaemia, obesity and family history of CAD. No statistically significant difference of risk factors for Non-ST-Elevation Myocardial infarction was observed between two groups of patients ($p > 0.05$)

Table-III: Platelet count of the study population (n=100).

Platelet count (cmm/L)	Group I (n=50)	Group II (n=50)	P value
Mean $\pm$ SD	165696.6 $\pm$ 28396.3	293660 $\pm$ 69896.9	0.001 ^s
Range (min-max)	(86000-199000)	(202000-420000)	

Significant ($p < 0.05$) with unpaired t-test

The mean Platelet count was 165696.6 ± 28396.29 cmm/L range from 86000-199000 cmm/L in group I and 293660 ± 69896.9 cmm/L range from 202000-420000 cmm/L in group II. The mean platelet count difference was statistically significant ($p < 0.05$).

Table-IV: In-hospital outcome of the study population (n=100).

Outcome	Group I (n=50)		Group II (n=50)		P value
	n	%	n	%	
Bleeding	7	14.0	1	2.0	0.026 ^S
Q-wave MI	8	16.0	2	4.0	0.045 ^S
Arrhythmia	11	22.0	4	8.0	0.049 ^S
HF	13	26.0	5	10.0	0.037 ^S
Stroke	5	10.0	4	8.0	0.726 ^{NS}
Death	4	8.0	3	6.0	0.695 ^{NS}

S= Significant

NS= Not Significant

P value reached from Chi square test

Table IV shows in-hospital outcome of the study population and found bleeding 7(14.0%) and 1(2.0%) in group I and group II respectively. Q-wave MI was 8(16.0%) in group I and 2(4.0%) in group II, arrhythmia was 11(22.0%) in group I and 4(8.0%) in group II. Heart failure was 13(26.0%) and 5(10.0%) in group I and group II respectively. Stroke was 5(10.0%) in group I and 4(8.0%) in group II. Death was 4(8.0%) in group I and 3(6.0%) in group II. Bleeding, Q-wave MI, arrhythmia and HF were statistically significant ($p<0.05$), but stroke and death were not statistically significant ($p>0.05$) between two groups.

Table-V: Association between platelet count with bleeding, Q-wave MI, arrhythmia, HF, Stroke and Death.

Variable	β	Odds ration (OR)	95% CI	P value
Bleeding	2.08	8.03	1.11-79.93	0.060 ^{NS}
Q-wave MI	1.86	6.43	1.27-32.58	0.024 ^S
Arrhythmia	1.23	3.43	0.96-13.19	0.057 ^{NS}
HF	1.10	0.86	0.19-7.25	0.288 ^{NS}
Stroke	0.78	0.84	0.99-3.49	0.860 ^{NS}
Death	0.81	0.98	1.09-4.37	0.672 ^{NS}
Constant	-0.48	0.62		0.052 ^{NS}

NS= Not Significant, S= Significant

Q-wave MI was significantly associated only with platelet count where OR 6.43 and 95% CI 1.27-32.58 and other factors were not associated in multivariate logistic regression model.

Discussion:

This prospective study was carried out with an aim to observe the impact of platelet counts on in-hospital outcome of NSTEMI.

A total of 100 patients of NSTEMI presented within 24 hours of chest pain age ranging from 36 to 100 years were included in the study.

In this present study it was observed that the mean age was 56.8 ± 12.5 years ranging from 38 to 100 years, 55.9 ± 10.7 years ranging from 36 to 78 years group I and group II respectively. Majority of the patients found in the age group of 51-60 years in both groups. The mean age was almost similar between two groups. Mueller et al.⁵ (2006) has observed higher mean age in their study, which was 64.2 ± 11.8 years. Similarly McClure et al.² (1999) observed that the median age was 67 years and 64 years in low platelet count group & high platelet count group respectively. Jeong et al.⁸ (2007) carried out a study on 2762 acute NSTEMI patients and found that mean age was 64.6 ± 12.8 years. All the above findings are higher with the present study, which may be due to increased life expectancy in their study patients.

Regarding the risk factors smoking 64.0% and 58.0% in group I and group II respectively. HTN observed 44.0% in group I and 36.0% in group II. Smoking and HTN were the most common risk factor for Non-ST-Elevation Myocardial Infarction in both groups, however diabetes mellitus, dyslipidaemia, obesity and family history of premature CAD were also observed in this study patients. No significant difference of risk factors for Non-ST-Elevation Myocardial Infarction was observed between two groups of patients in the present study patients. McClure et al.² (1999) found HTN 57.8% vs 55.1% in low platelet count group & high platelet count group. DM was observed 26.7% and 22.7% in low platelet count group & high platelet count group respectively. However regarding the tobacco use, 21.4% low platelet count group and 28.8% high platelet count group were current smoker. Family history of CAD was 36.3% vs 35.2% in low platelet count group & high platelet count group. Patients with low platelet count group were older, weighed less. Mueller et al.⁵ (2006) found smoker was 23.2%, HTN 61.7% Avremakis et al.⁴ (2007) demonstrated a significant lower platelet count in non-DM non-smokers with UA or AMI when compared with non-DM non-smoker controls.

In this present study regarding the hospital outcome, it was found bleeding 14.0% and 2.0% in group I and in group II respectively. Q-wave MI was 16.0% in group I and 4.0% in group II, arrhythmia was 22.0% in group I and 8.0% in group II. Heart failure 26.0% and 10.0% in group I and group II respectively. Stroke was 10.0% in group I and 8.0% in group II. Death was 8.0% in group I and 6.0% in group II. Bleeding, Q-wave MI, arrhythmia and HF were significantly ($p<0.05$) higher in group I patients but stroke and death were not statistically significant ($p>0.05$).

between two groups.

In-hospital bleeding, one of the outcomes of this study, was significantly higher in group-I (14%) than group-II (2%) (p -value <0.05). In group-I, echymosis other than paraumbilical area, epistaxis, intracranial haemorrhage were 8%, 4%, 2% respectively. In group-II, only echymosis other than paraumbilical area was 2%. McClure et al.² (1999) observed in their study that the incidence of bleeding was 75.4% in low platelet count group and 27.8% in high platelet count group. This result is higher than present study, possibly due to different invasive procedure like CAG, PCI with or without stenting, IABP insertion & CABG in their management protocol.

In-hospital Q-wave MI, another outcome of this study was significantly higher in group-I (16%) than group-II (4%) (p -value <0.05). McClure et al.² (1999) observed in their study that MI was 27.2% in low platelet count group & 12.2% in high platelet count group. Their result is higher than current study result but the result comparing between two groups is almost similar. Anderson et al.⁶ (2010) observed that, upto 25% of patient with NSTEMI and elevated CK-MB go on to develop Q wave MI during their hospital stay. On considering total events, their result is consistent with current study.

Heart failure was significantly higher in group-I (26%) than group-II (10%) in the present study (p -value <0.05). In group-I, Killip class-I, II, III, IV were 74%, 14%, 8%, 4% respectively. In group-II, Killip class-I, II, III, IV were 90%, 6%, 2% & 2% respectively. Hung et al.⁷ (2006) observed in their study that heart failure was 8.4% in low platelet count (<2 lacs) group and 11.5% in higher platelet count group (>2 lacs). In comparison between low & high platelet count group, current study is contradictory to Hung et al.⁷ (2006) study. As because Hung et al.⁷ (2006) carried out their study on STEMI patient.

Arrhythmia was significantly higher in group I (22%) than group II (8%) in this study (P -value <0.05). In group I, AF, AV block, VT & VF were 8%, 8%, 4%, 2% respectively. However, in group II, AF was 2%, AV block was 2% and VT was 4%.

Stroke was 10% in group I and 8% in group II but the difference was not significant in present study. McClure et al.² (1999) observed in their study that the incidence of stroke was 3% in low platelet count group and 0.6% in high platelet count group. In comparison between two groups, the result is consistent with current study.

Another in hospital outcome was death which was 8% in group I and 6% in group II and the difference was not statistically significant. McClure et al.² (1999) observed that death was 7.4% in low platelet count group & 3.3% in high platelet count Group. This result is also similar to current study.

Kaplar-Meier Survival analysis showed cumulative 4-year mortality rates of 12.5%, those who have platelet count less than 181000 per cmm. This mortality rate was higher than

other groups having platelet count >181000 per cmm. Low platelet count and adverse outcome might be explained by mainly 3 mechanisms: First, Recent studies point to a possible correlation of platelet count and blood levels of certain inflammatory markers. This could be well demonstrated for soluble CD40 ligand, an independent predictor of adverse outcome in UA/NSTEMI⁵. Second, more extensive coronary artery disease may be an important mediator responsible for the higher mortality in patients with very low platelet count⁵. Third, low platelet count in the first platelet count quintile can be caused by comorbidity with a hidden prothrombotic state which can be associated with increased risk of death⁵. A significant association of low platelet count and adverse clinical outcome in patients with high risk PCI and UA/NSTEMI has also been demonstrated⁸.

In this current study it was observed that Q-wave was significantly associated only with platelet count where OR 6.73 and 95% CI 1.27-32.58 and other factors regarding hospital outcome not associated in multivariate logistic regression model.

Conclusion:

This prospective study was carried out to observe the impact of platelet counts on in-hospital outcome of NSTEMI. Most of the patients were found 51-60 years age in both groups and male was predominant in both groups. Smoking, HTN, diabetes mellitus, dyslipidaemia, obesity and family history of CAD were most common risk factor for Non-ST-Elevation Myocardial Infarction in both groups ($p>0.05$). The RBS and S. Creatinine were almost similar between two groups.

The Troponin-I level was significantly ($p<0.05$) higher in group I patients. The TC and LDL were higher in group I, however TG was higher in group II but the difference was not significant ($p>0.05$). HDL was almost parallel between two groups. Bleeding, Q-wave MI, arrhythmia and HF were significantly ($p<0.05$) higher in group I, but stroke and death were similar in both groups. In multivariate logistic regression model, Q-wave MI was significantly associated only with platelet count and other factors were not associated.

Conflict of Interest : None

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Comparative Study of Radiation Exposure of Patients undergoing Transradial and Transfemoral Coronary Angiogram and Percutaneous Coronary Intervention

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Abstract

Introduction: Coronary artery disease (CAD) is now the leading cause of death worldwide. Percutaneous coronary interventions (PCIs) are an important group of technologies for the diagnosis and treatment of patients with CAD. PCI is usually performed using the transfemoral (TF) approach but the transradial (TR) approach has been increasingly used as an alternative to TF approach due to less vascular complications, earlier ambulation and improved patient comfort. Accurate assessment of radiation exposure during PCI is paramount important as radiation has many short and long term hazards. TR and TF route has distinct advantages and disadvantages. But in respect of radiation exposure of patients there are controversial evidence between TR and TF approach. **Objective:** To compare the radiation Exposure in patients with percutaneous coronary intervention by TR and TF approach. **Materials and Methods:** This prospective observational comparative study was conducted in the National Institute of Cardiovascular Diseases, Dhaka, from June 2015 to May 2016. A total of 200 patients were selected and categorized into two groups (Group I= Trans radial, n =100) and (Group II = Trans femoral, n= 100). Again divided into subgroups (group Ia, trans radial CAG = 70, group IIa, trans radial PCI =30) and (group IIa, trans femoral CAG =70, group IIb, trans femoral PCI = 30). Then different outcome variables were evaluated and compared. **Results:** Patient demographics were the same in both groups. Fluoroscopy time during TR and TFCAG and PCI was (4.4 ± 1.6 min vs 4.1 ± 3.9 min, $p=0.61$) and (11.7 ± 1.3 min vs 11.1 ± 1.5 min, $p=0.13$) respectively. Regarding radiation dose during TR and TF coronary angiogram, Dose area product(DAP) were (2732 ± 1195.5 mGym² vs 2434 ± 488.0 mGym², $p=0.07$) and Air Kerma (AK) were (307.6 ± 112.2 mGy vs 283.7 ± 48.5 mGy, $p=.10$) with statistically no significant difference of radiation dose (DAP and AK) between two groups. Utilization of Contrast volume during TR and TF angiogram (64.8 ± 8.9 vs 68.2 ± 7.5 , $p=0.01$) were less in trans radial group. Also Utilization of Contrast volume in TR-PCI and TF- PCI (168.0 ± 13.0 vs 177.7 ± 19.9 ml, $p=0.03$) were less in trans radial PCI. **Conclusion:** The basis of the results, no significant differences were found in patient of radiation dose in both TR and TF group. Furthermore utilization of contrast volume was lower in trans-radial CAG and PCI. Trans radial CAG and PCI can be performed with the same safety as for the trans femoral approach.

Key words: Radiation Exposure, TR-PCI, TF-PCI.

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Introduction:

Coronary artery disease is the Global Burden of Disease & remains a major cause of health loss for all regions of the world¹. As a result of an epidemiological transition from communicable to non-communicable diseases for last few decades, cardiovascular diseases (CVD) are being considered as an important cause of mortality and morbidity in many developing countries including Bangladesh². There are many risk factors associated with coronary heart disease. Diabetes mellitus (DM), hypertension (HTN), obesity, smoking, high density lipoproteins and triglycerides levels have been found to have a greater impact on coronary heart disease³.

