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INSTRUCTIONS TO THE CONTRIBUTORS

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Manuscripts should be typed on one side of good quality paper, with margins of at least 25 mm and using double space throughout. Each component of the manuscript should begin on a new page in the sequence of title page, abstract, text, references, tables, and legend for illustrations. The title page should include the title of the paper, name of the author(s), name of the department(s) to which the work should be attributed. The text should be presented in the form of introduction, materials and methods, results and discussion. The authors should sign a covering letter mentioning that final manuscript has been seen and approved by all authors. The letter should mention the name of the person (with address and telephone number) responsible for negotiation concerning the manuscript.

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Discussion

Emphasize the new and important aspects of the study and the conclusion that follow from them. The detail data or other material given in the Introduction or the results section should

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For reference, use author number style (Vancouver) whice is based on ANSI standerd adapted by the National Library of Medicine (NLM). References should be number consecutively in the order in whice they are first mentioned in the text. The titles of journals should be abbreviated according to the style used in Index Medicues. If author's number is more then six then write "et al." after first one or two author's name.

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The editorial board reserves the customary right to style and if necessary shorten the material accepted for publication and to determine the priority and time of publication. Editorial board assumes that the research work is based on honest observations. It is not a task of the editorial board to investigate scientific fraud paper.

EDITORIAL

Osteoporosis: Diagnosis by Measuring BMD

Professor Dr. A. H. S. M. Kamruzzaman

Osteoporosis, defined as a skeletal disorder characterized by compromised bone strength predisposing to an increased risk of fracture, is a major public health problem throughout the world [1]. The social and economic burden of osteoporosis is increasing steadily because of the aging of the world population [2]. Women are more prone to have osteoporosis. World-wide, approximately 200 million women have osteoporosis [3].

Bone strength reflects the integration of 2 main features: bone density and bone quality [5]. Many factors contribute to the risk of osteoporotic fractures, all of which should be taken into account in the assessment of fracture risk in patients [4]. Normal bone turnover involves a balance between the processes of bone resorption and bone formation in which osteoclasts remove (resorb) bone by acidification and proteolytic digestion and osteoblasts secrete osteoid (organic matrix of bone) into the resorption cavity [5]. In postmenopausal women, the rate of bone turnover increases dramatically and remains elevated for up to 40 years after cessation of ovarian function, leading to continuous, progressive bone loss [6]. The basis for the increased bone turnover is thought to be due in part to a shortening of the lifespan of osteoblasts and a prolongation of the lifespan of osteoclasts.

The WHO established diagnostic criteria for osteoporosis on the basis of bone mineral density (BMD) T-scores [7]. The T-score describes the patient's BMD in terms of the number of SDs by which it differs from the mean peak value in young, healthy persons of the same sex. The WHO uses a threshold of 2.5 SDs below the mean of young adult women as the criterion for a diagnosis of osteoporosis.

BMD is the standard tool used to diagnose osteoporosis. Several methods of imaging have been developed to measure BMD, including dual-energy x-ray absorptiometry (DXA) and quantitative computed tomography (QCT). The WHO guidelines for the diagnosis of osteoporosis are based on DXA measurements of the hip or spine [7].

There are several ways to measure BMD. DXA is considered the gold standard of methods used to diagnose osteoporosis [8]. This test is capable of measuring bone mineral content at any site in the body but usually is used at central sites (the lumbar spine and the proximal femur) and peripheral sites, including the distal forearm [9]. This is accomplished by passing 2 beams of different energies through the bone at the site being measured [10]. A major advantage of DXA is that it exposes the patient to radiation levels approximately 90% less than a standard chest radiograph. The unit of measurement for bone density with the use of DXA is areal density (g/cm^2); however, BMD is reported as a T-score on the basis of this measurement. Peripheral DXA techniques analyze BMD at the distal radius and the calcaneus with high precision and low radiation exposure. Because these measurements are less useful in predicting the risk of fractures of the spine and proximal femur than spinal and hip DXA, a low BMD value obtained by periph-

eral techniques is not sufficient for a diagnosis or for making treatment decisions, but it does warrant further assessment. In addition, peripheral sites are less likely than central sites to show an increase in BMD in response to treatment.

The clinical consequences and economic burden of osteoporosis indicate a need for intervention in women at high risk. Many risk factors are associated with osteoporosis and fracture, including low-peak bone mass achieved during growth, hormonal factors, the use of certain drugs, cigarette smoking, low physical activity, low intake of calcium and vitamin D, race, small body size, and a personal or family history of fracture. All these factors should be taken into account when assessing the risk of fracture to determine which patients require further assessment and/or treatment.

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Original Article

Association of Obesity with Severity of COVID-19 Patients of Bangladesh

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Abstract

Introduction: COVID-19 has been declared as a global pandemic officially on March 11, 2020 by World Health Organization. Since then, it has become a great challenge to health-care systems. Studies have evaluated that, overweight and obesity may be associated with severity of COVID-19. **Aims and objectives:** The aim of the study was to find the association of obesity with severity of COVID-19. **Materials and methods:** It was a cross-sectional analytical study that was performed in the departments of Biochemistry of Sir Salimullah Medical College, Dhaka, Bangladesh and Satkhira Medical College, Satkhira, Bangladesh during the periods of July 2020 and December 2020. A total of 500 COVID-19 RT-PCR positive patients was included in this study. The clinical syndrome of COVID -19 was divided as mild, moderate, severe and critical case according to National Guidelines on Clinical Management of Coronavirus Disease 2019 of Bangladesh. Association of obesity with severity of COVID-19 was searched in this study. **Results:** Among the 500 study subjects 79.2% were sedentary workers and 35.8% were overweight and obese. Obesity was significantly associated with severity of COVID-19 with a *p* value of <0.001.**Conclusion:** Obesity is associated with severity of COVID-19.

Keywords: Obesity, COVID-19.

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Introduction

World Health Organization declared COVID-19 a global pandemic officially on March 11, 2020. COVID-19 caused by SARS-CoV-2 represents a great challenge to health-care systems as it is a rapid spreading and highly fatal disease [1]. After a rapid spread in China, new outbreaks occurred in Italy and in several European countries, followed by a spread to many countries in the world. The disease is primarily transmitted through large respiratory droplets and represents from asymptomatic or mild infection to severe form of disease [2]. Studies have shown that the clinical feature of COVID-19 may vary from fever, dry cough, dyspnea, and fatigue in mild cases to viral pneumonia and severe acute respiratory distress syndrome (ARDS) in more severe cases. It may even cause death [3]. As there is no specific treatment found to be effective for COVID yet, the management protocol of COVID is identified as early detection and symptomatic management. For this purpose, the clinical syndrome of COVID-19 is divided as mild, moderate, severe and critical case according to National Guidelines on Clinical Management of Coronavirus Disease 2019 of Bangladesh (DGHS, 2020).

Many studies have evaluated risk factors such as age, sex, chronic lung disease (e.g., COPD, chronic asthma), cardiovascular disease (e.g., heart failure, old MI, ASD, VSD), diabetes mellitus, hypertension may be related to COVID-19 complications. Studies have shown that, elderly males and person with cardiovascular diseases are more prone to adverse COVID-19 outcomes. In severe patients with COVID-19, respiratory failure can occur within a short time, even leading to death. Early data from Wuhan Hospital showed that 61.1% of patients in ICU had respiratory failure, 44.4% had arrhythmia, and 30.6% had a shock [4]. In addition, obesity is a major risk factor for many non-communicable disease and recent studies found that obesity associated risk factors is related with severe COVID-19 outcomes [5, 6].

In 2009, a significant percentage of hospital admission and mortality because of H1N1 Influenza, a virus infection was due to obesity. There might be a similar effect with novel COVID-19 infection. The Centers for Disease Control and Prevention has listed severe obesity at any age (body mass index [BMI] ≥ 40 kg/m²) as a high-risk condition for COVID-19. Social determinants of health, such as race/ethnicity, income level and education have been shown to be risk factors for COVID-19 [7].

Obesity and diabetes are established comorbidities for COVID-19. Adipose tissue shows high expression of ACE2 and with the help of this SARS- CoV-2 enters host cells. This makes adipose tissue a reservoir for SARS-CoV-2 viruses. The level of expression of ACE2 in adipose tissue is reported to be higher than in lung tissue. The expression of ACE2 receptors is the same for adipose tissue in obese and non-obese patients but the difference is in the mass of the adipose tissues that made patients with obesity more susceptible to the complications of COVID [8]. ACE2 on adipocytes have systemic effects on the cardiovascular system and there is an interaction between gender, adipocyte ACE2 and complications of obesity, e.g., hypertension [9].

Obesity is correlated with increased risk for pro-inflammatory and pro-thrombotic states as well as poor lung mechanics which are considered as poor prognostic factors in severe illness in COVID-19 outcomes. Among obese COVID patients, immunological and inflammatory alteration may enhance by excess mass of adipocytes as pro-inflammatory cascades are stimulated by increased mass of adipose tissue. Adipocytes in healthy adipose tissue are insulin-sensitive and nearly all immune cells such as resident macrophages, mast cells, monocytes, natural killer cells, B cells, T cells, neutrophils, and eosinophils have been found in adipose tissue. Obesity changes the composition, structure, and function of adipose tissue [10].

Due to excess intake of calorie, adipose tissue undergoes expansion. Expansion of adipocytes and inadequate vascularization lead to hypoxia, adipocyte apoptosis/necrosis and enhanced secretion of inflammatory adipokines such as cytokines, and chemokines. This causes a massive immune cell infiltration that further promotes inflammation [11].

The severe manifestation of COVID-19 is characterized by an uncontrolled excessive production of soluble inflammatory cytokines. This cytokine storm is characterized by highly increased levels of IL-6, TNF-α, IL-2, and IL-7 in patient blood [12].

The aim of the study was to observe the frequency of obesity and the pattern of severity of disease presentation by COVID-19 positive patients and to explore whether the pres-

ence of obesity increase the COVID patients' risk. Moreover, to the best of our knowledge, no such study was reported to be done in our country. So, this study is designed to evaluate the association of obesitywith severity of COVID-19 Patients of Bangladesh.

Materials and methods

It was a cross-sectional analytical study that was performed in the departments of Biochemistry of Sir Salimullah Medical College, Dhaka, Bangladesh and Satkhira Medical College, Satkhira, Bangladesh during the periods of July 2020 and December 2020. A total of 500 COVID-19 RT-PCR positive patients were included in this study. The clinical syndrome of COVID -19 was divided as mild, moderate, severe and critical case according to National Guidelines on Clinical Management of Coronavirus Disease 2019 of Bangladesh. Obesity was assessed by calculating BMI from height and weight of the study subjects. Association of obesity with severity of COVID-19 was searched in this study. Our research question was whether obesity was associated with severity of COVID-19.