In patients with obstructive coronary artery disease (CAD), percutaneous coronary intervention (PCI) and CABG surgery are both treatment options⁴. With the advent of increasing facility of catheterization procedures and increased burden of coronary artery disease, frequency of performing cardiac catheterization procedures is increased significantly. Percutaneous coronary intervention (PCI) is the standard treatment for ischemic heart disease. Coupled with

evidence-based pharmacological strategies, the use of PCI in appropriate patients reduces morbidity and mortality across the spectrum of risk⁵. Continual evolution of antithrombotic therapy and device technology has resulted in the application of PCI to a wider population of patients⁶. Procedural success rates are high and ischemic complications relatively rare after percutaneous coronary intervention⁷.

Till now the transfemoral approach (TFA) has traditionally been the preferred access site for percutaneous coronary interventions (PCIs) and coronary angiograms (CAGs). In 1989, the radial route was first introduced, and since then, the number of procedures performed by the radial route increased as the technique evolved with improvement in catheter design and with interventional cardiologists' experience⁸. However, vascular access site complications such as bleeding, hematoma, arteriovenous fistula or pseudoaneurysm are quite common after procedures through TFA⁹. Transradial approach (TRA) is an attractive options for same-day or outpatient procedure. This approach results in improved time to ambulation, additional comfort to patients, shorter hospitalization duration¹⁰, lower hospital expenses and improve clinical outcomes. But there is controversy over the amount of radiation dose that received by the patient in TRA compared to TFA approach¹¹.

The radiation exposure during fluoroscopy-guided procedures became a topic of concern as the number of procedures increased during the years. In Publication of the International Commission on Radiological Protection (ICRP), the risks of radiation exposure from fluoroscopy guided procedures are described. The ICRP reported an increase of radiation induced injuries to patient's skin (deterministic effect) as well as the risk to develop radiation induced cancers (stochastic effect). Deterministic effects occur with increasing severity as the dose of radiation rises, leads to temporary or permanent sterility, cataract, lung fibrosis and permanent neurological deficit. Stochastic effects occur with increasing probability due to the increased dose of radiation and repeated intervention also increasing the chance. Leukaemia may arise after an interval of around 2-5 years and solid tumours after an interval of about 10-20 years¹². Roguin et al (2012) reported that radiation exposure during PCI is associated with radiation-induced injuries. With an increasing number of complex and repeated PCI, radiation-induced hazards are currently a major concern in fluroscopy guided procedure mainly due to risk of cancer induction¹³.

Over the years, contradictory results were reported on the radiation exposure of patients from procedures performed by the radial route. Some studies showed a significant increase in radiation dose for radial compared to femoral approaches. Other studies showed no differences between two approaches¹⁴. Usman et al demonstrate that radial route for cardiac catheterization procedures is associated with

longer fluoroscopy time leading to increased radiation exposure¹⁵. In another study no differences were found in patient's radiation dose in both transfemoral and transradial group and transradial route might be a good substitute route¹¹. Shah et al.,(2013) showed that transradial approach is associated with higher radiation exposure when compared with transfemoral approach¹⁶. While this controversay continues, very few studies have compared the radiation exposure with radial versus femoral approach throughout the world. The aim of the study was to compare radiation exposure of patients during coronary angiogram and PCI accessed by the radial and femoral route.

Materials and Methods:

This case control study was conducted in Department This prospective observational comparative study was conducted in Department of cardiology National Institute of Cardiovascular Diseases (NICVD), Dhaka, from April 2016 to March 2017, to assess the radiation exposure and Fluoroscopy time between transradial and transfemoral coronary angiogram and PCI. Patient's undergone coronary angiogram & percutaneous Coronary Intervention (PCI) who were hemodynamically stable were included in this study. Total 200 patients were selected and allocated into two groups on the basis of procedural approach during coronary angiogram and PCI. The group I was consisting of 100 patients who underwent transradial approach and the group II comprised of 100 patients who underwent tranfemoral approach. Again divided into subgroups (group Ia, transradial CAG, n =70, group IIa, trans radial PCI, n =30) and (group IIa, trans femoral CAG, n =70, group IIb, trans femoral PCI, n = 30). Informed written consent was taken from each patient before enrollment. Meticulous history was taken and detailed clinical examination was done and recorded in pre designed structured pro forma. Demographic data, e.g., age, sex, occupation, BMI and different risk factor profile was evaluated.

Cardiac procedure: CAG and PCI will be done according to standard protocol. A detailed explanation was provided to the patient regarding the nature of the procedure, its potential risk and benefits. Even if radial access was planned, both femoral access sites were also be prepared. Premedication was done by giving a loading dose of 300 mg of Aspirin, Clopidogrel 300 mg, 40 mg of Atorvastatin and 5 mg of tab. Diazepam. Armrest was provided with the table, so that the patients arm was in abduction. A 500ml plastic sachet of normal saline was placed on the armrest beneath the wrist to elevate the wrist. The hand was then fixed in hyperextension with adhesive tape, prepared in a sterile fashion and the draped positioned. The course of the artery was palpated and 1-2 ml of 2% injection lignocaine subcutaneously infiltrated, 2-3 cm proximal to the flexor crease of the wrist. Then the radial artery was fixed with the index and middle finger of the left hand and the radial artery was punctured with puncture needle at 30-45° angles. A soft 0.025-inch straight guide-wire was advanced through the needle, and a 6-F, 17-cm radial sheath was be placed. Spasmolytic cocktail

made up of injection verapamil of 2.5 to 5mg in 10 ml normal saline with or without 100 microgram nitroglycerine was introduced through side channel of vascular access sheath to reduce the spasm of the radial artery. Along with that 10,000 unit of conventional injection heparin regardless of the weight of the patient, was administered during PCI to keep activated clotting time (ACT) values between 250-300 s. Over a 0.032 inch exchange wire the JR-6F/JL-6/AL-2/TR5 catheter was advanced to the ascending aorta using fluoroscopic guidance. The PCI was performed with 6-F (7-F if need) traditional guide catheters used for TF (Dehghani P et al., 2009) or radial guide catheter. Where difficulty encountered in advancing the wire in the arm due to loops or other anatomic variants, a hydrophilic (Terumo) wire had tried to solve the problem. When difficulty was encountered in advancing the wire from the subclavian artery to the ascending aorta, the patients asked to take a deep breath. The radial artery sheath was removed immediately after completion of TR-PCI, and haemostasis was achieved by application of an adjustable plastic clamp (TR-Band) on the radial artery. The clamp was gradually released over 2 to 3 h while monitoring for access site bleeding or hematoma. The clamp was be removed after satisfactory access site haemostasis had been achieved. PCI through transfemoral approaches done by standard method. Haemostasis was achieved over 2 to 3 hrs with monitoring of ACT for access site bleeding or hematoma by manual pressure over femoral artery. Duplex study done when clinically suspected any vascular complication. After completion of CAG and PCI, radiation exposure dose, fluoroscopy time recorded from monitor and contrast volume used in procedure was noted in data sheet.

Estimation of radiation dose and fluoroscopy time:

The radiation exposure of patients undergone CAG and PCI were measured using dose area product (DAP) meters and Air Kirma (AK). The DAP is expressed in mGym² or μ Gym². The DAP and AK was integrated in the X-ray systems. The X-ray systems provided direct feedback of the radiation exposure on the monitor of the systems. The radiation exposure from fluoroscopy mode and cine mode as well as the total radiation exposure displayed on the monitor of the X-ray systems and recorded from monitor. Moreover, the fluoroscopy time (in minutes) displayed on the monitor and recorded fluoroscopy time. All the information were recorded in data collection sheet. Statistical analysis of the data was done using statistical processing software (SPSS) and Microsoft. Quantitative data expressed as mean and standard deviation and qualitative data as frequency and percentage. Comparison was done by tabulation and graphical presentation in the form of tables, pie chart, graphs, bar diagrams, histogram & charts etc.

Results & Observation:

The findings of the study obtained from the data analysis were presented. Results and observations are given below:

Table I: Demographic characteristics of the patients (n=200)

Variables	Group I (n=100)	Group II (n=100)	Total (n=200)	p value
Age in years				
Mean $\pm$ SD)	51.2 $\pm$ 10.0	52.9 $\pm$ 10.8	52.0 $\pm$ 10.4	0.243
Range (min – max)	(32 – 73)	(35 – 72)	(32 – 74)	
Gender				
Male	83 (83%)	85 (85%)	168 (84%)	0.701
Female	17 (17%)	15 (15%)	32 (16%)	
BMI (kg/m ²)				
Mean $\pm$ SD	25.21 $\pm$ 4.20	25.25 $\pm$ 3.28	25.23 $\pm$ 3.75	0.175

The age distributions revealed that mean age was found 51.2 $\pm$ 10 years in Group I and 52.9 $\pm$ 10.8 years in Group II. The mean age difference was insignificant (p=0.243) between two groups in unpaired t-test. The mean age of the total population was 52.0 $\pm$ 10.4 years. Out of 200 patients, 168 (84%) patients were male and 32 (16%) patients were female. Male and female patient's ratio was 5.25:1. In group I, there were 83 (83%) male and 17 (17%) female patients and in group II, male and female patients were 85 (85%) and 15 (15%) respectively. Male patients were predominant in both study groups. The mean BMI of group I and group II were 25.21 $\pm$ 4.20 vs. 25.25 $\pm$ 3.28kg/m². The difference of mean BMI was statistically insignificant (p=0.175)

Table II: Evaluation of clinical parameters between two groups (n = 200)

Clinical parameters	Group I (n= 100)	Group II (n= 100)	P value
	Mean $\pm$ SD	Mean $\pm$ SD	
Pulse /min	78.3 $\pm$ 5.6	80.6 $\pm$ 7.8	0.105
Systolic Blood pressure (mmHg)	126.6 $\pm$ 16.6	129.3 $\pm$ 16.6	0.254
Diastolic Blood pressure (mmHg)	79.0 $\pm$ 8.8	79.5 $\pm$ 9.2	0.695

Table II shows clinical parameters. Mean pulse rate was found 78.3 $\pm$ 5.6/min in group I and 80.6 $\pm$ 7.8/min in group II which was statistically insignificant (p=0.10). The mean systolic blood pressure was 126.6 $\pm$ 16.6 mmHg in group I and 129.3 $\pm$ 16.6 mmHg in group II. The mean diastolic blood pressure was 79.0 $\pm$ 8.8 mmHg in group I and 79.5 $\pm$ 9.2 mmHg in group II. Difference of systolic and diastolic blood pressure was not significant statistically (p=0.25, p=0.69).

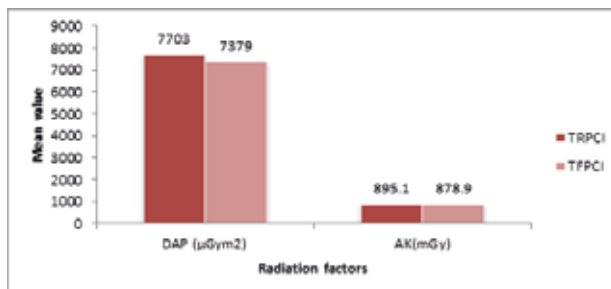
Table III. Comparison of different procedural variables during transradial CAG (TR-CAG) with transfemoral CAG (TF-CAG) (n=140)

Variables	Group Ia (TR-CAG, n=70)	Group IIa (TF-CAG, n=70)	P value
Fluoroscopy time (FT) in min mean $\pm$ SD	4.4 $\pm$ 1.6	4.1 $\pm$ 3.9	0.618

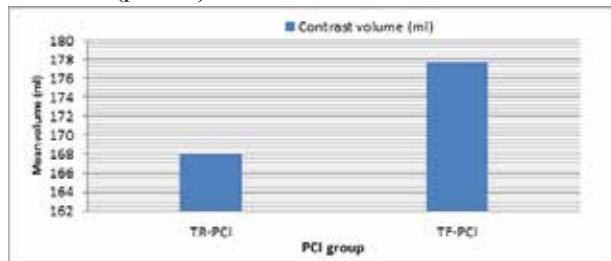
Table III. Comparison of different procedural variables during transradial CAG (TR-CAG) with transfemoral CAG (TF-CAG) (n=140)

Variables	Group Ia (TR-CAG, n=70)	Group IIa (TF-CAG, n=70)	P value
Radiation unit (mean±SD)			
Dose area product (DAP, μGym^2 or mGym ²)	2732±1195.5	2434±488.0	0.078
Air Kirma (AK, mGy)	307.6±112.2	283.7±48.5	0.107
Contrast volume (ml) mean±SD	64.8±8.9	68.2±7.5	0.011*

The above table III demonstrates that mean Fluoroscopy time (FT) during transradial and trans femoral CAG were (4.4 ± 1.6 vs. 4.1 ± 3.9 min) with no statistical difference ($p=0.618$). Mean dose area product (DAP) during TR-CAG and TF-CAG were (2732 ± 1195.5 vs. 2434 ± 488.0 μGym^2) with no statistical difference ($p=0.078$). Mean Air Kimma (AK) during TR-CAG and TF-CAG were (307.6 ± 112.2 vs. 283.7 ± 48.5 mGy) with no statistical difference ($p=0.10$). Mean contrast volume was observed greater in transfemoral CAG than transradial CAG (68.2 ± 7.5 vs. 64.8 ± 8.9 ml) with statistically significant difference ($p=0.01$).

**Figure 1: Comparison of Radiation dose between TR-PCI (RCA, single stent, type A lesion, n=30) and TF-PCI (RCA, single stent, type A lesion, n=30)**

The figure 1 describes that mean dose area product (DAP) during trans radial and trans femoral PCI were (7703 ± 1247.6 vs. 7379 ± 631.9 μGym^2) with no statistical difference ($p=0.21$). On the contrary, mean Air Kirma (AK) during trans radial and trans femoral PCI were (895.1 ± 142.4 vs. 878.9 ± 87.9 mGy) with no statistical difference ($p=0.60$).

**Figure 2: Comparison of contrast volume during PCI with TRA (RCA, single stent, type A lesion, n= 30) and TFA approach (RCA, single stent, type A lesion, n= 30)**

The above table describes that Mean contrast volume used greater in transfemoral PCI than trans radial PCI (177.7 ± 19.9 vs. 168.0 ± 13.0 ml) with statistically significant difference ($p=0.03$)

Discussion:

The main objective of the study was to assess radiation exposure of patients undergoing transradial and transfemoral coronary angiogram and percutaneous coronary intervention. In the current study the mean age of group I was 51.2 ± 10 years and group II was 52.9 ± 10.8 years. The mean age was almost similar between two groups. The sex incidence of the present study was observed that male were 83 (83%) and 85(85%) and female were 17 (17%) and 15 (15%) in the group I and II respectively. No statistically significant differences were found in between groups. The clinical parameters like Pulse and BP were observed almost identical in both groups of patients.

In this study regarding the mean fluoroscopy time in trans radial and trans femoral coronary angiogram, it was 4.4 ± 1.6 min and 4.1 ± 3.9 min in the group Ia and group IIa respectively with the statistically no differences ($p=0.61$). It resembling a study done by Tayeh and Ettori¹⁷ where showed no significant difference of fluoroscopy time in transradial CAG and trans femoral CAG. In Present study finding regarding fluoroscopy time is consistent with the studies done by Tarighatnia A et al., (2016)¹¹, Barbosa et al., (2014)¹⁸, Weaver et al., (2010)¹⁹, there is no significant difference.

The mean fluoroscopy time in present study regarding trans radial and trans femoral PCI, mean fluoroscopy time was 11.7 ± 1.3 min in group Ia and 11.1 ± 1.5 min in group IIa with statistically insignificant difference ($p= 0.13$). Current study finding regarding fluoroscopy time during PCI is consistent with the studies done by Tarighatnia A et al., (2016)¹¹, Weaver et al., (2010)¹⁹.

In present study regarding radiation exposure in trans radial and trans femoral coronary angiogram, mean dose area product (DAP) was (2732 ± 1195.5 mGym² and 2434 ± 488 mGym², $p=0.07$) Air Kirma (AK) was (307.6 ± 112.2 and 283.7 ± 48.5 , $p=0.10$) in group Ia and group IIa respectively with statistically no significant difference. It resembling a study done by Tarighatnia A, et al., (2016)¹¹ showed no significant difference of DAP in trans radial and trans femoral angiogram (1732.55 vs 1949.71 , $p=.17$) and also no significant difference of Air Kirma in trans radial and trans femoral route (233.88 vs 210.78 , $p=0.9$). Georges JL, et al²⁰ demonstrated radial route associated with lower radiation exposure in comparison to femoral route ($p<.001$). The Learning curve, the experience and the high volume centres for radial access have been underlined as key factors in radiation dose reduction²⁰. Jolly S, et al²¹ showed median DAP was not different between radial and femoral angiogram. Kuipers et al²² showed radial route was associated with lower radiation exposure in compare to femoral route. Lower radiation dose in radial approach in

above studies might be due to intervention done in high volume radial centers by experienced operators¹¹. But following studies contradict the result of present studies. Shah B et al¹⁶ revealed that radial route was associated with higher radiation exposure in compare to femoral angiogram (DAP was 19649 vs 15395, $p=.02$). The main reasons for the possible higher radiation dose during trans radial access are probably related to the more complicated catheter manipulation requiring prolonged fluoroscopy time and to more unfavourable operator position, closer to X-ray source, especially for less skilled operators. These difficulties are easily overcome by increasing the radial competence²⁰.

Regarding radiation exposure in this study during trans radial and trans femoral PCI, mean dose area product (DAP) were (7703 ± 1247.6 mGym² and 7379 ± 631.9 mGym²), and Air kirma were (895.1 ± 142.4 mGy and 878.9 ± 87.9 mGy, $p=.60$) in group Ib and group IIb respectively with statistically no significant difference. It resembling a study done by Tarighatnia A, et al¹¹ showed no significant difference of DAP in trans radial and trans femoral PCI (3907.96 ± 249.7 vs 4643.58 ± 221.4 , $p=.02$) and also no significant difference of Air Kirma in trans radial and trans femoral PCI (619.85 ± 40.44 vs 702.19 ± 35.87 , $p=0.12$). Georges J., et al²⁰ revealed that radial route associated with lower radiation exposure in comparison to femoral route ($p<.001$). Jolly S, et al²¹ demonstrates median DAP was not different between radial and femoral route. Kuipers, et al.²² showed that radial route was associated with lower radiation exposure in compare to femoral route. Radiation exposure is higher in radial route in comparison to femoral route but differences present only in lower volume centers and less experienced operator. There is no significant difference in radiation exposure in radial vs femoral route if it is done in high volume center by experienced operator.

But following studies contradict the result of present studies. Shah B, et al¹⁶ showed that radial route was associated with higher radiation exposure in compare to femoral route. Radial route for cardiac catheterization procedures is associated with longer fluoroscopy time leading to increased radiation exposure¹⁵. The discrepancy regarding radiation exposure dose between trans radial and trans femoral PCI studies could be explained by differences in the imaging system used, the operator's skill and the characteristics of angiography¹¹.

Conclusion:

In this study no significant differences were found in patients radiation dose in both radial and femoral group regarding coronary angiogram and PCI. Furthermore utilization of contrast volume was lower in trans radial coronary angiogram and PCI. So we can conclude that trans radial angiogram and PCI can be performed with the same safety as for the trans femoral approach. The operator's experience plays a major role in the success rate. These results are obtained in an experienced center in the trans

radial approach and conclusions might look different in catheter laboratory with lower experience in this approach. So, transradial approach is an attractive alternative to conventional transfemoral approach.

Conflict of Interest: None.

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Spectrum of Upper Gastrointestinal Endoscopic Findings in Patients with Dysphagia: A Study of 147 Cases

Ramesh Lamichhane^{*1}, Madhusudan Saha², Gopal Kumar Yadav³

Abstract

Introduction: This retrospective descriptive cross-sectional study was done to see upper gastrointestinal endoscopic findings in patients presenting with dysphagia. **Materials and Methods:** Reports of patients undergoing upper gastrointestinal endoscopy were retrieved from endoscopy records. Data regarding age, gender, and endoscopic features and impressions were collected. The data analysis was done using IBM SPSS® v21 (IBM, Armonk, New York). Frequency, proportions, mean $\pm$ SD, and range were calculated. **Results:** Out of 147 participants, the mean age of the participants was 53.46 ± 15.99 years. There was an equal proportion of participants of each gender (50.3% female and 49.6% male). The prevalence of endoscopic abnormalities was 93.8%. Most of the participants had carcinoma esophagus (38.7%, 57) followed by gastritis (35.3%, 52), gastric polyp (10.8%, 16), and duodenitis (8.8%, 13). **Conclusion:** Dysphagia is an alarming symptom that warrants prompt evaluation. With diagnostic and therapeutic value, upper GI (gastrointestinal) endoscopy remains a rapid initial effective tool in the evaluation of patients with dysphagia.

Key words: Dysphagia, gastrointestinal endoscopy, malignancy.

Number of Tables: 03; Number of References: 20; Number of Correspondence: 03.

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Introduction:

Dysphagia, a Greek word, attributes to the subjective sensation of difficulty swallowing^{1,2}. The prevalence of dysphagia varies with age. It affects 16-22% of the population above 50 years of age³. Studies show about one-fifth of the population visiting primary care complaints of dysphagia⁴. Moreover, dysphagia occurs in more than 40% of elderly admitted patients⁵. Upper gastrointestinal endoscopy (Esophagogastroduodenoscopy, EGD) is the most common and initial diagnostic procedure performed for the evaluation of patients with dysphagia owing to its advantage of direct visualization and tissue acquisition for biopsy^{1,6,7}. The presence of dysphagia has been linked with anxiety, and depression resulting in

a significant negative impact on physical and mental functioning^{8,9}.

There are limited data regarding the prevalence of different endoscopic abnormalities in South Asian countries. Due to limited data, the trending change in the etiology of dysphagia is not well known. This study was done to identify the spectrum of upper gastrointestinal endoscopic abnormalities in patients presenting with dysphagia.

Material and Methods:

This retrospective descriptive cross-sectional study was done using the endoscopic findings database maintained in Popular Medical Center, Sylhet, Bangladesh from March 11, 2021 to September 30, 2021. All patients presenting with dysphagia undergoing upper GI endoscopy for the first time with complaints of dysphagia including both in and out patients were included in this study. Exclusion criteria included those with incomplete information in the database. Demographic information i.e., age, sex, and the endoscopic findings were recorded in a data sheet. Statistical Analysis: Statistical analysis was done using a statistical package for social sciences, IBM SPSS® v21 (IBM, Armonk, New York). Mean and SD was calculated for continuous data and percentage (proportion) were calculated for categorical data.

Results:

A total of 147 patients were included in this study. The mean age of the participants was 53.46 ± 15.99 with the maximum and minimum age being 90 and 18 years respectively. The majority of patients are from the age group 41-60 years accounting for 68(46.2%). There was an equal proportion of participants of each gender (50.34% female and 49.66% male (Table I).

Out of all the participants who underwent endoscopy, 138(93.87%) had abnormal endoscopic features. Overall the most common finding was esophageal carcinoma (38.78%, 57) followed by gastritis

(35.37%, 52), gastric polyp (10.88%, 16), and duodenitis (8.84%, 13) (Table II).

In the age group ≤ 25 years, 7(53.8%) patients had gastritis followed by duodenitis in 2(15.3%) of the patients. Among the age group 26-40 years, the most common endoscopy finding was gastritis 10(45.4%) followed by esophageal cancer in 5(22.7%) patients. In the age group 41-60 years, 32(47%) patients had esophageal cancer and 19(27.9%) patients had gastritis findings. In the elderly age group ≥ 61 years, esophageal cancer was seen in 20(45.4%) and gastritis was seen in 16(36.3%) of the patients (Table III).

Table-I: Demographic characteristics of participants (N=147)

		Count	Proportions
Sex	Female	74	50.3%
	Male	73	49.7%
Age Group	≤ 25 years	13	8.8%
	26-40 years	22	15.0%
	41-60 years	68	46.3%
	≥ 61 years	44	29.9%
	Mean= 53.46 SD= 15.99		

Table-II: Endoscopic diagnosis in patients presenting with Dysphagia

SN	Characteristics	Frequency	Proportions
1. Endoscopic features			
	Normal	9	6.12
	Abnormal	138	93.87
2. Endoscopic diagnosis			
Larynx			
	Vocal cord palsy	3	2.04
	Laryngeal neoplasm	7	4.76
	Reinke edema	1	0.68
	Total	11	7.48
Esophagus			
	Esophageal candidiasis	6	4.08
	Esophagitis	8	5.44
	Esophageal inlet patch	1	0.68
	Esophageal webs	1	0.68
	Esophageal rings	2	1.36
	Carcinoma esophagus	57	38.78
	Hiatal hernia	4	2.72
	Esophageal stricture	2	1.36
	Barrett's esophagus	1	0.68
	Extrinsic compression	2	1.36
	Total	84	57.14
Stomach			
	Gastric polyp	16	10.88
	Gastritis	52	35.37
	Carcinoma gastric	4	2.72
	Gastric outlet obstruction	1	0.68
	Total	73	49.65

SN	Characteristics	Frequency	Proportions
Duodenum			
	Duodenitis	13	8.84
	Duodenal polyp	1	0.68
	Total	14	9.52

Table-III: Endoscopic findings according to age and gender.

Diagnosis	Age Group				Sex		Total
	≤ 25	26-40	41-60	≥ 60	Female	Male	
	Count (%)	Count (%)	Count (%)	Count (%)	Count (%)	Count (%)	
Normal	1 (7.6)	2 (9)	4 (5.8)	2 (4.5)	7 (9.4)	2 (2.7)	9
Esophageal cancer	0	5 (22.7)	32 (47)	20 (45.4)	18 (24.3)	39 (53.4)	57
Gastritis	7 (53.8)	10 (45.4)	19 (27.9)	16 (36.3)	31 (41.8)	21 (28.7)	52
Gastric polyp	1 (7.6)	2 (9)	6 (8.8)	7 (15.9)	10 (13.5)	6 (8.2)	16
Duodenitis	2 (15.3)	2 (9)	6 (8.8)	3 (6.8)	7 (9.4)	6 (8.2)	13
Laryngeal neoplasm	1 (7.6)	0	1 (1.4)	5 (11.3)	4 (5.4)	3 (4.1)	7
Candidiasis	0	1 (4.5)	4 (5.8)	1 (2.2)	5 (6.7)	1 (1.3)	6
Oesophagitis	1 (7.6)	2 (9)	4 (5.8)	1 (2.2)	8 (10.8)	0	8
Hiatus hernia	0	0	1 (1.4)	3 (6.8)	3 (4.05)	1 (1.3)	4
Gastric ulcer	0	2 (9)	1 (1.4)	1 (2.2)	1 (1.3)	3 (4.1)	4
Stomach cancer	0	1 (4.5)	1 (1.4)	2 (4.5)	0	4 (4.1)	4
Vocal cord palsy	0	0	1 (1.4)	2 (4.5)	1 (1.3)	2 (2.7)	3
External compression	0	0	2 (2.9)	0	1 (1.3)	1 (1.3)	2
Esophageal stricture	1 (7.6)	0	0	1 (2.2)	1 (1.3)	1 (1.3)	2
Esophageal ring	0	0	0	2 (4.5)	2 (2.7)	0	2
Barrett's esophagus	1 (7.6)	0	0	0	0	1 (1.3)	1
Esophageal inlet patch	1 (7.6)	0	0	0	0	1 (1.3)	1
Esophageal web	0	0	0	1 (2.2)	1 (1.3)	0	1
Reinke edema	0	0	0	1 (2.2)	0	1 (1.3)	1
Compression	0	0	1 (1.4)	0	1 (1.3)	0	1
Duodenal polyp	0	0	0	1 (2.2)	1 (1.3)	0	1
Gastric outlet obstruction	1 (7.6)	0	0	0	1 (1.3)	0	1

Discussion:

Dysphagia is an alarming symptom that warrants prompt evaluation and appropriate treatment. Older age, weight loss, and evidence of gastrointestinal bleed should raise suspicion about the malignant causes of dysphagia¹⁰. One in six adults experiences difficulty swallowing¹¹. Upper Gastrointestinal endoscopy is done to evaluate as well as for the management of dysphagia¹².