Purposive convenient sampling was done. Sign symptoms of the subjects were defined as mild, moderate, severe and critical.

- Mild symptoms are addressed as fever, fatigue, cough (with or without sputum production), sore throat, nasal congestion, anorexia, malaise, or headache, diarrhea, nausea, and vomiting.
- Moderate symptom as pneumonia but no signs of severe pneumonia.
- Severe symptom as severe pneumonia presented as fever or suspected respiratory infection plus Respiratory rate > 30 breaths/min or severe respiratory distress or sepsis.
- Critical as presence of ARDS or septic shock.

Inclusion criteria:

COVID-19 positive patient with age between 30 to 59 years and both sexes.

Exclusion criteria:

Participants with a known case of

- Genetic diseases.
- Psychiatric disorders.
- Hematological disorders.

Results

Distribution of the study subjects on the basis of occupationis shown in table 1 that shows 79.2% of the study subjects were sedentary workers. Table 2 shows our 35.8% study subjects were overweight and obese. Table 3 shows the distribution of study subjects by clinical classification. Table 4 shows the association of obesity with disease severity (clinical classification) of COVID-19 patients which shows obesity is associated with severity of COVID-19 with a p value of <0.001 which was obtained by Chi squared test.

Table 1: Distribution of the study subjects by occupation (n=500)

Occupation	Frequency n (%)
Sedentary worker	396 (79.2)
Active worker	104 (20.8)
Total	500 (100)

Table 2: Distribution of the study subjects by BMI (n=500)

BMI (Kg/m²)	Frequency n (%)
<18.9	10 (2)
18.9-24.9	311 (62.2)
25.0-29.9	140 (28)
≥ 30	39 (7.8)
Total	**500 (100)**

BMI <18.9=Underweight, 18.9-24.9=normal, 25-29.9=overweight and ≥30=obese

Table 3: Distribution of the study subjects by clinical classification (n=500)

Clinical classification	Frequency n (%)
Mild	154 (30.8)
Moderate	229 (45.8)
Severe	108 (21.6)
Critical	9 (1.8)
Total	**500 (100)**

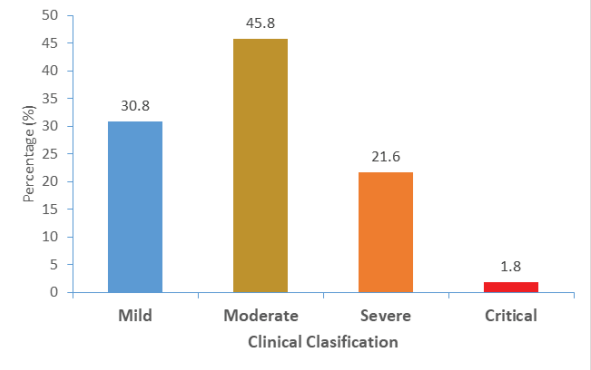

Figure 1: Bar diagram showing the clinical classification of the COVID-19 patients

Table 4: Association of obesity with disease severity (clinical classification) of COVID-19 patients (n=500)

	Clinical classification				
	Mild (n=154) n (%)	Moderate (n=229) n (%)	Severe (n=108) n (%)	Critical (n=9) n (%)	
Obesity	4 (2.6%)	22 (9.6%)	8 (7.4%)	5 (55.6%)	<0.001*

p value reached from Chi-square test, *significant

Discussion

COVID-19 infection is not controlled so far. So, control of comorbidity is one of the main aim to lead a better life and keep ourselves away from the highly contagious disease. And all the comorbid diseases are linked to obesity at some point. So, the aim of the study was to observe the association of obesity with the severity of disease presentation by COVID-19 positive patients and to explore whether the presence of obesity increase the COVID patients' risk. So, we have done a cross-sectional analytical study that was performed in the departments of Biochemistry of Sir Salimullah Medical College, Dhaka, Bangladesh and Satkhira Medical College, Satkhira, Bangladesh during the periods of February 2021 and June 2021. A total of 500 COVID-19 RT-PCR positive patients was included in this study. The clinical syndrome of COVID -19 was divided as mild, moderate, severe and critical case according to National Guidelines on Clinical Management of Coronavirus Disease 2019 of Bangladesh. Association of obesity with severity of COVID-19 was searched in this study.

We found 79.2% of our study subjects doing sedentary work (table 1). In their study Chen N et al. 2020 showed only 2% of their study subjects were active worker. We found our 35.8% study subjects with overweight and obese (table 2).Bello-Chavolla OY et al. 2020 also found majority of their patients with obesity.

We had most of our patients with moderately ill with COVID-19 (table 3). Similar results were found in the studies of Muscogiuri G et al. (2020). We tried to divide our study subjects as mild, moderate, severe and critical according to National Guidelines on Clinical Management of Coronavirus Disease 2019 of Bangladesh. We found the association of obesity with severity of COVID-19 with a *p* value of <0.001 which was obtained by chi squared test (table 4). All these diseases were linked together at

some point with obesity. In their study, Bello-Chavolla OY. et al. (2020) found risk factors for lethality in COVID-19 with early-onset diabetes, obesity, chronic obstructive pulmonary disease, advanced age, hypertension, immunosuppression, and chronic kidney disease (CKD). They also observed that obesity mediates 49.5% of the effect of diabetes on COVID-19 lethality.

Though our study has a few limitations. It was conducted in a limited population. In addition, this study had no control group, and the findings may not be generalizable to other populations.

Conclusion

In conclusion, the findings of the present study suggest that, severity of COVID-19 is associated with obesity.

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Original Article

Atherosclerotic Risk Estimation among Apparently Healthy Adult Individuals

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Abstract

Introduction: Coronary risk factors have become a major health problem in South Asians, despite low fat intake and low rates of obesity. To prevent and control the premature occurrence of cardiovascular events and other atherosclerotic disorders among the apparently healthy adult individuals of our population, the magnitude, frequency and pattern of dyslipidemia and their cardiovascular risks must be known. **Methods:** This cross sectional observational study was conducted in the department of Biochemistry and Molecular Biology, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh from August 2019 to July 2020. 643 Adults over 20 years of both sexes who were apparently healthy were enrolled for this study. Anthropometric measurements, Lipid biomarkers and blood sugar profile were evaluated. **Results:** Female below 40 years bear lowest risk of atherosclerotic cardiovascular disease (ASCVD) events and there is no high risk female among all (n=322) participants. Their risk level increases after 40 years (11.11% intermediate risk) and peaked above 60 years (61.29% intermediate risk). Male bear high risk of atherosclerotic cardiovascular disease (ASCVD) events above 40 years (1.75%) which peaked above 60 years (26.47%). Chi square test shows the p value <.0001which is statistically significant. **Conclusions:** These results highlight the extensive need for routine screening programs for blood lipid levels of our adults early and frequently even they are apparently healthy.

Key words: Atherosclerosis, Cardiovascular diseases.

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Introduction

Cardiovascular disease constitutes a major public health problem worldwide. The clinical events of cardiovascular disease (CVD) are end points of gradual progression of atherosclerosis. Atherosclerosis begins in childhood and progresses during adolescence and young adulthood to result in lesions that cause clinically manifest coronary heart diseases in middle aged and older individuals [1]. The lifetime risk of CVD is substantial [2] 0and the condition is often silent or may strike without warning, underscoring the importance of prevention. When diagnosing dyslipidemia, clinicians should estimate a patient's cardiovascular risk. Risk assessment guides clinicians' decisions on treatment for primary prevention. Despite major advances in treatment of ischemic heart disease (IHD) patients, a large number of victims of the cardiovascular disease who are apparently healthy die suddenly without prior symptoms. Available screening and diagnostic methods are insufficient to identify the victims before the event occurs. The first detectable clinical manifestation of atherosclerosis is often a clinical event: a stroke or myocardial infarction (MI).

According to the INTERHEART study, Bangladeshis were found to have the highest preva-

lence of CAD risk factors among the South Asian populations [3]. Primary prevention in terms of risk stratification is pivotal in order to accurately determine and intervene early in the natural history of disease. One goal in risk factor research is to move ever closer to the proximal direct causes of disease [4]. Treatment is most beneficial for patients with the highest risk. Calculation of risk using specific equations is more accurate than using lipid levels alone or simply counting risk factors. It is widely recognized that CVD risk factors cluster and interact multiplicatively to promote vascular risk [5]. This knowledge led to the development of multivariable risk prediction algorithms incorporating those risk factors that can be used by primary care physicians to assess in individual patients the risk of developing all atherosclerotic CVD or specific components of CVD, i. e, coronary heart disease, stroke, peripheral vascular disease, or heart failure. Although risk-scoring systems that evaluate 'traditional' risk factors such as lipids, hypertension, diabetes, and smoking greatly improve risk prediction, multiple studies demonstrate that 20% to 25% of all future events occur in individuals with only 1 of these factors. Moreover, the prevalence of traditional risk factors is almost as high in those without disease as in affected individuals [6].

CVD risk prediction tools estimate the probability of having a cardiovascular (CV) event within a defined timeframe, based upon the levels or presence of known risk factors. CV risk is estimated as either absolute (CV risk prediction for a given future period,5-10 years), relative (Ratio of CVD risk to a low-risk age- and sex-matched comparison group), lifetime (Risk prediction beyond 10 years), or recurrent (The chance that an event that has been treated will occur).

Multiple risk models for the prediction of cardiovascular risk of individual patients have been developed. The 10-year risk of a coronary event (high, intermediate, or low) can be determined by detailed assessment using one or more of the following tools: the Framingham Risk Score (2002), MESA 10-year ASCVD Risk with Coronary Artery Calcification Calculator, Reynolds Risk Score, the ACC/AHA Arteriosclerotic Cardiovascular Disease Risk Estimator, and the UKPDS risk engine (2017). Among these, the Framingham Risk Score, developed based on the Framingham Heart Study (data obtained from 2,439 white men and 2,812 white women, ranging from 30 to 74 years of age) was a great leap forward [7]. Multiple predictive CVD risk score calculators were developed from this study. The Reynolds risk score was developed in women alone and its transportability to other samples or its exchangeability for disease-specific profiles is unknown [8]. UKPDS risk engine to calculate ASCVD risk in individuals with type 2 Diabetes Mellitus (T2D). The Framingham CHD risk assessment tool has been validated in whites and blacks in the United States [9] and in Europe [10]. Many studies in the US and Europe have shown that Framingham risk factors overestimate the risk of CAD in Hispanics and northern Europeans, and some Asians (Japanese, Chinese) [11-13]. Study of South Asians in the UK by the European SCORE (Coronary Risk Systematic Evaluation) showed relatively low 10 year risk when compared with the Framingham model [14]. Investigators from the United Kingdom was developed the second risk score (ASSIGN; ASsessing cardiovascular risk using SIGN guidelines to assign potential patients to preventive treatment) by using 12 000 individuals from the Scottish Heart Health Extended cohort, also incorporated family history and deprivation but performed marginally better than the older Framingham CVD risk functions [15]. FRS is transportable (with calibration) to culturally diverse populations in Europe, the Mediterranean region, and Asia [16].

As the prevalence of risk varies between ethnic groups, there is a need for population specific risk estimations. The CAD rates among Asian Indians worldwide are 50% to 400% higher than people of other ethnic origin and at least 4 times that of Caucasians [17]. Asian Indians, compared with other subpopulations, are at more risk for developing CAD and Diabetes at a younger age-approximately 10 years [18]. No predictive CVD risk score is currently available for the Indians as well as for the Bangladeshis considered to be a high-risk population.

While several studies have claimed to improve on the FRS, there is little evidence for any improved prediction beyond the Framingham risk score [19]. Recently there has been particular interest in using C-reactive protein levels to guide the use of statins. Compared with the use of Framingham or other global CHD risk calculation tools alone, there is little evidence that the use of C-reactive protein levels leads to improved outcomes or better cost-effectiveness [20].

The Framingham formulation for predicting coronary heart disease (CHD) was incorporated into the Third Report of the Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III). Considering all above conditions, this study had followed the global risk approach based on Framingham risk score that allows more accurate estimates of risk to guide clinical primary prevention efforts. The variables used for risk score computation are gender, age, total cholesterol, HDL cholesterol, systolic blood pressure (SBP), diastolic blood pressure (DBP), diabetes mellitus (DM), and smoking. A Global risk of coronary heart disease is a calculation of the absolute risk of having a coronary heart disease event (e.g., death, myocardial infarction) over a specified period. Global CHD risk calculation has been proven superior to risk estimation by physicians [21]. Analyses of receiver operator characteristic curves (i.e., graphical techniques to assess the relative accuracy of different tests) have shown that in both men and women, global CHD risk calculation is better at predicting events than risk factor counting [22]. Thus, global CHD risk calculation can assist physicians in identifying patients at moderate to high risk who stand to benefit most from preventive pharmacotherapy. Thus, not only is the overall risk quantified, but the source of the risk can be identified for treatment. This allows for estimation of the total risk reduction that can be achieved by single interventions or by a combination of therapies [23].

Materials and methods

This observational cross sectional study was carried out in the Department of Biochemistry and Molecular Biology, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh during the period from August 2019 to July 2020. 322 adult males and 321 adult females were selected for the study from 643 interested apparently healthy adult individuals aged 20 years and above from employees of BSMMU, Dhaka, and their relatives. Normotensive, non-diabetic, non-alcoholic, nonmalignant and non-pregnant adult Individuals with no apparent illness (no known history of cardiovascular, renal, gastrointestinal, hepatic, psychiatric or endocrine diseases) were included in this study. Informed written consent was taken from each study subject. Sociodemographic data and behavioral risk factors data were collected using a pretested questionnaire. Anthropometric measurements, Lipid biomarkers, blood sugar profiles were evaluated. 10-year Predicted Risk of ASCVD Events among male and female participants were calculated using Global Coronary Heart Disease Risk score based on Framingham risk score. Chi square test was done to find out *p* value of the variables.

Table 1. Age wise point distribution in both sexes (Step-1)

Age group (Yrs)	Male		Female	
	Points	Participants	Points	Participants
30-34	-1	71	-9	69
35-39	0	45	-4	51
40-44	1	58	0	60
45-49	2	57	3	44
50-54	3	27	6	37
55-59	4	23	7	19
60-64	5	16	8	11
65-69	6	11	8	17
70-74	7	13	8	14

Table 2. Total Cholesterol (TC) level wise point distribution in both sexes (Step-2)

TC (mg/dl)	Male		Female	
	Points	Participants	Points	Participants
<160	-3	74	-2	76
160-199	0	123	0	124
200-239	1	82	1	90
240-279	2	29	1	24
=/>280	3	13	3	8

Table 3. HDL-C level wise point distribution in both sexes (Step-3)

HDL-C (mg/dl)	Male		Female	
	Points	Participants	Points	Participants
<35	2	117	5	58
35-44	1	148	2	141
45-49	0	39	1	55
50-59	0	15	0	44
≥ 60	-2	2	-3	24

Table 5. Diabetes Mellitus wise point distribution in both sexes (Step-5)

DM	Male		Female	
	Points	Participants	Points	Participants
Absent	0	321	0	322
Present	2	0	4	0

Table 6. Smoking wise point distribution in both sexes (Step-6)

Smoking	Male		Female	
	Points	Participants	Points	Participants
No	0	248	0	322
Yes	2	73	2	0

Results

A Global risk of coronary heart disease is a calculation of the absolute risk of having coronary heart disease event (e.g., death, myocardial infarction) for 10 years. The risk of a coronary event (high, intermediate, or low) determined by detailed assessment of the global risk approach based on Framingham risk score. The variables used for risk score computation are gender, age, total cholesterol, HDL cholesterol, systolic blood pressure (SBP), diastolic blood pressure (DBP), diabetes mellitus (DM), and smoking. Total points were calculated by summation of points from all 6 steps.

The risks obtained with each of the tools in accordance to published instructions on their use were divided into High risk (>20%), Intermediate risk (10 % – < 20%), and Low risk(<10). Although family history is not included in risk calculator, patients with a strong family history of early-onset cardiovascular disease (i.e., father with an event before 55 years of age, mother with an event before 65 years of age) are likely at greater risk than the calculations indicate. For them the 10 Year CVD risk would be double.

Discussion

Deposition of excess cholesterol in the walls of blood vessels causing narrowing and reduced circulation. Atherosclerosis is a chronic process, undergoes a series of changes in the arterial walls including endothelial damage, lipid infiltration, followed by intimal thickening, platelet adherence, smooth muscle cell

Table 4. Blood Pressure wise point distribution in both sexes (Step-4)

Male SBP (mmHg)	Diastolic Blood Pressure (mmHg)									
	< 80		80-84		85-89		90-99		≥ 100	
	Points	Partici-pants	Points	Partici-pants	Points	Partici-pants	Points	Partici-pants	Points	Partici-pants
<120	0	22	0	17	1	1	2	0	3	0
120-129	0	128	0	80	1	25	2	2	3	0
130-139	1	34	1	7	1	3	2	0	3	1
140-159	2	0	2	1	2	0	2	0	3	0
≥ 160	3	0	3	0	3	0	3	0	3	0

Female SBP (mmHg)	Diastolic Blood Pressure (mmHg)									
	< 80		80-84		85-89		90-99		≥ 100	
	Points	Partici-pants	Points	Partici-pants	Points	Partici-pants	Points	Partici-pants	Points	Partici-pants
<120	-3	18	0	23	0	4	2	1	3	0
120-129	0	124	0	92	0	10	2	3	3	0
130-139	0	33	0	7	0	4	2	0	3	1
140-159	2	0	2	1	2	1	2	0	3	0
≥ 160	3	0	3	0	3	0	3	0	3	0

Table 7: 10-year Predicted Risk of ASCVD Events among apparently healthy adults

Sex	Age Grpup (Years)	10 Year Predicted Risk of ASCVD Events				*p* value
		<5 %	5 - <10 %	10 - <20 %	≥ 20%	
Male	**<40** (n=116)	91 (78.44%)	23 (19.82%)	2 (1.72%)	-	**< 0001[s]**
	40-60 (n=171)	47 (27.48%)	88 (51.46%)	33 (19.29%)	3 (1.75%)	
	>60 (n=34)	1 (2.94%)	7 (22.58%)	17 (50%)	9 (26.47%)	
	All age (n=321)	139 (43.30%)	118 (36.76%)	52 (16.19%)	12 (6.54%)	
Female	**<40** (n=120)	120 (100%)	-	-	-	**< 0001[s]**
	40-60 (n=171)	94 (54.97%)	56 (32.74%)	21 (12.28%)	-	
	>60 (n=31)	-	14 (45.16%)	17 (54.84%)	-	
	All age (n=322)	214 (66.46%)	70 (21.74%)	38 (11.8%)	-	

s = significant; p value obtained from Chi Square test

proliferation and plaque formation. Rupture of the plaque is the final event that results in a clinical endpoint. Cardiovascular disease risk scoring system gives an estimate of the probability that a person will develop cardiovascular disease within a specified amount of time, usually 10 to 30 years. Because they give an indication of the risk of developing cardiovascular disease, they also indicate who is most likely to benefit from prevention. In this study Framingham Risk Score was used to estimate the 10-year risk of developing coronary heart disease. This study was done among apparently healthy adult individuals employed in Bangabandhu Sheikh Mujib Medical University and their relatives. The primary objective was to analyze the frequency of atherosclerotic risk among apparently healthy adult individuals.

The 10-year risk of a coronary event shows there was no high-risk (>20%) participant among female of any age group.1.75% above 40 years and 26.47% above 60 years male shows high-risk (>20%). 11.80% of female above 40 years shows intermediate-risk (>10%). 16.19% of all age male shows intermediate-risk (>10%).

In our study (Table-VIII) female below 40 years bear lowest risk of atherosclerotic cardiovascular disease (ASCVD) events and there is no high risk female among all (n=322) participants. Their risk level increases after 40 years (11.11% intermediate risk) and peaked above 60 years (61.29% intermediate risk). Male bear high risk of atherosclerotic cardiovascular disease(ASCVD) events above 40 years (1.75%) which peaked above 60 years (26.47%). Chi square test shows the p value <.0001which is statistically significant.

It is a paradox that the increased risk of people of Indian origin to diabetes and CAD is not explained by conventional risk factors. The force of lipid-related risk factors and of higher body mass index appears to be greater in people of South Asian origin owing to the presence of central obesity, insulin resistance, low high-density lipoprotein cholesterol, higher lipoprotein(a), decreased beta-cell function, in-utero under nutrition, deficiency of antioxidants and higher levels of angiotensin-converting enzyme [24].