Our study showed esophageal carcinoma followed by gastritis were the two most common findings in patients with dysphagia. Studies in Pakistan and Africa also showed carcinoma of the esophagus as the most common finding^{13,14}. However, USA based study showed benign stricture followed by GERD were the most common findings¹⁵.

The normal endoscopic finding was very low in our study found only in 9(6.1%) patients. Indian, Pakistan, and USA based studies showed normal findings of 39.8%, 20.9%, and 29% respectively, which is much higher than our study¹⁶⁻¹⁸.

In our study, esophageal cancer was noted in 57(38.78%) patients making it the most common finding overall. All the patients diagnosed were from age group 26 and above. It was most commonly seen in the age group 41-60 accounting for 56.1%. Khan et. al. also reported malignant esophageal stricture in 27.3% of patients predominantly of the age group more than 40 years, which was slightly lower than our study¹⁷. Esophageal carcinoma is predominantly seen in male patients (68.42%) in our study which is consistent with other studies¹⁷. Esophageal cancer is most commonly diagnosed at late stages (stage 3)¹⁹. Thus early diagnostic measures should be taken in patients with dysphagia in the middle and older age group.

Gastritis was the second most common finding in our study seen in 52(35.3%) of the patients. Yahya et. al. reported gastritis in 22.8% of patients which is lower than our study²⁰. This may be due to differences in population, food habits, and environment. Gastritis was more common in females than in males predominantly in the age group 41 years and above.

The gastric polyp was the third most common finding seen in 16(10.8%) patients. This finding was not reported in previous studies. Gastric polyp is usually an asymptomatic incidental finding. Due to the possibility of malignancy appropriate diagnosis and treatment are necessary.

Duodenitis was seen in 16(10.8%) of the patients predominantly in the age group more than 40 years. The study by Yahya et. al. only showed this finding in 2.6% of patients²⁰.

The author's primary interest was to look for the endoscopic findings the physician may find while doing endoscopy in patients presenting with dysphagia. In our study, esophageal cancer was the most common finding. To look for the emerging trend of causes of dysphagia a study multicentric study with a large sample size needs to be done.

Conclusion:

Dysphagia should be taken as an alarming symptom in age 40 and above and warrants prompt evaluation and treatment. With diagnostic and therapeutic value, upper GI (gastrointestinal) endoscopy remains a rapid initial effective tool in the evaluation of patients with dysphagia

Conflict of Interest: None.

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Effect of Activity (ADL) Modification on Reduction of Pain in Patients with Chronic Non-Specific Low Back Pain

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Abstract

Introduction & Objective: : Low back pain is the commonest cause of activity limitations and absence of work in developing country like Bangladesh. The aim of this study was to chalk out the association between ADL modification with chronic low back pain. **Materials & Methods:** : This Randomized Clinical Trial was performed in the Department of Physical Medicine and Rehabilitation, JRRMCH, Sylhet. Eighty patients of 30 to 60 years old, fulfilling the selection criteria were included in this study. Patients were divided into two groups after randomization by lottery method. Patients of Group-A were treated with NSAID, Anti-ulcerant & Activity (ADL) Modification while patients of Group-B were treated with NSAID and Anti-ulcerant only. Patients of both groups were treated for six weeks. Main outcome measures were Subjective Pain Intensity Score, VAS, Tenderness Index, Disability due to pain, Spinal Mobility Index and Oswestry Disability Index. **Results:** Majority of the patients of both groups were 30 to 40 years old (52.5% in Group-A and 47.5% in Group-B). Males were predominant in both groups. While majority belongs to middle socio-economic class, occupationally farmers were majority in both groups (22.5% in Group-A and 20% in Group-B). VAS was better in patients who received instructions about activity (ADL) modification than those who did not receive them. Subjective Pain Intensity Score and Tenderness Index improved in both groups but their difference was not statistically significant. Disability due to Pain and Spinal Mobility Index, both the variables improved at the end of 3rd week and their difference was statistically significant ($P<0.05$). **Conclusion:** From the study it can be concluded that Activity (ADL) Modification helps to reduce pain in patients with chronic non-specific low back pain.

Key words: ADL, Low Back Pain.

Number of Tables: 05; Number of References: 21; Number of Correspondence: 03.

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about 8 to 10% of adults experience LBP daily². It has a significant economic impact on society, reported in the last thirty years³. LBP is more common in heavy manual workers, particularly those who are in occupations requiring heavy lifting & twisting⁴. **Chronic Low Back Pain (CLBP)** is defined as low back pain persisting for more than 12 weeks while **Non-specific** low back pain is pain not attributed to a recognizable pathology (e.g. infection, inflammation, tumour, fracture, osteoporosis etc.). Risk factors include heavy physical work in awkward postures, frequent bending & twisting with/without lifting and prolonged static postures. Individual and workplace factors have also been reported to be associated with the transition to chronic low back pain⁵. Diagnosis depends on the history and physical examination in which the pain is reproduced. X-ray studies may reveal disc degeneration and facet arthritis, but the diagnosis is clinical⁶. Chronic LBP is often resistant to solitary drug treatment. Many models and therapies have been postulated and applied. Physical therapy such as thermotherapy like short wave diathermy, electrical nerve stimulation, pelvic traction and exercise therapy have been undertaken to reduce the problem⁷. But the first & foremost step in managing Chronic Low Back Pain is to avoid activities that increase intra-discal pressure and thus making pain symptoms worse by putting extra strain to the back muscles. Studies show that modification of the activities like limiting prolonged unsupported sitting, avoiding bending or twisting the back during lifting, avoiding heavy weight lifting helps to provide long-term symptom relief and decreases the chance of recurrence of LBP⁸. For the purpose of this study, activity modification instructions will be to avoid prolonged sitting and standing, to lie down in supine position using a plain firm bed, to be cautious while getting out of bed by following a sequential position like first flex the knees then lie on

Introduction:

Low back pain (LBP) is one of the commonest and most troublesome of complaints, causes are many and an exact diagnosis is often difficult. The disability with which it is usually associated is often severe & prolonged; therapy is sometimes ineffective¹. Back pain affects 60-80% of people at some time in their lives and

one side then hang the legs out of bed then get up using both hands and then start walking, to use high commode, to avoid stooping, to use long handled cleaner during sweeping, to avoid high heeled shoes, to keep back straight during forward bending activities, to avoid twisting, to avoid weight lifting or to lift with caution, and to drive in a comfortable position with adequate height keeping back straight. This study will help to find out the effect of modification of these activities of daily living in reducing pain of patients with chronic non-specific low back pain. Bangladesh is a poor country burdened with huge population and limited resources. It is very difficult to manage such a huge number of patients with chronic non specific low back pain with the existing resources and management system. Diagnostic approaches and therapeutic options are diverse and often inconsistent, resulting in rising costs and variability in the management of CLBP. Hence, Data are needed to find out an effective, inexpensive and easy-to-do procedure in the treatment of chronic non-specific low back pain which can impact on their final outcome quite positively in the long run.

Objectives

To determine the role of activity (ADL) modification on reduction of pain in chronic non-specific low back pain. To assess the disability of patients and the outcome of chronic non-specific low back pain with or without activity (ADL) modification. Low back pain is a symptom complex which affects the area between lower rib cage and gluteal folds. When it persists for more than three months (twelve weeks) is called **chronic low back pain**⁹. Chronic low back pain remains poorly understood and inadequately treated due to the heterogeneity of the patients population and the lack of a simple and useful system¹⁰. Chronic low back pain is one of the most common causes of chronic disability and most prevalent medical disorder among industrialized societies¹¹. The type of low-back pain most commonly confronting the physiatrist is of benign mechanical origin. Benign mechanical causes are divided into static (postural) and kinetic (faulty biomechanical) types. Of the static causes, the most prevalent is excessive lordosis in which there is exorbitant facet weight-bearing and foraminal closure. Alternatively, prolonged daily flexed postures may cause posterior migration of the disc, resulting in low back pain and probably sciatic radiculopathy¹². Nachemson has shown that the positions like sitting, lifting from a standing position with extended knees, leaning forward while seated in a chair etc. increase ligamentous stress and intradiscal pressures most¹³. Holding these positions for a prolonged period of time will stress the supporting ligaments and muscles of the spine, increasing the likelihood of low back pain. Again in a prospective cohort study undertaken from 1993 to 2007 researchers showed long-term associations between physical load in daily activities (such as awkward posture etc.) and chronic low back pain (CLBP) in general population¹⁴. So, Activity (ADL) Modification can play a cost-effective and efficient role for reducing pain and disability of chronic non-specific low back pain.

Materials and Methods:

Study design was Randomized Controlled Clinical Trial. **Place of study** was Jalalabad Ragib-Rabeya Medical College Hospital, Sylhet, Bangladesh. **Period of study** was 6 (six) months (23-09-13 to 22-03-14). Study population was selected from the Department of Physical Medicine and Rehabilitation, Jalalabad Ragib-Rabeya Medical College Hospital, Sylhet. **Eighty** patients of CLBP as sample size who met the selection criteria. **Sampling Method:** Subjects were selected purposively according to the availability of the patients who fulfill the inclusion criteria and then randomly allocated in two groups by lottery method. **Inclusion criteria** was Patients of both sexes from 30 to 60 years having low back pain for more than 3 months with no known underlying pathology and those who were able to complete a questionnaire. Exclusion criteria were Patients having LBP due to pregnancy, trauma or surgery, infective cause such as TB spine, Cauda-equina syndrome, malignancy, concomitant PUD, renal impairment or any other contraindication to take NSAIDs. **Activity Modification:** Modification of activities that increase intradiscal pressure and/or put extra strain to the back muscles, such as:

- To avoid prolonged sitting.
- To avoid prolonged standing.
- To lie down in supine position using plain firm bed.
- To be cautious while getting out of bed by following a sequential position like first flex the knees then lie on one side then hang the legs out of bed then get up using both hands and then start walking.
- To avoid stooping.
- To avoid twisting.
- To keep back straight during forward bending activities.
- To use long handled cleaner during sweeping.
- To avoid weight lifting or to lift with caution.
- To avoid high heeled shoes.
- To use high commode.
- To drive in a comfortable position with adequate height keeping back straight.

Study Procedure: Patients with chronic low back pain for at least 3 months' duration having attended the Physical Medicine and Rehabilitation department of Jalalabad Ragib-Rabeya Medical College Hospital were selected according to the inclusion & exclusion criteria. After that, patients selected for the study were divided into two groups (Group-A and Group-B) through randomization by lottery method. Patients of Group-A were treated with NSAID (Aceclofenac 100 mg twice daily orally) along with an anti-ulcerant (Omeprazole 20 mg) and instruction about Activity (ADL) Modification to be followed during performing daily activities for 6 weeks (42 days). Patients of Group-B were treated only with NSAID (Aceclofenac 100 mg) and anti-ulcerant (Omeprazole 20 mg) for the same duration. **Procedure of Data Analysis:** Data will be processed and analyzed by computer software SPSS (Statistical Package for Social Science). Test statistics to be used were descriptive statistics, Chi-square (X^2) and F-test

(Analysis of variance). Level of significance was set at 0.05 so that, $P < 0.05$ was considered to be significant.

Ethical Implications: Study subjects were informed verbally about the study design, purpose of the study and their right to withdraw them from the project at any time, for any reason, whatsoever. Subjects who have given informed written consent to participate in the study were included as the study sample.

Results:

Table I shows majority 21 (52.5%) and 19 (47.5%) age belong to 30 - 40 years in Group-A and Group-B respectively. The mean age found in Group-A is 41.5 ± 2.1 and 39.2 ± 1.13 in Group-B.

Table I: Age distribution of the study subjects.

Age	Group A (n=40)	Group B (n=40)
30 – 40	21 (52.5%)	19 (47.5%)
40 – 50	14 (35%)	15 (37.5%)
50 – 60	5 (12.5%)	6 (15%)
Mean $\pm$ SD	41.5 ± 2.1	39.2 ± 1.13

Table II shows majority in both groups are farmers which is 22.5% in Group-A and 20% in Group-B

Table II: Distribution of the occupation of the study subjects

Occupation	Group A (n=40)	Group B (n=40)
Businessman	5 (12.5%)	6 (15%)
Service-holder	8 (20%)	7 (17.5%)
Housewife	4 (10%)	3 (7.5%)
Driver	1 (2.5%)	1 (2.5%)
Teacher	2 (5%)	3 (7.5%)
Farmer	9 (22.5%)	8 (20%)
Day Laborer	6 (15%)	5 (12.5%)
Health worker	1 (2.5%)	2 (5%)
Others	4 (10%)	5 (12.5%)

Table III shows significant improvement in Subjective Pain Intensity, Tenderness Index and Oswestry Disability Index after 3 and 6 wks of treatment. Whereas in VAS significant improvement occurs only after week 3 and Spinal Mobility Index significantly improves after week 6.