The value of such an easily computed measure is that it allows patients to determine if they are at intermediate to high risk and prompts them to obtain further evaluation from their physician. Physicians should calculate the global risk of coronary heart disease when considering pharmacologic interventions for primary prevention.

Conclusion

These results highlight the extensive need for routine screening programs for blood lipid levels of our adults early and frequently even they are apparently healthy. Body weight should be reduced to keep BMI and waist circumference in normal range. This study also suggest the importance of community based health education program addressing life style modification, healthy diet, physical exercise and avoidance of stresses. As per American Heart Association, all adults of 40 years and older with no history of heart disease should know their absolute risk of developing CHD and should have global CHD risk calculated every 5 years.

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Original Article

D-chiro-inositol in PCOD Causing Infertility: Our Experience

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Abstract

Introduction: Infertility is a miserable condition of conjugal life. PCOD is a common cause of women infertility. Women with PCOD have insulin resistance and hyperinsulinemia possibly because of a deficiency of a d-chiro-inositol containing phosphoglycan that mediates the actions of insulin. We hypothesized that the administration of d-chiro-inositol would replenish stores of the mediator and improve insulin sensitivity and thereby reduce hyperandrogenism and improves fertility. **Methods:** This prospective observational study was done between the periods of June 2020 and December 2020. The patients who came to the private chambers of the authors and out-patient department of Satkhira Medical College Hospital, Satkhira, Bangladesh with conception problem were the study subjects. Among the study subjects 30 were selected who were diagnosed as PCOD. Initially 15 of the patients were given metformin and ovulation inducing drug and another 15 patients were given metformin, ovulation inducing drug and d-chiro-inositol for 3 menstrual cycles. **Results:** With treatment without d-chiro-inositol, among 15 patients, 4 conceived within 3 menstrual cycles. Remaining 11 patients were given the previous treatment and d-chiro-inositol and 7 of them conceived but the residual 4 patients were non-responsive to the treatment. Treatment with d-chiro-inositol, among the 15 patients 9 conceived in 3 menstrual cycles and 2 conceived by the same treatment in 6 menstrual cycles. Remaining 4 patients of group B were non-responsive. **Conclusion:** It could be concluded that d-chiro-inositol improves ovarian function and fertility and may be used as adjunct therapy.

Keywords: Polycystic Ovary Disease (PCOD), d-chiro-inositol, infertility.

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Introduction

Infertility is a disconsolate condition in conjugal life. Conception in healthy fertile couples happens on average after 8 months of regular intercourse [1]. Infertility is defined as the inability to conceive after a year of regular unprotected sexual activity [2]. Among many causes of female infertility PCOD is not uncommon.

Polycystic ovary syndrome (PCOS) is a common endocrinopathy affecting women of reproductive age. Common features include menstrual irregularities, hyperandrogenism and polycystic ovarian morphology although the presentation can be heterogeneous. Insulin resistance is thought to be responsible for the hormonal and metabolic derangements observed. PCOS has two phenotypes, overweight/obese and lean, the latter being a much less common presentation of the syndrome [3].

Inositols make up a family of six-membered cyclic polyols that naturally occur as five different stereoisomers. Myo-Inositol (myo-Ins) represents approximately 99% of mammalian

inositol pool, and contributes to various functions in different tissues [4]; the remainder of inositol molecules in mammals consists of d-chiro-inositol, which mediates different functions than those mediated by myo-Ins [5].

D-chiro-inositol acts as insulin sensitizer or insulin mimetic agent that increase intracellular insulin signaling. As a consequence, organs become sensitive to lower levels of insulin [6]. The modulatory activity of d-chiro-inositol on the expression of the steroidogenic enzyme aromatase, which catalyzes the transformation of androgens to estrogens. Particularly, d-chiro-inositol lowers aromatase expression in a dose-response manner, thus increasing androgen levels at the expense of estrogens [7]. D-chiro-inositol has a double role; besides acting as insulin sensitizer, it has steroidogenic properties. Under normal insulin conditions, d-chiro-inositol treatment reduces aromatase expression and thus estradiol production, decreasing the negative feedback on the hypothalamus [8].

In human body, Inositols are commonly found in almost every tissue and their absolute and relative concentration can strongly differ, depending on the milieu [9]. Inositols exist either in their free form or as phosphate derivatives. Inositol-phosphates are the active molecules that participate to intracellular signaling pathways [10], being either components of cell membranes as phosphatidyl-inositol-phosphates (PIP) or water-soluble molecules (IP). Myo-Ins is involved in the Follicle-Stimulating-Hormone (FSH) and the Thyroid-Stimulating-Hormone (TSH) pathways, while both myo-inositol and d-chiro-inositol are insulin second messengers [11].

Several studies report the improvement of fertility with d-chiro-inositol but in our country there is ample study on it. Therefore, this observational study was done to see whether d-chiro-inositol can be used as an adjunct therapy in the treatment of PCOD causing infertility.

Methods

This prospective observational study was done between the periods of June 2020 and December 2020. The patients who came to the private chambers of the authors and out-patient department of Satkhira Medical College Hospital, Satkhira with conception problem were the study subjects. Among the study subjects 30 were selected who were diagnosed as PCOD by trans-vaginal ultrasonography and hormone tests. Initially 15 of the patients (group A) were given metformin and ovulation inducing drug (letrozole) for 3 menstrual cycles and another 15 patients (group B) were given metformin, ovulation inducing drug (le) and d-chiro-inositol for 3 menstrual cycles. Dosage of Metformin was 500 mg twice daily, that of letrozole was 5 mg once daily and that of d-chiro-inositol was 500 mg once daily.

Results

Grouping of the patients were done by initial treatment given to them (table 1). Among the 15 patients of group A, 4 conceived within 3 menstrual cycles. Remaining 11 patients of group A were given the previous treatment and d-chiro-inositol for the next 3 menstrual cycles and among the 11 patients 7 conceived but the residual 4 patients were non-responsive to the treatment (table 2). Among the 15 patients of group B, who were treated with metformin, ovulation inducing drug (letrozole) and d-chiro-inositol, 9 conceived in 3 menstrual cycles and 2 conceived by the same treatment in 6 menstrual cycles (table 4). Remaining 4 patients of group B were non-responsive. Figure 1 shows the treatment outcome with and without d-chiro-inositol.

Table 1: Initial treatment received by patients.

	Drug	Duration
Group A	Metformin with letrozole	3 menstrual cycles
Group B	Metformin, letrozole with d-chiro-inositol	3 menstrual cycles

Table 2: Treatment outcome of the patients in group A (n = 15)

Treatment given	Success n (%)
Initial treatment with Metformin with letrozole for 3 menstrual cycles	4 (26.6)
Metformin, letrozole with d-chiro-inositol after initial treatment for 3 menstrual cycles	7 (46.6)

Table 3: Treatment outcome of the patients in group B (n = 15)

Treatment given	Success n (%)
Initial treatment with Metformin, letrozole with d-chiro-inositol for 3 menstrual cycles	9 (60)
Treatment with Metformin, letrozole with d-chiro-inositol after initial treatment for another 3 menstrual cycles	2 (46.6)

Table 4: Overall success rate with d-chiro-inositol in group A & B (n = 26)

Duration	Success n (%)
In 3 menstrual cycles	16 (61.53)
In 6 menstrual cycles	2 (7.69)
Total	18 (69.22)

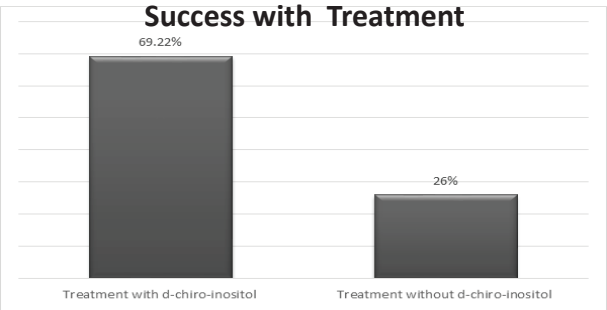

Figure 1: Bar diagram showing success with and without treating with d-chiro-inositol.

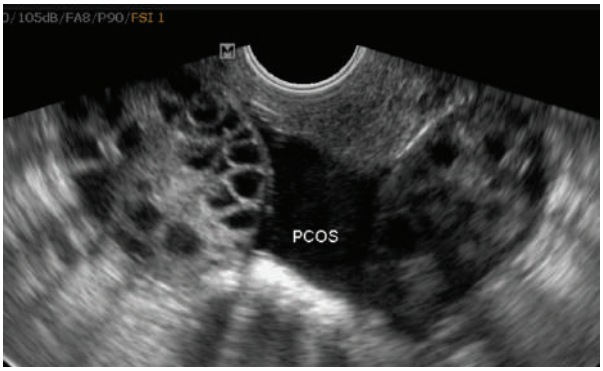

Figure 2: Typical trans-vaginal ultrasonography of polycystic ovary syndrome showing cystic ovaries.

Discussion

Conjugal life becomes horrible with infertility. Most of the causes of infertility is due to female cause. Polycystic ovarian syndrome is one of the important and common causes of female cause of infertility. Many of the female cause can be successfully treated. PCOS can also be treated successfully but some cases are refractory to conventional therapy. This is why, this study was conducted to see whether d-chiro-inositol can be used as an adjunct therapy of PCOS.

This prospective observational study was done between the periods of June 2020 and December 2021. The patients who came to the private chambers of the authors and out-patient department of Satkhira Medical College Hospital, Satkhira with conception problem were the study subjects. Among the study

subjects 30 were selected who were diagnosed as PCOD by trans-vaginal ultrasonography and hormone tests. Initially 15 of the patients (group A) were given metformin and ovulation inducing drug (letrozole) for 3 menstrual cycles and another 15 patients (group B) were given metformin, ovulation inducing drug (le) and d-chiro-inositol for 3 menstrual cycles (table 1). Dosage of Metformin was 500 mg twice daily, that of letrozole was 5 mg once daily and that of d-chiro-inositol was 500 mg once daily.

We grouped the patients into group A and B according to initial treatment received (table 1). Group A patients received conventional treatment of PCOD and group B patients received the same treatment and d-chiro-inositol. Among the 15 patients of group A, 4 conceived within 3 menstrual cycles. Remaining 11 patients of group A were given the previous treatment and d-chiro-inositol for the next 3 menstrual cycles and among the 11 patients 7 conceived but the residual 4 patients were non-responsive to the treatment (table 2). Among the 15 patients of group B, who were treated with metformin, ovulation inducing drug (letrozole) and d-chiro-inositol, 9 conceived in 3 menstrual cycles and 2 conceived by the same treatment in 6 menstrual cycles (table 4). Remaining 4 patients of group B were non-responsive. Similar outcome were found by the study of Antoaneta Gateva in 2018 [11].