Table III: Outcome variables in Group-A.

	ANOVA F	Significance
(a) Subjective Pain Intensity		
W ₀ to W ₃	5.807	0.002 (S)
W ₀ to W ₆	7.615	0.001 (S)
(b) Pain Scale (VAS)		
W ₀ to W ₃	9.110	0.010 (S)

	ANOVA F	Significance
W ₀ to W ₆	6.845	0.053 (NS)
(c) Tenderness Index		
W ₀ to W ₃	13.348	0.001 (S)
W ₀ to W ₆	12.554	0.002 (S)
(d) Disability due to pain		
W ₀ to W ₃	3.315	0.070 (NS)
W ₀ to W ₆	1.347	0.233 (NS)
(e) Spinal Mobility Index		
W ₀ to W ₃	3.542	0.061 (NS)
W ₀ to W ₆	2.214	0.001 (S)
(f) Oswestry Disability Index		
W ₀ to W ₃	10.486	0.013 (S)
W ₀ to W ₆	7.672	0.002 (S)

Table IV shows significant improvement in Tenderness Index and Oswestry Disability Index after 3 and 6 weeks of treatment. In case of Subjective Pain Intensity and VAS significant improvement occurs only after week 3.

Table IV: Outcome variables in Group-B.

	ANOVA F	Significance
(a) Subjective Pain Intensity		
W ₀ to W ₃	3.653	0.030 (S)
W ₀ to W ₆	6.201	0.064 (NS)
(b) Pain Scale (VAS)		
W ₀ to W ₃	8.345	0.001 (S)
W ₀ to W ₆	0.089	0.960 (NS)
(c) Tenderness Index		
W ₀ to W ₃	10.041	0.015 (S)
W ₀ to W ₆	10.246	0.021 (S)
(d) Disability due to pain		
W ₀ to W ₃	5.964	0.078 (NS)
W ₀ to W ₆	2.131	0.153 (NS)
(e) Spinal mobility Index		
W ₀ to W ₃	5.130	0.056 (NS)
W ₀ to W ₆	5.100	0.098 (NS)
(f) Oswestry Disability Index		
W ₀ to W ₃	17.312	0.001 (S)
W ₀ to W ₆	11.106	0.002 (S)

Table V shows that Subjective Pain Intensity and Tenderness Index improved in both groups but their difference were not statistically significant. Disability due to Pain and

Spinal Mobility Index, both the variables improved at the end of week 3 and their difference was statistically significant, though this significance abolishes at the end of wk 6. No statistically significant difference was found between the groups regarding Oswestry Disability Index.

Table V: Comparison of outcome variables in Group-A and Group-B.

	Group - A Mean $\pm$ SD	Group - B Mean $\pm$ SD	Probability (P)
(a) Subjective Pain Intensity			
Pretreatment, W ₀	2.16 $\pm$ 0.57	2.12 $\pm$ 2.17	0.171 (NS)
At the end of W ₃	1.45 $\pm$ 0.53	1.51 $\pm$ 1.42	0.185 (NS)
At the end of W ₆	1.04 $\pm$ 0.68	1.06 $\pm$ 1.15	0.325 (NS)
(b) Pain Score (VAS)			
Pretreatment, W ₀	8.07 $\pm$ 0.61	7.72 $\pm$ 7.02	0.949 (NS)
At the end of W ₃	5.45 $\pm$ 0.71	5.52 $\pm$ 5.56	0.625 (NS)
At the end of W ₆	3.86 $\pm$ 0.73	4.03 $\pm$ 3.95	0.149 (NS)
(c) Tenderness Index			
Pretreatment, W ₀	1.42 $\pm$ 0.59	1.32 $\pm$ 1.41	0.110 (NS)
At the end of W ₃	0.76 $\pm$ 0.43	0.85 $\pm$ 0.96	0.615 (NS)
At the end of W ₆	0.67 $\pm$ 0.57	0.58 $\pm$ 0.78	0.216 (NS)
(d) Disability due to pain			
Pretreatment, W ₀	0.84 $\pm$ 0.25	0.82 $\pm$ 0.90	0.162 (NS)
At the end of W ₃	0.42 $\pm$ 0.50	0.54 $\pm$ 0.44	0.012 (S)
At the end of W ₆	0.23 $\pm$ 0.44	0.31 $\pm$ 0.25	0.115 (NS)
(e) Spinal Mobility Index			
Pretreatment, W ₀	6.05 $\pm$ 0.31	6.03 $\pm$ 6.21	0.503 (NS)
At the end of W ₃	6.54 $\pm$ 0.48	6.43 $\pm$ 6.66	0.031 (S)
At the end of W ₆	6.63 $\pm$ 0.44	6.73 $\pm$ 6.75	0.362 (NS)
(f) Oswestry Disability Index			
Pretreatment, W ₀	29.74 $\pm$ 3.3	28.96 $\pm$ 29.64	0.543 (NS)
At the end of W ₃	25.36 $\pm$ 3.72	24.33 $\pm$ 26.16	0.155 (NS)
At the end of W ₆	22.54 $\pm$ 3.97	21.60 $\pm$ 23.55	0.062 (NS)

Discussion:

Age of the patients:

In this study mean age is 41.5 $\pm$ 2.1 in Group-A and 39.2 $\pm$ 1.13 in Group-B. Mean age difference is almost similar between the groups. In a study conducted by Shakoor et al.¹⁶ comprising 102 patients of chronic low back pain mean age was found to be 42.8 $\pm$ 10.5 years in Group-A and 38.5 $\pm$ 8.4 years in Group-B and overall mean age was 42.22 $\pm$ 8.07 years. Findings of the current study are similar with those of the above study.

Sex of the patients:

In the present study it was observed that male were predominant in both groups, which was 55% in Group-A and 57.5% in Group-B. Difference was not significant (P>0.05) in between the groups. In study Borman, Keskin and Bodur¹⁵ found male to female ratio was 1=1.6 and 1=2.5 in Group-A and Group-B respectively. But, in large epidemiological studies no statistically significant difference exists between male and female. These findings are

consistent with the findings of current study.

Socio-economic condition:

In the study, it was observed that majority of the patients came from middle class followed by low class poor family. Poor people of our country have to do heavy manual works which include repetitive twisting, bending, heavy weight-lifting etc. In addition, they do not have enough money to have an adequate management option to procure at the early stage of the disease which in turn increases the likelihood of chronic illness. Shakoor et al.¹⁶ in a study of patients with chronic low back pain also found that most of their patients came from middle socio-economic group. So, their findings are consistent with that of the present study.

Occupation:

In this study it was observed that patients were mostly farmers (22.5% and 20%), service-holders (20% and 17.5%) and day laborers (15% and 12.5%) in Group-A and Group-B respectively. In a study Borman, Keskin and Bodur¹⁵ showed 38.1% and 61.9% patients were employed in Group-A and Group-B respectively. Moyeenuzzaman et al.¹⁷ found 15 % housewives, 24% students, 19% service holders, 13% farmers and 11% workers in a study conducted in BSMMU.

Duration of pain:

In this study, mean duration of pain was 21.1 $\pm$ 2.34 months in Group-A and 23.3 $\pm$ 1.50 months in Group-B, their difference was not statistically significant (P>0.05). Borman, Keskin and Bodur¹⁵ found mean duration of low back pain was 34.09 $\pm$ 14.1 months and 27 $\pm$ 19.5 months in Group-A and Group-B respectively. Almost similar observation was found by Shimada et al.¹⁹ Emery et al.²⁰ and Kraamer²¹.

Outcome variables:

In the study it was observed that all variables individually improved in Group-A and Group-B but they were not statistically significant. VAS was better in patients who received instructions about activity (ADL) modification than those who did not have them but the difference was not statistically significant. Subjective pain intensity and tenderness index improved in both groups though their difference was not statistically significant. These scores are in accordance with observation by Deyo et al.¹⁸ Disability due to pain and spinal mobility index, both the variables improved at the end of third week and their difference was statistically significant (P<0.05) but at the end of sixth week statistical significance abolishes (P>0.05). Deyo et al.¹⁸ showed almost similar observation. No statistically significant (P>0.05) difference was found between the groups regarding Oswestry disability index.

Conclusion:

Because LBP presents such a large public health problem, potential impact of eliminating the unhealthy effect of physical load by modification of activities (ADL) is substantial. But as the sample size was small and there were some limitations in the trial, no firm conclusion could

be drawn. Information found here need verification by larger long-term follow up studies. Considering the data collected from this study it can be concluded that Activity (ADL) Modification helps reduce pain in patients with chronic non-specific low back pain.

Conflict of Interest: None.

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Demographic Study of Dermatological Manifestations of DM Patients Attending in a Medical College Hospital

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Abstract

Introduction: Diabetes mellitus (DM) is a common metabolic disorder and is significant for its ability to adverse effect of various organs. Skin manifestations in this condition are due to metabolic derangements, chronic complications and infections, which are commonly observed after developing clinical diabetes mellitus, but may also precede the disease.

Aim: The aim of this study was to understand dermatological manifestations in diabetes mellitus relation with demographic parameters. **Materials and Methods:** It was a hospital based cross sectional study carried out among 80 randomly selected diabetic patients with/without skin lesions. Patients were then asked for their willingness to participate in the study. Skin examination was carried out and skin lesions were identified. All data was recorded in the pre-designed, pre-tested, and semi-structured questionnaire developed for the study. Data was analyzed using SPSS version 26. Frequencies and percentages were calculated for the necessary data. **Result:** : Mean age of the subjects was 51.0±13.2 years, minimum age 25 and maximum 80 years. It was observed that, out of 80 patients, 52 (65.0%) were aged between 41–60 years. 52 (65%) were female and 28(35%) were male patients. 46(57.5%) were housewives and 16(20.0%) were service holders, 10(12.5%) were farmers and other 8(10%). 41(51.2%) from middle class, 38(47.5%) from lower class and 1(1.3%) were from upper class. 61.2% patients came from rural area and 38.8% patients from urban area. The mean duration of diabetes mellitus was 6.6±5.1 years, 42.5% patients duration had 5-10 years followed by 36.3% below 5 years and 21.3% patients had DM more than 10 years. Out of 80 patients, a total of 39(48.8%) DM patients had skin manifestations and 41(51.2%) had no skin manifestations. Among 39 DM patients with skin disease, 19(48.7%) having a single, while 8(25.5%) had two and 13(30.8%) patients had three or more skin lesions. 22(56.4%) patients found diabetic dermopathy, diabetic foot ulcer 12(30.8%), fungal infections 9(23.1%), bullous lesions 7(17.9%), diabetic foot gangrene 5(12.8%), lypodystrophy 5(12.8%), pruritus 5(12.8%), xerosis 5(12.8%) cases, scleredema 3(7.7%), ichthyosis 2(5.1%) and bacterial infections 2(5.1%). Age, sex, educational level, socioeconomic status, residence found no significant association ($p>0.05$), but duration of diabetes mellitus was significantly associated with the presence of dermatological manifestations ($p=0.001$). **Conclusion:** The spectrum of skin manifestations due to DM in this study population is similar to that in other parts of the world. Diabetic dermopathy, Pruritus and fungal infections are the most common cutaneous manifestations in DM patients. The presence of skin manifestations can highlight the suspicion for DM enabling early diagnosis and management and thereby can be helpful for preventing complications.

Key words: : Cutaneous manifestations, Type II diabetes, Skin, DM.

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Introduction:

Skin is the largest organ in the body. It determines appearance and plays a major role in protection, support of the interior. More than one third of diabetic patients have some type of dermatologic manifestations during the course of their chronic disease¹. The association of certain skin diseases with diabetes mellitus has been fairly well recognized with an incidence rate ranging from 11.4% to 66%^{2,3}. At least 30% of patients with diabetes mellitus have some type of cutaneous involvement during the course of their chronic disease⁴. Skin sugar levels run parallel to the blood sugar levels⁵.

Skin changes generally appear subsequent to the development of DM but may be the first presenting sign or even precede the diagnosis by many years. Among the many skin manifestations in DM, none is pathognomonic of this disease⁶. Diabetes affects all age groups and all social classes. Hyperglycemia is the hallmark of

diabetes. Insulin deficiency may be absolute type I diabetes or partial in type II diabetes⁷. One of the complications of longstanding diabetes is lesions of the skin. Around 30% of the patients suffering from diabetes are estimated to have skin lesions in some form⁸. Dermatological manifestations in DM are mainly due to four causes. First is directly due to diabetes. Second are lesions of skin due to infections of the skin. Third due to other complications of diabetes and fourth due to reaction of the body of the patient to insulin or oral hypoglycemic drugs. The list of skin lesions due to diabetes is long but mainly comprises of diabetic dermopathy, necrobiosis lipoidica, diabetic bullae diabetic thick skin, and yellow nails⁹. Diabetics are prone to develop viral diseases of the skin like warts or herpes zoster. Other skin disorders seen among these diabetic patients are gangrene of foot, and waxy skin¹⁰. The baseline derangements in metabolic processes damage the skin among patients with diabetes. The longstanding degenerative nature of diabetic complications also affect the skin. Suggested pathogenetic mechanism is disturbed metabolism of carbohydrates and other reasons like impairment in the mechanisms of the host etc¹¹. The data on lesions of the skin due to diabetes are scarce. The present study was planned with the objective to evaluate diabetic dermatological manifestations relation with sociodemographic characteristics of the study subjects.