Eight of our patients out of 30 did not conceived neither with metformin with letrozole nor with metformin, letrozole and d-chiro-inositol. They were residual cases and were hospitalized for laparoscopic visualization and cauterization if needed.

Conclusion

From the study it could be concluded that d-chiro-inositol is more effective in patients with infertility when used in addition to conventional therapy and can be used as an adjunct therapy.

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Original Article

Outcome of Tympanoplasty Using Temporalis Fascia Graft Performed under Operating Microscope

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Abstract

Introduction: Chronic otitis media (COM) is a major health problem in a developing country like Bangladesh. Tympanic membrane (TM) perforation in COM is a common surgical indication in otolaryngology practice. It can be managed by tympanoplasty or myringoplasty. The main objectives of tympanoplasty include the closure of the tympanic membrane perforation and restoration of hearing loss. Repair of TM perforation via the microscopic ear surgery (MES) is traditionally preferred worldwide with success rates ranging from 83% to 100%. Objectives: The purpose of our study was to find out the outcome of tympanoplasty in terms of closure of tympanic membrane perforation using temporalis fascia graft performed under operating microscope. **Materials and Methods:** The present study was a prospective observational type of study conducted in a private hospital in Satkhira from January 2018 to December 2020. Convenient non-randomized purposive sampling technique was applied. Thirty seven patients of COM inactive mucosal type with central perforation were included in the study. The gender and age of the patients were determined. Perforation positions and sizes were determined. Preoperative hearing status was also evaluated. All patients were operated by same surgeon using temporalis fascia graft and operating microscope. Patients were followed in weeks 1, 3 and 12. Graft uptake was evaluated after 3 months. **Results:** Thirty seven patients were included in the study of which 11 (29.73%) were male and 26 (70.27%) were female with male: female ratio of 1:2.4. The age of the patients ranged from 15 to 60 years, with the mean age was 27.2 ± 9.3 years. Overall graft success rate was 94.6% (35). Success rate was more in female patients 96.2% (25). All perforations 100.0% (27) in left ear were healed but 80.0% (8) perforations were healed in right ear. Only 2 (5.4%) of all perforations in right ear which was one in male and another in female group failed to heal. Those failed to heal were large perforations of more than 50% size of the tympanic membrane. **Conclusion:** Tympanoplasty is the only permanent treatment option for closure of the defect. Use of appropriate technique, materials and devices as well as surgeons expertise is essentials for successful outcome. In our study, use of operating microscope in a district level hospital made a successful outcome.

Keywords: Tympanoplasty, Temporalis fascia, Operating microscope, Outcome.

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Introduction

Chronic otitis media (COM) is a major health problem in a developing country like Bangladesh, especially in low socio economic strata (prevalence>10%). COM has a major impact on the social life of a person in the form of hearing disability [1]. The recurrent discharge from the ear is also troublesome and discomfortable for the patient.

Tympanic membrane (TM) perforation in COM is a common surgical indication in otolaryngology practice. It can be managed by tympanoplasty or myringoplasty [2]. Tympanoplasty is a surgical procedure used to repair tympanic membrane (TM) perforation and modern tympanoplasty was firstly described by Zollner and Wullstein in 1952 [3].

The main objectives of tympanoplasty include the closure of the tympanic membrane perforation and restoration of hearing loss. To date, alternative surgical approaches, different grafting techniques, and various graft materials (fat, vein, cartilage, fascia and skin) have been used for successful tympanoplasty [4-7].

Repair of TM perforation via the microscopic ear surgery (MES) is traditionally preferred worldwide with success rates ranging from 83% to 100% [8-10]. The success rate of tympanoplasty among adults is variable in literature with a rate of 60-99% [11]. Numerous studies attempted to link certain variables to the outcome of this procedure including: size, location and etiology of the perforation, pre-operative and post-operative audiometric results, dryness of the ear, condition of the contralateral ear, type of graft materials used, associated middle ear disease, surgical technique, age and smoking history of the patient as well as the surgeon's experience [12-16].

The purpose of our study was to find out the outcome of tympanoplasty in terms of closure of tympanic membrane perforation using temporalis fascia graft performed under operating microscope.

Materials and Methods

The present study was a randomized prospective observational type of study conducted in a private hospital in Satkhira from January 2018 to December 2020. Convenient non-randomized purposive sampling technique was applied.

Thirty seven patients of COM inactive mucosal type with central perforation were included in the study. Patients and the attendants were informed and counseled regarding the disease process, surgical procedure, the expected outcomes, complications and alternative treatments available. Written consent was taken from the patient as well as from the attendants.

Both males and females of 15 to 60 years of age were included in the study. All cases of COM with inactive mucosal disease with a central perforation and pure conductive hearing loss were included in the study. The ear was dry for at least 4 weeks.

Patients with active mucosal disease, squamous disease, ossicular discontinuity/ necrosis, sensorineural and mixed hearing loss and patients below 15 years and above 60 years were excluded from the study. Patients with diabetes mellitus, active focus of infection in throat, nose and oral cavity, patients with recurrent disease (revision cases) and patients who failed to follow-up for at least 3 months were also excluded from the study.

After careful selection of all study cases of COM with central perforation and conductive hearing loss were admitted in the hospital.

Relevant history, clinical examination, tuning fork tests, routine investigations along with X-Ray mastoid was carried out and data was noted in a data sheet. Pure Tone Audiometry was done in all cases for hearing evaluation.

All cases were operated under operating microscope by the same surgeon under general anesthesia. Post auricular approach was applied. The grafts were taken from the temporalis fascia by the same post-auricular incision. The graft was left to dry and reshaped before placing in the TM. After elevating the tympanomeatal flap, the grafts were placed with underlay technique [17]. The middle ear was packed with absorbable gel foam. The dry graft was placed lateral to the long process of the malleus and then medial to the remaining drum anteriorly. Then the ear canal was packed with gel foam. All patients were routinely prescribed a course of oral antibiotics during the first postoperative week, with prescription of eardrops until the gel foam had been absorbed.

The postoperative status of the TM in weeks 1, 3 and 12 was recorded along with the results of audiometry tests at 12th week. Graft healing was considered successful if the TM was completely intact at the 3 months postoperative visit.

Data was analyzed and graph was generated using Microsoft excel. Continuous variables were analyzed by mean values. The quantitative findings were mentioned by frequencies and percentages.

Results

Thirty seven patients were included in the study. The age of the patients ranged from 15 to 60 years, with the mean age was 27.2 ± 9.3 years. Table 1 shows the frequency of gender and operated ear of the study subjects that shows 11 (29.73%) were male and 26 (70.27%) were female with male: female ratio of 1:2.4. Most of the patients, 27 (72.97%) were operated in their left ear and remaining 10 (27.02%) in their right ear.

Table 1. Demographic characteristics of study patients (n = 37)

Variables		Frequency n (%)
Gender	Male	11 (29.73)
	Female	26 (70.27)
Ear Operated	Right	10 (27.02)
	Left	27 (72.97)
Total		**37 (100)**

Position of the perforations was grouped in three i.e. anterior, posterior and central in relation to the handle of the malleus. Table 2 shows that, most of the perforations, 25 (67.57%) were in central part of TM with 9 (24.32%) in anterior and 3 (8.11%) in posterior part of TM. Size of the perforation was <50% in 9 (24.32%) patients and ≥50% in 28 (75.68%).

Table 2. Distribution of study patients according to perforation characteristics (n = 37)

Variables		Frequency n (%)
Position of perforation	Anterior	9 (24.32)
	Posterior	3 (8.11)
	Central	25 (67.57)
Size of perforation	< 50%	9 (24.32)
	≥ 50%	28 (75.68)

Graft success rate was evaluated according to demographic profile and perforation characteristics which are shown in table 3. Overall graft success rate was 94.6% shown in figure 1. Success rate was more in female patients

96.2% (25). All perforations 100% (27) in left ear were healed but 80% (8/10) perforations were healed in right ear. Only 2 (5.4%) of all perforations in right ear which was one in male and another in female group failed to heal. Those failed to heal were large perforations of more than 50% size of the tympanic membrane.

Table 3. Distribution of graft success rate according to demographic profile and perforation characteristics (n=37)

Characteristics		Perforation Healed n (%)	Perforation Remained n (%)
Gender	Male (n = 11)	10 (90.9)	1 (9.1)
	Female (n = 26)	25 (96.2)	1 (3.8)
Ear Operated	Right (n = 10)	8 (80)	2 (20)
	Left (n = 27)	27 (100)	0 (0)
Position of perforation	Anterior (n = 9)	8 (88.9)	1 (11.1)
	Posterior (n = 3)	3 (100)	0 (0)
	Central (n = 25)	24 (96)	1 (4)
Size of perforation	< 50% (n = 9)	9 (100)	0 (0)
	≥ 50% (n = 28)	26 (92.9)	2 (7.1)

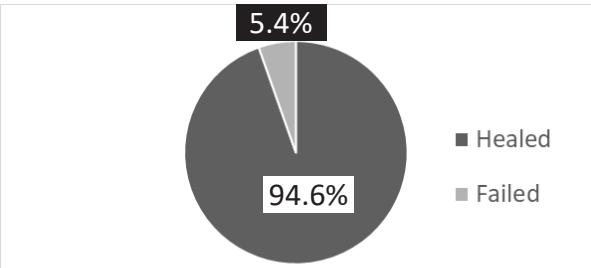

Figure 1. Pie chart showing overall graft success rate.

Discussion

Bangladesh is one of the countries with highest load of chronic otitis media [18]. Tympanic membrane (TM) perforation in COM is a common surgical indication in otolaryngology practice. It can be managed by tympanoplasty or myringoplasty [2].

The main objectives of the treatment of chronic otitis media are to repair the tympanic membrane, to eliminate the chronic discharge and if necessary, to provide integrity and mobility of the ossicular chain via ossiculoplasty or artificial prostheses [4-7, 19]. Different surgical approaches, artificial prostheses, various graft materials and grafting techniques have been used for this purpose [19, 20].

In our study the objective was to find out the outcome of tympanoplasty in terms of closure of tympanic membrane perforation using temporalis fascia graft performed under operating microscope. The study was conducted in a private hospital in Satkhira. Thirty seven patients were enrolled in the study. Data was collected and analyzed and our findings are discussed and compared with previously published relevant studies.

Van Baarle et al. (1983) [21] demonstrated a relationship between the age of surgery and graft success in one of their studies. They found that the rate of graft success was reduced in patients younger than 15 years and older than 45 years and the best result was obtained between 15 and 45 years of age. The age range of the patient in our study was 15 to 60 with mean age 27.2 ± 9.3 years and we had 2 patients over 45 years of age, no patient was below the age of 15 years. Therefore, no relationship could be established between age and graft success. Similar to our study, there was no significant difference between gender and graft success in a study by Yilmaz et al. (2009) [22].

In the present study, the overall graft success rate was 94.6% (35) which is in accordance

with study by Kawatra et al. (2014) [23] who reported success rate of 93.3%. Hay et al. 2014 [24] conducted study on 116 patients and found success rate of 91% which is slightly below than our study. Jain S et al. (2017) [25] studied 500 cases and reported graft success rate of 96.6% and Patil et al. 2014 [26] reported similar result of 96% which is slightly better than our results.

Tatlipinar et al. 2010 [27] studied the effect of the location of perforation on graft success. They reported 80% success rate in central and posterior perforations in their study which was better than anterior and central perforations. In our study, graft success was highest in posterior perforation being 100.0%, 96.0% in central perforation and lowest 88.9% in anterior perforation which is similar with the study. In 1984, Adkins and White [28] found in their study that the success rate in central perforations were lower than others which is not similar to our study.

The present study has a limitation. This study included a relatively small sample size, resulting in a lack of generalization of the findings.

Conclusion

Tympanic membrane (TM) perforation in COM is a common surgical indication in otolaryngology practice. Tympanoplasty is the only permanent treatment option for closure of the defect. Use of appropriate technique, materials and devices as well as surgeon's expertise is essentials for successful outcome. In our study, use of operating microscope in a district level hospital made a successful outcome.

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Original Article

Clinical Aspects and Associations of Retro-peritoneal Tumors in Surgical Practice in a Tertiary Level Hospital of Bangladesh

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Abstract

Background: Retroperitoneal tumors are extremely rare tumors occurring in the retroperitoneum. Retroperitoneal tumors are divided into benign tumors and malignant tumors, including retroperitoneal sarcoma. Approximately 70–80% of primary retroperitoneal soft-tissue tumors are malignant, reflected in different clinical studies so far. **Aims & objective:** The ultimate aim of this research was to address different associated aspect. **Methodology:** A cross sectional study was conducted in Khulna Medical College Hospital, Khulna, Bangladesh with a total number of 42 patients of retro-peritoneal tumors, from a period of July 2016 to December 2020. All data was collected and analyzed prospectively. Convenient purposive sampling was the sampling method. **Results:** 71.4% patients were male in this research, most of which were in 50-60 years age group. Mean (± SD) age was 54 ± 2.1 and 55 ± 2.0 in male and female respectively. Most of the size of the tumors was in between 10 to 20 cm (42.9%). Malignant tumors were found in 76.2% patients. Lyposarcoma was the commonest pathological variant (28.6%). Approximately 56.3% patients with malignant tumors were resectable. In 14.3% cases, down-staged by neo-adjuvant therapy was possible. About 19% (08) was non-resectable lesions. Distant metastasis was detected in 25% cases. Nodal and organ involvement was detected in 31.2% (10). **Conclusion:** Retro-peritoneal tumors commonly found with elderly patients. Majorities are malignant tumors. Lyposarcoma and fibrosarcoma are relatively common. Approximately half of the lesions were resectable initially, but still the incidence of non-resectable lesions is quite high. Nodal involvement, organ involvement and systemic metastasis are common at presentation.

Keywords: Retro-peritoneal tumors, lyposarcoma, fibrosarcoma, nodal involvement, metastasis.

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Introduction

Retroperitoneal tumors (RT) commonly present with elderly population. In many cases, they are detected incidentally as a result of imaging techniques performed to investigate unrelated issues [1, 2]. The retroperitoneal space is the second most frequent location, followed by the lower extremities, where malignant mesenchymal tumors arise. Each year, approximately 250 to 300 new cases of retroperitoneal sarcoma are diagnosed in the United Kingdom [3]. Among all retro-peritoneal tumors, two thirds of these tumors are malignant tumors. Approximately, one third of this cases are sarcomas. The most frequent sarcomas are liposarcoma, malignant fibrous histiocytoma, and leiomyosarcoma, respectively. Other malignant RT types are lymphoma, epithelial tumors, malignant paraganglioma, and metastatic tumors. Fibromatosis, renal angiomyolipoma, benign paraganglioma, neurofibroma, lipoma, angiofibroma, and schwannoma can be listed among the benign tumors. The majority of sarcomas in the retroperitoneal region cannot be completely removed surgically because of their close prox

imity to vital organs [4]. Retro-peritoneal tumors develop insidiously and are generally seen as large masses; 50% of RT is larger than 20 cm at the time of diagnosis. Full physical examination, evaluation of all peripheral lymph nodes, and testis examination for male patients are important when approaching patients with such tumors. Retro-peritoneal liposarcomas are most frequently seen between 50 and 70 years of age. With a 5-year survival rate of between 40% and 50% [5], the prognosis is worse than that of other soft tissue sarcomas regarding local recurrence [6].

In this current research, the aim is to evaluate the different clinical aspects of retro-peritoneal tumors in our surgical set-up in a tertiary level hospital of Bangladesh.

Methodology

This research was conducted as a cross sectional study in Khulna Medical College Hospital, Khulna, Bangladesh, with a total number of 42 cases of retro-peritoneal tumors, from a period of July 2016 to December 2020, based on inclusion & exclusion criteria. All data was collected and analyzed prospectively- such as patient details history, clinical examination, investigation and operative findings etc. Convenient purposive sampling was used as a method of selecting study sample. In this clinical study, both manual and computer based statistical analysis of the data were done. Data were analyzed manually and then rechecked with SPSS (Statistic package for social science) computer package programmer. The survey data were usually be analyzed using both analytic as well as descriptive statistic. Such as; mean, SD, percentage etc. Ethical clearance was taken individually from patient and from the ethical review committee of Khulna Medical College Hospital, Bangladesh.

Results

Age and sex distribution of all patients were shown in table 1. Mean ± SD were 54 ± 2.1 and 55 ± 2.0 years respectively in both male and female patients.

Table 1. Age and sex distribution of study population.

Age Group (Year)	Male		Female	
	Frequency n (%)	Mean ± SD	Frequency n (%)	Mean ± SD
<30	02 (4.8)	**54 ± 2.1**	00 (0)	**55 ± 2**
30-39	02 (4.8)		02 (4.8)	
40-49	07 (16.7)		01 (2.4)	
50-60	14 (33.3)		07 (16.7)	
>60	05 (11.9)		02 (4.8)	
Total	30 (71.4)		12 (28.6)	

Table 2: Pathological classification of the tumors.

	Pathological Type	Frequency n (%)
Malignant	Lyposarcoma	12 (28.6)
	Fibrosarcoma	08 (19)
	Leiomyosarcoma	06 (14.3)
	Malignant fibrous histiocytoma	04 (9.5)
	Malignant paraganglioma	01 (2.4)
	Hodgkins lymphoma	01 (2.4)
	Total	**32 (76.2)**
Benign	Neurofibroma	05 (11.9)
	Lipoma	03 (7.1)
	Fibroma	01 (2.4)
	Angiofibroma	01 (2.4)
	Total	**10 (23.8)**

Table 3: Resectability (assessed by CT scan) in case of malignant tumors.

Resectability	Frequency n (%)
Resectable	18 (56.3)
Resectable after neo-adjuvant therapy	06 (14.3)
Non-resectable	08 (19.0)
Total	**32 (100)**

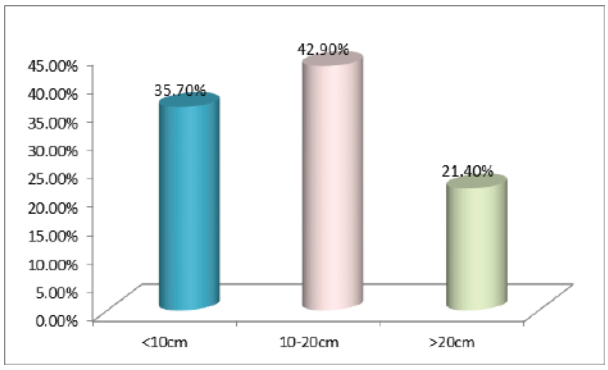

Figure 1: Size of retro-peritoneal tumors.

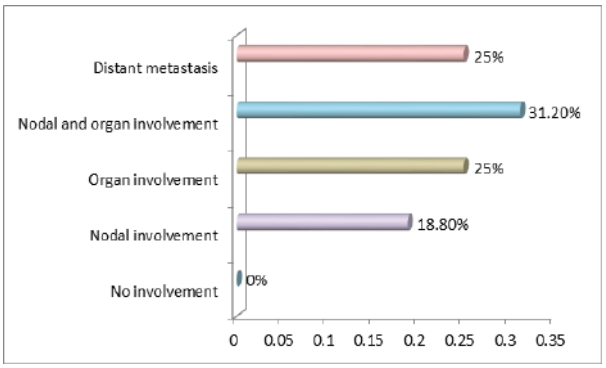

Figure 2: Nodal, organ involvement and distant metastasis in case of malignant **tumors.**

Average maximum dimension of the retro-peritoneal tumors in study population is depicted in figure 1, which suggests that most of the tumors (42.9%) were in between 10 to 20 cm.

Table 2 shows the pathological pattern of the retro-peritoneal tumors in study group. Majority of the tumors were malignant (76.2%).

Preoperatively resectability was assessed by CT scan findings, which is tabulated in table 3. Approximately in 56.3% cases the tumors were resectable in case of malignancy.

In figure 2, nodal & organic involvement and distant metastasis is depicted in case of patients with malignant tumors.

Discussion

Among the total 42 cases of retro-peritoneal tumors, 71.4% (30) patients were male. Majority of the patient were in 50-60 years age group, which were 33.3% (14) and 16.7% (07) in male and female respectively. Mean ± SD of age in case of male patients were 54 ± 2.1 years, whereas in female, it was 55 ± 2 years. Another important clinical aspect of this study was approximate size of retro-peritoneal tumors, measured by CT scan findings. In 2000, Linehan et al. studied 159 patients diagnosed with RTs and found that the increase in tumor size played a significant role in the increase of local recurrence and in metastasis rates [7, 8]. Most of the size of the tumors was in between 10 to 20 cm (42.9%), followed by in 35.7% cases, it was less than 10 cm. In 21.4% patients, the maximum dimension of the tumors was more than 20 cm.