Materials and Methods:

This cross sectional study carried at Khulna Medical College Hospital, Khulna from May 2020 to April 2021. Sample size: 80 randomly selected confirmed diabetic patients with/without skin lesions were selected for the study. Informed consent was obtained from enrolled patients. All patients were given appropriate treatment for their skin lesions and diabetes. **Inclusion criteria:** Confirmed cases of diabetes with/without skin lesions of patients admitted into medicine department of KMCH and both sexes were included in the study. **Exclusion criteria:** Patients unwilling to participate in the study. Patients presented with DM with acute illness. **Procedure:** Patients confirmed to have diabetes according to their treatment records and blood sugar levels were screened. Those found to have skin lesions were then asked for their willingness to participate in the study. Cutaneous infections were classified as bacterial, viral and fungal. Detailed history was taken to trace the source of infection. Thorough skin examination was carried out and skin lesions were identified and recorded. All data was recorded in the pre-designed, pre-tested, and semi-structured questionnaire developed for the study. The samples were sent for histopathology and culture to confirm the clinical diagnosis in required cases. Treatment was initiated based on the final diagnosis. **Statistical analysis:** Data was analyzed using proportions. Simple statistical methods were used to quantify and analyses data. Frequencies and percentages were calculated for the necessary data and 95% confidential intervals of the percentages were also given.

Results:

Table-I: Sociodemographic characteristics of the study patients (n=80).

Variables	Number of patients	Percentage (%)
Age group (years)		
<40	13	16.2
41-60	52	65.0
60-80	15	18.8
Mean±SD (range)	51.0±13.2 (25 – 80) years	
Sex		
Male	28	35.0
Female	52	65.0
Education level		
Illiterate	19	23.8
Primary	20	25.0
Secondary	10	12.5
Higher secondary	18	22.5
Graduate	13	16.2
Occupation		
Housewife	46	57.5
Service	16	20.0
Farmer	10	12.5
Others	8	10.0
Socioeconomic status		
Low	38	47.5
Medium	41	51.2
High	1	1.3
Residence		
Rural	49	61.2
Urban	31	38.8
Duration of DM		
<5 yrs	29	36.3
5-10 yrs	34	42.5
>10 yrs	17	21.2
Mean±SD (range)	6.6±5.2 (1-20) years	

Table I shows distribution of respondents according to socio-demographic characteristics. Mean age of the subjects was 51.0±13.2 years, minimum age 25 and maximum 80 years. It was observed that, out of 80 patients, 52 (65.0%) were aged between 41–60 years, 15 (18.8%) were aged between 60–80 years, 13 (16.2%) were aged below 40 years. Majority of the patients 52 (65%) were female and 28(35%) were male. Among them patients 23.8% were illiterate, 25.0% completed primary, 12.5% patients secondary, 22.5% patients higher secondary and 16.2% patients were completed graduation. In the present study, 45(57.5%) were housewives and 16(20.0%) were service holders. It was seen that majority of the respondents 41(51.2%) were from middle class, 38(47.5%) were from lower class and 1(1.3%) were from upper class. Maximum (61.2%) patients came from rural area and 38.8% patients from urban area. The mean duration of diabetes mellitus was 6.6±5.1 years, maximum (42.5%) patients duration 5-10 years followed by 36.3% patients had below 5 years and 21.2% patients had duration of DM more than 10 years.

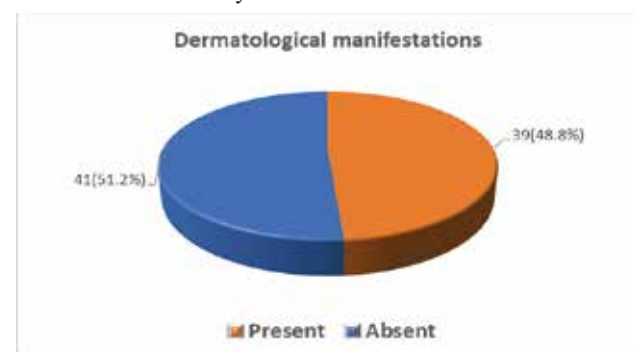


Figure-1: Pie diagram showing the frequency of dermatological manifestations within DM patients.

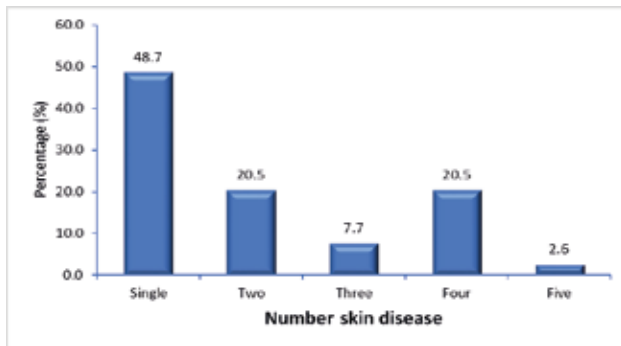


Figure-2: Distribution of the patients by number of dermatological manifestations (n=39).

Out of 80 patients, a total of 39(48.8%) DM patients had skin manifestations and 41(51.2%) had no skin manifestation. Among 39 DM patients with skin disease, 19(48.7%) having a single skin condition while 8(25.5%) had two and 3(7.7%) patients had three, 8(20.5%) have 4 skin diseases and 1(2.6%) patients had five skin disease (Figure 1 and Figure 2).

Table-II: Distribution of the patients by dermatological manifestations (n=39).

Dermatological manifestations	Number of patients	Percentage (%)
Diabetic foot ulcer	12	30.8
Diabetic foot gangrene	5	12.8
Bullous Lesions	7	17.9
Lipodystrophy	5	12.8
Bacterial infections	2	5.1
Fungal infections	9	23.1
Diabetic dermopathy	22	56.4
Necrobiosis Lipoidica diabetorum	1	2.6
Scleredema	3	7.7
Vitiligo	1	2.6
Ichthyosis	2	5.1
Pruritus	5	12.8
Xerosis	4	12.8
Granuloma annulare	1	2.6
Acquired perforating dermatosis	1	2.6

Table-II showed that among the 39 DM patients skin disease, the main complaint in 22 (56.4%) patients diabetic dermopathy, diabetic foot ulcer 12(30.8%), fungal infections 9(23.1%), bullous lesions 7(17.9%), diabetic foot gangrene 5(12.8%), Lipodystrophy 5(12.8%), pruritus 5(12.8%), xerosis in 4(10.3%) cases, scleredema 3(7.7%), ichthyosis 2(5.1%), bacterial infections 2(5.1%).

Table-III: Association of dermatological manifestations with sociodemographic characteristics of diabetic patients (n=80).

Variables	Dermatological manifestations		p-value
	Absent (n=41)	Present (n=39)	
Age group (years)			
<40	8(19.5%)	5(12.8%)	
41-60	26(63.4%)	26(66.7%)	
60-80	7(17.1%)	8(20.5%)	
Mean±SD (range)	49.3±14.2	52.8±11.9	0.234
Sex			
Male	12(29.3%)	16(41.0%)	0.270
Female	29(70.7%)	23(59.0%)	
Education level			
Illiterate	10(24.4%)	9(23.1%)	0.203
Primary	11(26.8%)	9(23.1%)	
Secondary	8(19.5%)	2(5.1%)	
Higher secondary	8(19.5%)	10(25.6%)	
Graduate	4(9.8%)	9(23.1%)	
Socioeconomic status			
Low	18(43.9%)	20(51.3%)	0.435
Medium	23(56.1%)	18(46.2%)	
High	0(0.0%)	1(2.6%)	

Variables	Dermatological manifestations		p-value
	Absent (n=41)	Present (n=39)	
Residence			
Rural	22(53.7%)	27(69.2%)	0.153
Urban	19(46.3%)	12(30.8%)	
Duration of DM			
<5 yrs	19(46.3%)	10(25.6%)	0.001*
5-10 yrs	16(39.0%)	18(46.2%)	
>10 yrs	6(14.6%)	11(28.2%)	
Mean±SD (range)	4.68±4.43	8.58±5.26	

Table-III showed that no significant association was observed between presence of dermatological manifestations with age, sex, educational level, socioeconomic status, residence ($p>0.05$). Duration of diabetes mellitus was significant associated with the presence of dermatological manifestations ($p=0.001$).

Discussion:

Diabetes mellitus is the most common metabolic disorder which involves the skin. Many skin disorders are associated with DM. Dermatological signs of DM mostly appear once the primary disease has already developed but may also appear coincidentally with its onset or even precede DM. In the present study, the mean age of the subjects was 51.0 ± 13.2 years, minimum age 25 and maximum 80 years. It was observed that, out of 80 patients, 52 (65.0%) were aged between 41–60 years, 15 (18.8%) were aged between 60–80 years, 13 (16.2%) were aged below 40 years. This is in agreement with the study by Gupta et al.¹² reported the majority of patients were in the age group of 40–60 years (32%), Mahajan et al.,¹³ Nigam and Pande,¹⁴ and Nawaf et al.¹⁵ The skin manifestations increase with age, duration, as well as the level of blood sugar control and severity of DM. Majority of the patients 52 (65%) were female and 28(35%) were male in our study. Gupta et al.¹² reported males (55%) outnumbered females (45%). Al Mutairi,¹⁶ Mahajan et al.,¹³ and Bhat et al.¹⁷ reported a higher incidence of dermatological manifestations in female diabetic patients, which supports this study.

It was seen that majority of the respondents 41(51.2%) were from middle class, 38(47.5%) were from lower class and 1(1.3%) were from upper class. Maximum (61.3%) patients came from rural area and 38.8% patients from urban area. Gupta et al.¹² reported out of 200 patients, 73% of the patients belonged to a rural background while 27% were from an urban background which coincides this study. The maximum no. of patients (48%) were from lower socioeconomic status, followed by 38% from middle socioeconomic and 14% were from upper socioeconomic status. The maximum no. of patients were housewives (51%), followed by retired persons (19%) and others (16%). In the present study, 46(57.5%) were housewives and 16(20.0%) were service holders. Study of Gupta et al.¹² and our study results almost same. The mean duration of diabetes mellitus was 6.6 ± 5.1 years, maximum (42.5%) patients duration 5-10 years followed by 36.3% below 5 years and 21.3% patients had duration of DM more than 10 years. In this study showed out of 80 DM patients, 39(48.8%) had skin manifestations and 41(51.2%) had no skin manifestation.

Among 39 DM patients with skin disease, 19(48.7%) having a single skin condition while 8(25.5%) had two and 3(7.7%) patients had three, 8(20.5%) have 4 skin diseases and 1(2.6%) patients had five skin diseases. Kiprono et al.¹⁸ reported 239 (43.9%) DM patients had skin manifestations. Among the 239 patients with skin manifestations, 297 skin diseases were diagnosed, with 188 (78.7%) DM patients having a single skin condition while 44 (18.4%) had two and seven (2.9%) patients had three or more skin diseases. Among 39 DM patients, 22 (56.4%) patients had diabetic dermopathy, diabetic foot ulcer 12(30.8%), fungal infections 9(23.1%), bullous lesions 7(17.9%), diabetic foot gangrene 5(12.8%), Lipodystrophy 5(12.8%), pruritus 5(12.8%), xerosis in 4(10.3%) cases, scleredema 3(7.7%), ichthyosis 2(5.1%), bacterial infections 2(5.1%). Kiprono et al.¹⁸ reported among the 150 primary non-infectious skin diseases associated with DM, pruritus was the main complaint in 90 (60.0%) patients while perforating dermatosis was the least common Table II. A total of 113 cutaneous infections were encountered and the majority 108(95.6%) was fungal infection, mainly candida, while the remaining five infections were viral three and bacterial two. All 16 patients with cutaneous disorders due to a diabetic complication had a diabetic foot ulcer. The prevalence of skin manifestations in DM patients is estimated to range from 20 to 50%^{19,20}. The rate of dermatological manifestations (48.8%, 39/80) in this study is similar to that reported in other studies. Previous reports showed that about 5-10% of patients had bacterial infections^{17,20}. In this study 2(5.1%) patients had bacterial infections. In present study showed that no significant association was observed between presence of dermatological manifestations with age, sex, educational level, socioeconomic status, residence ($p>0.05$). Duration of diabetes mellitus was significant associated with the presence of dermatological manifestations ($p=0.001$). Similarly Kiprono et al.¹⁸ observed no significant association between the development of cutaneous disorders and disease factors such as the gender, the age, the duration of DM and the type of DM. The association of cutaneous manifestation with these factors have been inconsistently reported^{16,20}. Although this study did not show association, cutaneous manifestations of DM generally appear after development of the disease and the duration of DM determines the risk of development of diabetic complications^{16,20}.

Conclusion:

The spectrum of skin manifestations due to DM in this study population is similar to that in other parts of the world. Primary non-infectious skin conditions associated with DM are common. Diabetic dermopathy, Pruritus and fungal infections are the most common cutaneous manifestations in DM patients. The presence of skin manifestations (which are easily visible) can heighten the suspicion for DM enabling early diagnosis of DM and thus be very well taken as a clinical marker for DM.

Conflict of Interest: None.

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Study of Changes in Serum Calcium Level during Postmenopausal Period of Women in Bangladesh

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Abstract

Introduction: The study was designed to evaluate the serum calcium levels may be altered in postmenopausal women.

Materials and Methods: This case control study was carried out in the Department of the Biochemistry, Mymensingh Medical College, Mymensingh, from January 2015 to December 2015. The subjects were selected on the basis of inclusion and exclusion criteria by purposive (non-random) method. This study included 50 postmenopausal women as case. **Results:** The results were compared with 50 apparently healthy premenopausal women as control. All statistical analysis was done by SPSS windows package. The values were expressed as Mean $\pm$ SD. Statistical significance of difference between two groups were evaluated by using student's unpaired t-test. Serum calcium level was analyzed. Serum calcium was determined by using colorimetric method. The mean value of serum calcium was 8.59 ± 1.02 (mg/dl) respectively in group B (Case) and 6.36 ± 1.06 (mg/dl) in group A (Control). The levels of serum calcium was significantly decreased in group B. **Conclusion:** Menopause has an effect on serum calcium which leads to increased risk of development of osteoporosis. The present study may facilitated the clinicians and gynecologists to update their knowledge in regard to serum calcium level of women associated with menopause.

Key words: Serum calcium, post menopausal women.

Number of Table: 01; Number of References: 13, Number of Correspondences: 04.

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Introduction:

The menopause is a period of decreasing ovarian function and diminished estrogen level, followed by cessation of menstruation. The term 'peri-menopause' includes the period immediately before the menopause (when the endocrinologic, biologic, and clinical features of approaching menopause

commence) and the first year after menopause. The term 'peri-menopause' includes the period immediately before the menopause and the first year after menopause. The term 'menopausal transition' include the period before the final menstrual period when variability in the menstrual cycle is usually increased and has been applied to the part of the peri menopause that ends with the final menstrual period (FMP). Premenopause is often used either to refer to the 1 or 2 years immediately before the menopause or to refer to the whole of the reproductive period before the menopause. Induced menopause is defined as the cessation of menstruation that follows either surgical removal of both ovaries (with or without hysterectomy) or iatrogenic ablation of ovarian function (e.g. by chemotherapy or radiation).

Calcium is an important mineral component in our diet. 99% of Calcium in the human body is distributed in the skeleton 1% which is extra skeletal, is present in every cell in the body, and in the extracellular fluid (ECF). Ionized Calcium concentration in the ECF is 4.8% mg/dl and total calcium is approximately double. Serum calcium is maintained within a narrow normal range, chiefly by resorption from the skeleton and alteration of urinary calcium loss and absorption from gut¹. The secretion of parathormone affects these changes when ECF calcium is sensed to be low by the calcium receptor in the parathormone gland².

The decreased level of serum calcium in postmenopausal women is due to lack of oestrogen and with the advancement of age. The postmenopause is associated with a fall in calcium absorption, which is only in part attributable to a fall

in calcitriol levels³. Dr. Menopause and aging is associated with accelerated loss of cortical bone. Bone loss occurs when the balance between formation and resorption is upset and resorption is excessive resulting in a negative remodeling balance^{4,5}. Despite its seemingly static appearance, bone is remarkably labile tissue and bone turnover is a dynamic process which increase in postmenopausal period as consequence of oestrogen deficiency⁶. Adverse changes in plasma calcium due to oestrogen deficiency have been implicated in the incidence of osteoporosis in postmenopausal women⁷. This is in accordance with the findings^{4,8,9} who also reported lower levels of serum calcium in postmenopausal women. Ageing and menopause, which lead to decline in oestrogen and progesterone production has been implicated in the decreased levels of calcium in postmenopausal⁴.

In this study, estimation of serum calcium of postmenopausal women and to compare with the apparently healthy premenopausal women has been made.

Materials and Methods:

This study was carried out at the department of biochemistry, Mymensingh Medical College and the subjects were collected from the outpatient department (OPD), Mymensingh Medical College Hospital, Mymensingh during the period of January 2015 to December 2015. A total of 100 subjects were studied. Finally the subjects of this study were included on the basis of inclusion and exclusion criteria. With all aseptic precautions 5 ml of blood was collected with a disposable syringe by ante-cubital venepuncture. Then blood is kept in testube for centrifugation at 3000rpm for 30 minutes. The serum obtained by centrifuging were kept in eppendorf after proper labeling. To avoid diurnal variations, samples were collected from 8AM-9AM after overnight fast. Serum calcium was determined by colorimetric method.

Statistical analysis:

All statistical analysis was done by using Statistical Package for Social Science (SPSS) using version 20.

Results:

A total of 100 subjects were included in the present study. Subjects were classified into group A (Control) and group B (Case). Group B comprising of (n = 50) postmenopausal women aged between 45-55 years served as case. Group A comprising of (n = 50) apparently healthy women aged between 30-40years served as control. The mean value of serum calcium was 8.59 ± 1.02 (mg/dl) in group B(Case) and 6.36 ± 1.06 (mg/dl) in group A(Control). The mean serum calcium was significantly decreased in group B (Case) when compared to that in group A (Control).

Table-I: Serum calcium level of the study subjects.

Biochemical variables	Group A (Control, n = 50)	Group B (Case, n = 50)	P value
	Mean $\pm$ SD	Mean $\pm$ SD	
Serum calcium (mg/dl)	8.59 ± 1.02	6.36 ± 1.06	< 0.001**

P value less than 0.05 taken as level of significance.

SD = Standard deviation

** = Highly significant

Discussion:

The present study was done to observe the various changes of serum calcium level in postmenopausal women compared with premenopausal women. Related medical history and clinical information of the subjects were taken by questionnaires from all the individuals included in this study.

In this study, serum calcium level in group B (Case) was significantly lower compared to group A (control). This finding is supported by the studies of^{10,11}; Nordin et al in 1989¹²; The decreased level of serum calcium in postmenopausal women is due to lack of oestrogen and with the advancement of age. The postmenopause is associated with a fall in calcium absorption, which is only in part attributable to a fall in calcitriol levels³. Menopause and aging is associated with accelerated loss of cortical bone. Bone loss occurs when the balance between formation and resorption is upset and resorption is excessive resulting in a negative remodeling balance^{4,5}. Despite its seemingly static appearance, bone is remarkably labile tissue and bone turnover is a dynamic process which increase in postmenopausal period as consequence of oestrogen deficiency⁶. Adverse changes in plasma calcium due to oestrogen deficiency have been implicated in the incidence of osteoporosis in postmenopausal women (Recker et al, 1998)⁷. This is in accordance with the findings of^{4,8,9} who also reported lower levels of serum calcium in postmenopausal women . Ageing and menopause, which lead to decline in oestrogen and progesterone production has been implicated in the decreased levels of calcium in postmenopausal women⁴. However, contrary to this finding, higher calcium in postmenopausal women was reported by^{9,13}. Heterogeneity of older adults, variabilities in body chemistry and their unique rate of ageing may be responsible for the disparity in these results.

Conclusion:

Menopause has an effect on serum calcium which leads to increased risk of development of osteoporosis. The present study may facilitated the clinicians and gynecologists to update their knowledge in regard to serum calcium level of women associated with menopause

Conflict of Interests: None.

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Determinants of Male Infertility among Married Couples in a Tertiary Hospital in Bangladesh

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Abstract:

Introduction: Infertility may be defined as a lack of conception after 1 – 2 years of unprotected coitus. In a normal population approximately 60 % of couples will achieve pregnancy within 6 months, 80 % by 12 months, and 90 % by 18 months leaving approximately 10 % of couples arbitrarily classified as infertile. A general classification of causes of infertility are male 35 – 40 %, female 40 – 50 %, sexual 10 % and unknown 10 %. **Objective:** To see the determinants of male infertility among the infertile couples who attending the outpatient department of infertility unit of the department of obstetrics and gynaecology of Bangabandhu Sheikh Mujib Medical University, Shahbag, Dhaka.

Materials and Methods: This prospective observational study was conducted in the Infertility unit, Department of Obstetrics and Gynaecology, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, during the period from 31.10.2016 to 21.03.2018. 500 infertile male patients were recruited from the out-patient department of infertility unit who came to take treatment for their infertility problem. They were analyzed by data collection sheet and the results were plotted in the table. **Result:** The socio-demographic characteristics of the study subjects (n = 500). Husbands age group was 22 -55 in years, Mean $\pm$ SD (34.0 $\pm$ 5.9). Educational level of male partners was, no education = 5 (1.0%), primary = 27 (5.4%), secondary = 152 (30.4%), graduate = 148 (29.6%), postgraduate = 74 (14.8%), Others = 94 (18.8%). Occupation of male partners was, unemployed = 6 (1.2%), service = 356 (71.2%), business = 138 (27.6%). Diabetes: In male = 28 (5.6%). Mumps: In male = 7 (1.4%). Chicken pox: In male = 18 (3.6%). Hypertension: In male = 10 (2.0%). Orchitis: In male = 6 (1.2%). Personal history of husband: Smoking = 129 (25.8%). In male patients, Testosterone level normal (10 – 30 nmol/L) in 133 (26.6%) patients and above normal (>30 nmol/L) in 367 (73.4%) patients. The semen analysis of the husbands of the infertile female patients. In quality of semen poor (<4%) in 305 (61%) patients. Regarding semen quality, oligospermia (<15 million/ml) was in 480 (96%) patients and azospermia (0% count) in 20 (4%) patients. In case of motility of sperms, rapid linear below normal (<50%) was in 90 (18%). In case of slow linear (SL), below normal (<15%) in 324 (64.8%) patients. In case of morphology of sperms, below normal (<14million/ml) in 25 (5%) patients.

Conclusion: This study shows a significant percentage of male are suffering from infertility. There is considerable association of determinants of infertility among the male partners.

Keywords: Male Infertility, Determinants, Semen abnormality.

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Introduction:

Infertility is defined as the inability to conceive at least 1 year after regular and unprotected sexual intercourse^{1,2}. The prevalence of infertility differs from one country to another^{2,3,4}. This is reported to range from 5 to 30% in various countries⁴. As estimated by the World Health Organization (WHO), 60–80 million couples are currently suffering from infertility⁵. Infertility affects approximately 15 % of couples. Roughly 40 % of cases involve a male contribution or factor, 40 % involve a female factor, and the remainder involves both sexes⁶. Infertility may be primary or

secondary. Primary infertility means if the couple has never conceived despite unprotected coitus for two years. Secondary infertility means if the couple fails to conceive following a previous pregnancy, despite unprotective coitus in the absence of contraception, breastfeeding or postpartum amenorrhoea for a period of two years. Other determinants of indirect causal factors of infertility include anaemia, malnutrition, poverty and tuberculosis. Reproductive health problems like sexually transmitted diseases (STD), urinary tract infections (UTI), reproductive tract infections (RTI), unhygienic delivery, postpartum infection and unsafe obstetric and abortion procedures are linked to sepsis and pelvic infections, which can cause infertility⁷.

Infertility among the married couples of reproductive ages is an emerging problem in Bangladesh. The effects of infertility for couples who are unable to conceive can be devastating in our society and can cause anxiety, depression and psychological stress. Male infertility accounts for another third of the infertility cases. Factors relating to the male infertility are: (a) Pretesticular causes (i) Endocrine problems, i.e. diabetes mellitus, thyroid disorders; (ii) Hypothalamic disorders, i.e. Kallmann syndrome, Hyperprolactinaemia; (iii) Hypopituitarism; (iv) Hypogonadism due to various causes; (v) Psychological factors; (v) Drugs, alcohol. (b) Testicular factors (i) Genetic defects on the chromosome Y and chromosome microdeletions; (ii) Abnormal set of chromosomes, i.e. Klinefelter syndrome; (iii) Neoplasm, i.e. Seminoma; (iv) Idiopathic failure; (v) Cryptorchidism; (vi) Varicocele; (vii) Trauma; (viii) Hydrocele; (ix) Mumps; (x) Testicular dysgenesis syndrome. (c) Post testicular causes (i) Vas deferens obstruction; (ii) Infection, i.e. prostatitis; (iii) Retrograde ejaculation; (iv) Hypospadias; (v) Impotence⁸⁻¹¹. Some causes male infertility can be determined by analysis of the ejaculate, which contains the sperm. The analysis includes counting the number of sperms and measuring their motility under a microscope: (a) producing few sperm, oligospermia, Or no sperm, azoospermia, and (b) a sample of sperm that is normal in number but shows poor motility, or asthenozoospermia¹². Smoking has well-known adverse impact on pregnancy outcome, and evidence strongly suggests that fertility is lower in both men and women who smoke. An active approach to prevention of infertility is justified, discouraging smoking and helping those who smoke to quit¹¹. Radiant heat or heavy metal exposure in men causes semen abnormalities. Exposure to herbicides or fungicides in women has been associated with decreased fertility¹². This study therefore, aims to assess the determinants of infertility in male partners of married couples of reproductive age and create awareness about the infertility problems.

Materials and Methods:

This study was the prospective observational study which was conducted in the Infertility unit, Department of Obstetrics and Gynaecology, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, during the period from 31.10.2016 to 21.03.2018 Bangabandhu Sheikh Mujib Medical University (BSMMU), is a tertiary hospital, where patients of infertility come from different parts of the country, and most modern treatment and management are given for the infertile couples. 500 infertile couples were recruited from the out-patient department of infertility unit who came to take treatment for their infertility problem either primary or secondary. All the study subjects were informed about the study. Ethical clearance was achieved from the Infertility unit, Department of Obstetrics and Gynaecology, Bangabandhu Sheikh Mujib Medical University (BSMMU). 500 female partners were analyzed by data collection sheet and the results were plotted in the table. After collecting the data, it was analyzed by appropriate statistical methods using Statistical package for Social Sciences (SPSS) software programme.