In this research, 76.2% (32) patients had malignant tumors, most often lyposarcoma (28.6%, 12 patients), followed by fibrosarcoma in approximately 19% (08) patients. Leiomyosarcoma was detected in 14.3% (06) cases. Other pathological pattern of malignant retro-peritoneal tumors such as- malignant fibrous histiocytoma, paraganglioma, lymphoma etc. are relatively rare variants, found in this study. On the contrary, benign tumors were found in 23.8% (10) cases, mostly neurofibroma (11.9%, 05 patients) and lipoma (7.1%, 03 patients).

Studies conducted at Johns Hopkins University School of Medicine in 2009 with 1,365 cases and at Anderson Cancer Center in Houston in 2008 with 1,091 cases showed that the biology of tumors and complete surgical resection were the keys to treatment [9-11]. In this research, resectability of the lesion was assessed by CT scan preoperatively. And the results suggest that in 56.3% (18) patients with malignant tumors, it was resectable. In 14.3%

(06) cases, initially it was not resectable, but after down-staged by neo-adjuvant therapy, it was resectable. The overall rate on non-resectable lesions was 19% (08). In benign lesion, in all cases, it was resectable.

Nodal involvement, organ involvement, systemic metastasis are relatively common in retro-peritoneal malignant tumors. In a research, it was found that the organs, which are frequently resected, in addition to the primary tumor, are the kidneys, colon, pancreas, and spleen [8, 12]. Based upon the CT scan and other investigative findings, distant hematogenous metastasis was detected in approximately 25% (08) patients. On the basis of operative and investigative findings, it was found that nodal and organ involvement was present in 31.2% (10) cases, followed by organ involvement in 25% (08) cases. Only nodal involvement was detected in 18.8% (06) cases.

Conclusion

Retro-peritoneal tumors are relatively common in elderly patients, most of which are malignant in nature. Lyposarcoma and fibrosarcoma are the most common pathological pattern. However, by preoperatively assessment and investigations, about half of the lesions were resectable initially, but still a large portion of patients were presented with non-resectable lesions. Majority of the patients had nodal involvement, organ involvement and/or haematogenous metastasis.

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Original Article

Effect of Oral Clonidine Premedication for Attenuation of Hemodynamic Response in Laryngoscopy and Tracheal Intubation in Hypertensive Patients

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Abstract

Background: Sympathetic response associated with laryngoscopy and endotracheal intubation is recognized as a potential cause for a number of complications especially in hypertensive patients. Various methods have been used to attenuate these hemodynamic responses; however most of the studies are in normotensive patients. **Aims:** To evaluate the effects of oral clonidine for attenuation of hemodynamic response in laryngoscopy and tracheal intubation in hypertensive patients. **Methods:** This randomized prospective comparative study was carried out in the department of Anesthesiology of Satkhira Medical College Hospital, Satkhira, Bangladesh during November 2020 to April 2021. A total of 200 hypertensive patients belonged to 30 - 50 years of both sexes underwent general anesthesia were included in this study. The patients were divided in two groups by randomization using fixed card sampling method. One hundred patients in study group who were given oral clonidine premedication was considered as Group A and another 100 patients in control group was considered Group B. **Results:** Demographic variable were almost similar in both groups. There was statistically significant attenuation in heart rate in both groups ($p<0.05$). The trends of attenuation of systolic, diastolic blood pressure and mean arterial pressure in group A compared to group B, were statistically significant ($p<0.05$). **Conclusion:** Oral clonidine provided good attenuation of hemodynamic response to laryngoscopy and intubation in hypertensive patients.

Keywords: Oral Clonidine, Hemodynamic Response.

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Introduction

Laryngoscopy and endotracheal intubation are potent stimuli that can induce increased sympathetic activity leading to tachycardia, hypertension and dysrhythmias. It may have deleterious respiratory, neurological and cardiovascular effects [1, 2]. Reflex changes in the cardiovascular system are most marked after laryngoscopy and intubation and lead to an average increase in blood pressure by 40–50% and 20% increase in heart rate [3]. This hemodynamic response is much higher in hypertensive patients [4, 5]. This response can lead to cardiac dysrhythmias (e.g., ventricular bigeminy), myocardial ischemia, raised intracranial pressure and even intracranial bleed [6]. The achievement of a smooth induction with minimal reflex hemodynamic response during laryngoscopy and endotracheal intubation remains an important anesthetic goal [7].

To attenuate this hemodynamic response to laryngoscopy and endotracheal intubation different methods have been used to varying success including opioids, beta adrenergic blockers, nitroprusside or nitroglycerine, calcium channel blockers, intravenous xylocaine, topical airway anaesthesia, and MAC bar (inha-

lational anaesthetics) [8, 9, 10]. Several strategies have been evolved to blunt this undesirable hemodynamic response to laryngoscopy and endotracheal intubation, but each method has its own advantages and disadvantage [7].

Clonidine, a 2-imidazoline derivative is a centrally acting alpha 2 receptor agonist. Alpha 2 receptor is coupled via a G-protein to several effecter mechanisms, including inhibition of adenylate cyclase and effects on potassium and calcium channels [11]. Clonidine acts at the medulla (in the nucleus tractus solitarius and nucleus reticularis lateralis region of rostroventro-lateral medulla), reduces sympathetic and increases parasympathetic tone, resulting in decrease in heart rate and blood pressure. It sensitizes brain stem pressor centres to inhibition by baro-reflexes. Clonidine also binds to imidazoline receptors, which mediate antihypertensive effects [11].

Clonidine is used primarily as anti-hypertensive drug but it has got sedative effect as well. Therefore, use of clonidine in hypertensive patients as a premedication has got additive advantage of sedation which is required in preoperative period and also hemodynamic stability during operation. When given orally, peak plasma concentration and maximal hypotensive effects are seen 90 min after the oral dose [12, 13]. Prevention of tachycardia in response to laryngoscopy and intubation and slowing of heart rate induced by clonidine share a complex underlying mechanism. It consists of 3 components: centrally, activation of alpha-2 adrenoceptors causing both a reduction in peripheral sympathetic tone and increased vagal induced reflex bradycardia, peripherally stimulation of presynaptic alpha adrenoceptors leading to diminished release of norepinephrine from the nerve endings and a reduction in peripheral sympathetic tone [14].

With this beneficial effects of oral clonidine in mind, this study was done to evaluate the effect of oral clonidine in attenuating the hemodynamic responses to laryngoscopy and intubation in known hypertensive patients.

Methods

This randomized prospective comparative study was carried out in 200 hypertensive patients, taking antihypertensive drugs and with systolic blood pressure (SBP) below 140 mmHg and diastolic blood pressure (DBP) below 90 mmHg scheduled for elective surgeries under general anesthesia. The study was done in the department of General surgery, under supervision of Department of Anesthesiology of Satkhira Medical College Hospital, Satkhira, Bangladesh, during November 2020 to April 2021. Anticipated difficult airway, emergency cases, history of allergy to clonidine, ASA IV and V, morbidly obese patients, asthma history, laryngoscopy and intubation taking more than 15 seconds, rapid sequence induction, patients taking tricyclic antidepressants, nasal endotracheal intubation and patients who didn't taken their routine antihypertensive drugs before surgery were excluded from the study. All the patients/legal guardians of participants were properly explained about the objectives of the study along with its procedure, risk and benefits to be derived from the study in easily understandable local language and then informed consent was taken from them. It was assured that all records would be kept confidential and would not be disclosed anyway except for the purpose of study. It was assured that the procedure was helpful for both the physician and patients in making rational approach regarding management of the case. All findings were collected in a pre-designed data collection sheet.

Study Procedure

Patients were randomized for treatment allocation (100 patients in each group). Group-A: Tab: Clonidine 0.1 mg, 90 minutes before induction and standard pre-medication, Group-B: Tab. placebo 90 minutes before induction. Monitoring consists of inspired oxygen concentration, ECG, pulse oximetry, capnography and non-invasive blood pressure. Intra-operatively, end tidal concentrations of carbon dioxide, oxygen, and inhalational anaesthetics concentration were monitored. General anaesthesia with oral endotracheal intubation and controlled mechanical ventilation was given to all patients. Baseline vitals (blood pressure, heart rate and oxygen saturation) were recorded. Patients were pre-oxygenated for 3 minutes with oxygen flow rate of 6 L/min on circle breathing system. Anaesthesia was induced in all patients with Fentanyl 2 µg/kg I/V, Thiopental sodium 5 mg/kg I/V or Propofol 2 mg/kg I/V and Vecuronium 0.1 mg/kg I/V to facilitate the tracheal intubation and controlled ventilation. Laryngoscopy and intubation was done by the primary anesthetist, and PVC endotracheal tube, size 7.0 mm for females and 8.0 mm for males were used. Blood pressures were recorded before induction, immediately after intubation and after 5 minutes. Twenty-five percent increases in blood pressure and heart rate was significant. Management of variations in blood pressure and heart rate was left to the discretion of the primary anesthetist.

Results

Distribution of the patients on the basis of heart rate is shown in table 1 that shows that there is significant low heart rate before and after intubation. Table 2 shows the distribution of the study population by systolic, diastolic and mean arterial blood pressure in groups that shows that, SBP, DBP and mean arterial blood pressure is significantly low in group A who received oral clonidine premedication.

Discussion

The sympatho-adrenal activation associated with laryngoscopy and tracheal intubation causes the rise in arterial blood pressure, tachycardia and dysrhythmias [5]. The achievement of a smooth induction with minimal reflex hemodynamic response during laryngoscopy and endotracheal intubation remains an important anesthetic goal. Several strategies have been evolved to blunt this undesirable hemodynamic response to laryngoscopy and endotracheal intubation, but each method has its own advantages and disadvantage [7]. This randomized prospective comparative study was carried out with an aim to find out the effects of oral clonidine in attenuating the hemodynamic responses to laryngoscopy and intubation in known hypertensive patients.

Tachycardia was defined as heart rate greater than 100 beats/min and hypertension when systolic blood pressure was more than 140 mmHg. Bradycardia was defined as reduction in heart rate less than 60 beats/min, and was treated with intravenous anesthetic and surgical techniques were standardized for all patients. In this present series, it was observed that the mean difference of heart rate were significantly ($p<0.05$) higher before intubation, after intubation and after 5 minutes in group B with compared to group A (table 1). Mohammadi et al. [14] in their study found the mean heart rate in before intubation was found 90.2±130.1 in clonidine group and 70.2±11.6 in lidocaine group, 5 minutes after intubation was 72.8±12.0 in clonidine group and 74.0±16.2 in lidocaine group.