Results

Table I: Socio-demographic characteristics of the study subjects (n=500)

Socio-demographic characteristics	No of patients	Percentage (%)
Age of the participants		
18-20	32	6.4
21-25	198	39.6
26-30	152	30.4
31-35	83	16.6
36-40	31	6.2
41-45	4	.8
Mean±SD (range: min-max)	27.1±5.2 (18 – 44 years)	
Range		
Husband's age group (in years)		
21-25	14	2.8
26-30	166	33.2
31-35	160	32.0
36-40	103	20.2
41-45	42	8.4
46-50	10	2.0
51-55	5	1.0
Mean±SD (range: min-max)	34.0±5.9 (22 – 55) years	
Range		
Educational level of female partner		
Not education	8	1.6
Primary	49	9.8
Secondary	247	49.4
Graduate	87	17.4
Postgraduate	54	10.8
Other	55	11.0
Educational level of male partner		
Not education	5	1.0
Primary	27	5.4
Secondary	152	30.4
Graduate	148	29.6
Postgraduate	74	14.8
Other	94	18.8

Socio-demographic characteristics	No of patients	Percentage (%)
Occupation of female partner		
Housewife	395	79.0
Service	103	20.6
Business	2	.4
Occupation of male partner		
Unemployed	6	1.2
Service	356	71.2
Business	138	27.6

Table I shows the socio-demographic characteristics of the study subjects (n = 500). Husbands age group was 22 -55 in years, Mean $\pm$ SD (34.0 $\pm$ 5.9). Educational level of male partners was, no education = 5 (1.0%), primary = 27 (5.4%), secondary = 152 (30.4%), graduate = 148 (29.6%), postgraduate = 74 (14.8%), Others = 94 (18.8%). Occupation of male partners was, unemployed = 6 (1.2%), service = 356 (71.2%), business = 138 (27.6%). Regarding religion, Muslims were 476 (95.2%), others were 24 (4.8%). Monthly income of the infertile couple were in taka, < 10000 = 52 (10.4%), 10000 – 20000 = 188 (37.6%), 20000 – 40000 = 212 (42.4%), > 40000 = 48 (9.6%). Area of residence: urban 176 (35.2%), rural = 310 (62.0%), slum = 14 (2.8%).

Table-II: Type of infertility of the study subjects (n=500).

Type of infertility		
Primary	299	59.8
Secondary	201	40.2
Total	500	100.0

Table II shows the type of infertility of the study subjects (n = 500): Primary infertility = 299 (59.8%), secondary infertility = 201 (40.2%).

Table-III: Duration of marital life of the infertile couples (n=500)

Duration of marital life (years)	No of patients	Percentage (%)
<5	225	45.0
5-10	164	32.8
10-15	77	15.4
15-20	31	6.2
>20	3	.6
Total	500	100.0

Table III shows the duration of marital life (in years) of the infertile couples: < 5 years = 225 (45.0%), 5 – 10 years = 164 (32.8%), 10 – 15 years = 77 (15.4%), 15 – 20 years = 31 (6.2%), > 20 years = 3 (0.6%).

Table-IV: Medical history of the couple (n=500)

Medical history of couple	Female partner No. (%)	Male partner No. (%)
Diabetes	18 (3.6%)	28(5.6%)
Mumps	1(0.2%)	7(1.4%)
Chicken pox	35(7.0%)	18(3.6%)
Hypertension	12(2.4%)	10(2.0%)
Chemotherapy	0(0.0%)	1(0.2%)
Tuberculosis	2(0.4%)	3(0.6%)
Hypothyroidism	38(7.6%)	3(0.6%)
Allergy	5(1.0%)	1(0.2%)
Radiation	0(0.0%)	1(0.2%)
Orchitis	0(0.0%)	6(1.2%)

Table IV shows the medical history of the couple (n = 500). Diabetes: In male = 28 (5.6%). Mumps: In male = 7 (1.4%). Chicken pox: In male = 18 (3.6%). Hypertension:

In male = 10 (2.0%). Tuberculosis: In male = 3 (0.6%). Orchitis: In female = 0 (0.0%), in male = 6 (1.2%). In male patients, Testosterone level normal (10 – 30 nmol/L) in 133 (26.6%) patients and above normal (>30 nmol/L) in 367 (73.4%) patients.

Table- V: Semen analysis of husbands (n=500)

Semen analysis (husbands)	No of patients	Percentage (%)
Semen type		
Intermediate (4-14%)	195	39.0
Poor (<4%)	305	61.0
Semen count		
Normal (15-20)	96	19.2
Above normal (>20)	404	80.8
Semen analysis		
Oligospermia (<15 million/ml)	480	96.0
Azoospermia (0%)	20	4.0
Rapid linear (RL)		
Normal (50- 60)	408	81.6
Above normal (>60)	2	.4
Below normal (<50)	90	18.0
Slow liner (SL)		
Normal (15-20)	125	25.0
Above normal (>20)	51	10.2
Below normal (<15)	324	64.8
Non propagative (Np)		
Normal (0-10)	439	87.8
Above normal (>10)	61	12.2
Morphology		
Normal (14-50)	72	14.4
Above normal (>50)	403	80.6
Below normal (<14)	25	5.0

Table V shows the semen analysis of the husbands of the infertile female patients. In quality, semen type was intermediate (4-14%) in 195 (39%) patients and poor (<4%) in 305 (61%) patients. Regarding semen count, normal (15-20 million/ml) was in 96 (19.2%) patients and above normal (>20 million/ml) was in 404 (80.8%) patients. Regarding semen quality, oligospermia (<15 million/ml) was in 480 (96%) patients and azospermia (0% count) in 20 (4%) patients. In case of motility of sperms, rapid linear (RL), normal (50-60%) in 408 (81.6%) patients, above normal (>60%) was in 2 (0.4%) patients and below normal (<50%) was in 90 (18%). In case of slow linear (SL), normal (15-20%) in 125 (25%) patients, above normal (>20%) was in 51 (10.2%) patients and below normal (<15%) in 324 (64.8%) patients. Regarding non propagative (NP), normal (0-10%) in 439 (87.8%) patients and above normal (>10%) was in 61 (12.2%) patients. In case of morphology of sperms, normal (14-50 million/ml) in 72 (14.4%) patients, above normal (>50 million/ml) in 403 (80.6%) patients and below normal (<14million/ml) in 25 (5%) patients.

Discussion:

Our study attempted to assess the determinants of male infertility among the married couples who were attending

the infertility outpatient department of Bangabandhu Sheikh Mujib Medical University, shahbag, Dhaka. Socio-demographic characteristics of the married couples attending the infertility outpatient department are one of the determinants affecting fertility. Rural residents 310 (62%) are more sufferer of infertility than urban 176 (35.2%) ones. Among the determinants of male infertility are: age, smoking, obesity, alcohol and caffeinated beverages consumption, stress, electronic devices, scrotal temperature, some drugs. Our findings of male infertility corresponds with the findings of Mahat et al.⁸. Besides, some structural factors of male genital tract, like varicocele, endocrine disorders, male reproductive tract infection, ejaculatory disorders, immunological factors, genetic and chromosomal defects also cause male infertility. One of the main causes of male infertility is semen quality. In our study, semen analysis shows normozoospermia and oligospermia together 96% and azoospermia 4%, motility 81.6%, which corresponds to the study of Nigeria⁹. Bhattacharya et al., 2009; also shows the male factors of infertility which also corresponds to our study results¹⁰. One study conducted by Farhi and Ben-Haroush et al., 2011; also shows the similar results of male infertility like ours one¹¹. Seminal fluid abnormalities among male partners of infertile couples in this study correspond to the study of male partners of Owolabi et al. 2013. Ile-Ife, Nijeria¹².

Conclusion:

In our study we have found a significant percentage of male are suffering from infertility, both primary and secondary. Male partners of the couples shows the major determinants of infertility are partly hormonal, structural abnormalities of male genitalia, infection of genital tract, abnormal sperms in the semen and partly psychological. These causes or determinants of infertility of male partners can be overcome by treatment and counseling which are available in this tertiary hospital.

Conflict of Interest: None.

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Management of Uncommon Presentation of Chronic Osteomyelitis of Humerus Using Ilizarov Technique in a 2 Years Old Child: A Case Report

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Abstract

Introduction: Chronic osteomyelitis is a surgical disease that can require significant dedication from both patient and surgeon to eradicate. Treatment requires isolation of pathogen, significant debridement for removal of all infective and necrotic material, then bony and soft tissue reconstruction. **Objective:** We shall try to highlight the option of management of a pan-Diaphyseal osteomyelitis of a children in the new era of osteosynthesis by Ilizarov.

Discussion: A two years old baby presented to us with the H/O chronic discharging sinus and arm sling for around 3 months. After clinical history taking and examination, radiography and pus testing (C/S) and sequestrum and pathological fracture was the identifying points we took the plan for exploration curettage and drainage. Finally we fix the arm by Ilizarov osteosynthesis for more than 3 months. The wound healed and osteomyelitis resolved.

Conclusion: Use of Ilizarov osteosynthesis for fixation and wire tension effect to resolve the infection^{1,2}.

Key words: Chronic Osteomyelitis, Humerus, Ilizarov Technique.

Number of References: 10; Number of Correspondence: 03.

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Introduction:

The term osteomyelitis was first used by French surgeon. Edouard Classignac in 1852. Correct incidence is 1/5000 in the developing countries³ injury or trauma is the most common etiology in children and adult. Sometimes infection or trauma affects the whole length of bone, if the patients immunity is depressed, the organism is very virulent or the operation or trauma affecting the whole length of the bone. It was not until the last 25 years that treatment of chronic osteomyelitis significantly advanced with the use of muscle flap, vascularized of bone transfer to manage large open defect after debridement. Further advancement have included antibiotic beads to manage dead space in staged reconstruction and the use of external fixator in the Ilizarov technique for skeletal reconstruction. These advancement have to led to increased success in the management of chronic osteomyelitis with success rate >90% in the literature. Academician professor Ilizarov said, in chronic osteomyelitis the tiny cavity by are filled with Infective organisms around the large fixed focus^{3,4,5,6,7,8}. The small cavities are the causes of recurrence. With the Ilizarov fixator, if you want, you can fill this gap by bone transport. The very big advantages of Ilizarov method is that one can simultaneously correct deformity and we can get excellent stability by inserting bio-compatible thin wire and securing it with the rings. Ilizarov fixator also eradicate infection by inducing huge inflammation by the tension of the Ilizarov wire. Decreased blood flow diminishes the healing capacity as a left as a rest of trauma causing thrombosis of vessels surrounded by the infected area.

Antibiotic cannot penetrate through the infected necrotic area and sequestrum produces an area of lowered vascularity. Resistance of organism to antibiotics organism from a

biofilm around the sequestrum or implant after inadequate surgical debridement^{9,10}.

CASE REPORT:

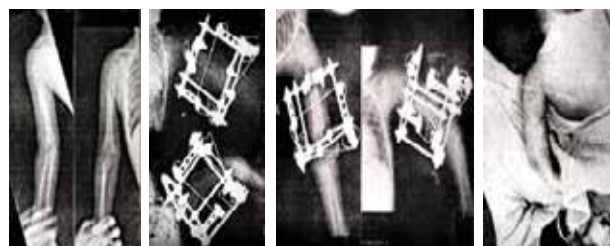
A 2 yrs old male baby hailing from Shahporan, Sylhet, presented to the out patient department with the complaints of swelling and discharging sinus from Left arm for 2 months. He had history of trauma over his Left arm 3 months back and primarily he is treated by traditional healer. After development of discharging sinus he was taken to a general practitioner, who prescribed some medication as well as as daily dressing of the wound with the condition of the wound worsening and child's overall health deteriorating he was eventually referred to our centre for further management.

The child was small built and appeared malnourished on examination of the affected limb, limb is swollen and discharging sinus present. Tenderness present on deep palpation associated with purulent discharge movement at the shoulder joint remained unaffected while elbow joint movement is slightly restricted.

A radiograph of the involved extremity was obtained which depicted a large sequestrum with features of thickening and sclerosis of humerus. There is no pathological fracture. Routine blood investigation were showed Hb:9.2gm, TLO-13800/cumm, ESR-55 mm of Hg, C-reactive protein was 10 mg/L.

A diagnosis of chronic osteomyelitis of the Left humerus was confirmed after clinical and radiological correlation patient was treated surgically with curettage, drainage and sequestrectomy followed by Ilizarov fixation under general anaesthesia, regular wound dressing and Ilizarov care done and secondary wound closure done after 3 weeks. Regular follow up and physiotherapy done and Ilizarov external fixator was removed after 3 months of application. He showed excellent recovery with overall healing of the wound with normalization of his blood parameters.

Radiological image:



Pre-operative x-ray of chronic osteomyelitis of Left humerus.

Post-operative x-ray of arm with Ilizarov external fixator

Final follow up after removal of Ilizarov fixator

Discussion:

Ilizarov technique serves four purposes:

1. To create a mechanical condition necessary for the development of distraction & compression
2. To store the new bone forming cells developed during

lengthening and deposited along the line of stress and tension.

3. Increase blood circulation for increased metabolic transformation of local tissue.

4. Most importantly the medullary and the periosteal blood supply is not disturbed.

Conclusion:

Chronic osteomyelitis in children with pan-diaphyseal osteomyelitis with discharging sinus can be treated by stable fixation of Ilizarov apparatus.

Conflicts of Interest: None.

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