In this study, it was observed that the mean systolic blood pressure at baseline and before intubation were almost similar between two groups but the mean difference of systolic

Table I: Distribution of the study population by Heart rate (n=200).

Heart Rate (bpm)	Group A (n = 100) Mean ± SD	Group B (n = 100) Mean ± SD	*p* value
Baseline	85.17 ± 6.81	87.6 ± 12.76	0.095
Before Intubation	87.83 ± 13.36	99.52 ± 12.75	0.001[s]
After Intubation	83.25 ± 19.36	89.25 ± 12.28	0.009[s]
After 5 minutes	74.58 ± 9.61	80.92 ± 10.3	0.001[s]

s=significant, *p* value reached from unpaired t-test

Table 2: Distribution of the study population by Systolic, Diastolic and Mean (arterial) Blood Pressure (n=200).

Blood pressure (mmHg)		Group A (n = 100) Mean ± SD	Group B (n = 100) Mean ± SD	*p* value
Systolic	Baseline	140.25 ± 18.99	143.42 ± 6.33	0.115
	Before Intubation	149.92 ± 23.33	153.92 ± 22.05	0.214
	After Intubation	138.75 ± 22.9	161.01 ± 21.44	0.001[s]
	After 5 minutes	122.92 ± 20.69	140.67 ± 20.57	0.001[s]
Diastolic	Baseline	89.17 ± 6.85	91.12 ± 9.26	0.092
	Before Intubation	87.75 ± 8.88	94.92 ± 9.18	0.001[s]
	After Intubation	87.42 ± 16.84	98.12 ± 18.45	0.001[s]
	After 5 minutes	79.83 ± 13.22	81.83 ± 17.91	0.370
Mean	Baseline	104.58 ± 10.93	107.17 ± 8.47	0.589
	Before Intubation	105.25 ± 13.21	114.75 ± 12.1	0.001[s]
	After Intubation	102.83 ± 18.1	115.33 ± 16.65	0.001[s]
	After 5 minutes	94.33 ± 17.09	98.01 ± 15.96	0.117

s=significant, *p* value reached from unpaired t-test

blood pressure at baseline and before intubation were almost similar between two groups but the mean difference of systolic blood pressure were significantly ($p<0.05$) higher after intubation and after 5 minutes in group B with compared to group A (table 2). Also the mean diastolic and mean arterial blood pressure was significantly increased in group B who did not given oral clonidine. Almost similar findings were reported by Mohammad et al (2016) [14].

Conclusion

From the above study it could be concluded that, oral clonidine provides good attenuation of hemodynamic response to laryngoscopy and intubation in hypertensive patients.

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Original Article

Fracture Radial Neck and Proximal Ulna with Medial Displacement of the Radial Shaft in Children: Our Experience

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Abstract

Background: Radial neck fracture in children is an uncommon injury, where the outcome of its treatment is dependent not only on the method but also on the timing of surgery. Most are minimally displaced or non-displaced. Severely displaced or angulated radial neck fractures often have poor outcomes, even after open reduction, and case series reported in literature are limited. **Objective:** To analyze the outcome in the treatment of fracture of the Radial neck and proximal Ulna with medial displacement of the Radial shaft. **Methods:** This retrospective study was conducted at Satkhira Medical College Hospital, Satkhira from 2014 to 2017. We followed up 24 cases for 3 years. At follow-up, the carrying angle in full elbow extension and the range of motion of the elbow and forearm were measured bilaterally. We recorded clinical results as good, fair, or poor according to the range of movement and the presence of pain. Radiographic evaluation documented the size of the radial head, the presence of avascular necrosis, premature physeal closure, and cubitus valgus. **Results:** Statistical analysis showed that fair and poor results are directly correlated with loss of pronation-supination (p= 0.001), reduction of elbow flexion-extension (p=0.001), increase of elbow valgus angle (p=0.002), necrosis of the radial head (p=0.001), premature physeal closure (p=0.01), and associated lesions (olecranon fracture with or without dislocation of the elbow) (p=0.002). In our cases, residual radial head deformity due to premature closure of the growth plate and avascular necrosis were correlated with a functional deficit. Associated elbow injury was coupled with a negative prognosis. In our series, about 25% of patients had fair and 20% had poor results. Outcomes were good in 55% and felt to represent a better outcome than if the fracture remained non-anatomically reduced with residual angulation and/or displacement of the radial head. **Conclusion:** This study reports the largest series of these fractures with a combination of significant angulation and displacement of the fracture requiring open reduction. We feel that open reduction is indicated when the head of the radius is completely displaced and without contact with the rim of the metaphysis.

Keywords: Radial Neck Fractures in Children, Open Reduction.

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Introduction

Radial neck fracture in children is an uncommon injury, where the outcome of its treatment is dependent not only on the method but also on the timing of surgery. Radial neck fractures commonly occur in children and tend to be more prevalent at ages 9 to 10 years; they represent up to 10% of all pediatric elbow fractures. Radial neck fracture accounts for 4.5 to 21% of pediatric elbow fractures. Most

Most radial neck fractures are minimally displaced or nondisplaced [1–3].

Elbow fractures often occur as a result of falling onto an outstretched hand with elbow in extension [4]. The vast majority of radial neck fractures which are un-displaced or minimally displaced, can be treated non-operatively with good outcomes, especially for young patients with an angulation less than 30° [2]. The mechanism of injury is usually a fall on an outstretched hand with a valgus compressive force across the elbow joint. Radial proximal met epiphyseal fractures are uncommon and account for 5% to 10% of all elbow fractures in skeletally immature patients [5]. The frequency of associated lesions is quite variable, 15% to 60% in reported series [6]. The treatment of radial neck fractures in children varies according to the fracture's displacement, angulation, and skeletal maturity. Most fractures are non-displaced or minimally displaced and can be treated with closed reduction and casting with a good outcome [7].

There is a general agreement that displaced radial neck fractures with >30 degree angulation should be surgically treated [8]. Treatment options include percutaneous pin reduction [9], elastic stable intramedullary nailing [10] and open reduction with or without internal fixation [11]. Open reduction is a method of treatment often used in comminuted fractures or in fractures with a completely displaced head anteriorly or posteriorly on the radial metaphysis and when closed reduction has failed. Reports in the literature note higher rates of complications after open compared with closed reduction [12]. Most authors agree that worse results may follow with open treatment. Whether poor results are a consequence of treatment or the magnitude of the bony and soft tissue injury is not clear. In series reported in the literature, when the head of the radius remains displaced >30% and angulated >45 degrees after attempts of closed or percutaneous reduction, an open reduction is indicated [13].

Materials & Methods

This retrospective study was conducted at Satkhira Medical College Hospital, Satkhira from 2014 to 2017. Twenty-four cases satisfied all the inclusion criteria and were evaluated clinically and radiologically at a mean follow-up of 3 years. At follow-up, the carrying angle in full elbow extension and the range of motion of the elbow and forearm were measured bilaterally. We recorded clinical results as good, fair, or poor according to the range of movement and the presence of pain. Radiographic evaluation documented the size of the radial head, the presence of avascular necrosis, premature physeal closure, and cubitus valgus.

We used the O'Brien classification 22 based on the angulation of the radial neck. Angulation was measured between the superior articular surface of the displaced radial head and the shaft of the radius. Displacement was also measured as the extent of lateral shift of the fragment by the distance from the center of the radial head to a line along the axis of the upper radius.

At follow-up, the carrying angle in full elbow extension and the range of motion (ROM) of the elbow and forearm were measured bilaterally. We recorded clinical results as good, fair, or poor according to the range of movement (pronation, supination, flexion, extension) and the presence of pain as per the Steinberg and Rodriguez-Merchan classification. We also evaluated any change in the carrying angle and axial deformity. Flexion and extension of the elbow, pronation and supination of the forearm, and the valgus angle of the extended elbow were measured using a goniometer. The

uninjured elbows served as controls. Radiographic evaluation documented the size of the radial head, presence of avascular necrosis, premature physeal closure and cubitus valgus. The final follow-up radiographs included standard antero-posterior and lateral radiographs of both elbows.

Results

Twenty-four cases satisfied all the inclusion criteria and were evaluated clinically and radiologically at a mean follow-up 3 years. There were 11 boys and 13 girls with a median age of 7 years, the right arm was involved in 16 patients and the left in 8. Average angulation of Radial neck at surgery was 77.7 degrees. We had poor outcome in 5 patients. 6 patients had premature closure and 3 had necrosis (table 1). Associated lesions of the patients is shown in table 2 which shows there were 2 patients with open fracture and/ or dislocation and 4 had Olecranon fracture.

Table 3: Paired t Test between Normal and Fractured Side in Radial Head Diameter at Follow-up Antero-posterior Radiograms; Valgus Angle, Flexion-extension, Pronation-supination at Clinical Follow-up.

t Test	95% CI	*p*
Radial head diameter: N vs. F	-4.26 to -2.57	<0.0001[s]
F Valgus angle: N vs. F	-11.83 to – 4.92	<0.0001[s]
Flexion-extension: N vs. F	0.79 to 6.29	0.01[s]
Pronation-supination: N vs. F	7.24 to 20.84	<0.0003[s]

Fair (25%) and poor (20%) results were directly correlated with reduction of pronation-supination ROM (P=0.001), reduction of flexion-extension ROM (P=0.001), increase of elbow valgus angle (P=0.002), presence of necrosis of the radial head (P=0.001), premature physeal closure (P=0.01), and an associated lesion, for example, olecranon fracture associated with or without elbow dislocation (P=0.002) (Table 2).

Table 1. Clinical and Radiologic Data (n = 24) at the beginning of the study.

Mean Age of the Patients (Year)	Sex Distribution of the Patients		Arm Affected		Average angulation of Radial neck at surgery (degree)	Outcome		Premature Closure		Necrosis	
	Male	Female	Right	Left		Poor	Fair	Yes	No	Yes	No
7	11	13	16	8	77.7	5	19	6	18	3	21

Table 2: Correlation between Steinberg and Rodriguez-Merchan Classification of the Results (1 Good, 2 Fair, 3 Poor) and Clinical and Radiologic Results.

Comparison	Correlation Coefficients	Significant	*p*
Results vs. pron-sup F	-0.615	Yes	0.001
Results vs. flex-ext F	-0.631	Yes	<0.001
Results vs. valgus angle F	0.588	Yes	0.002
Results vs. head necrosis	-0.630	Yes	<0.001
Results vs. premature physeal closure	-0.482	Yes	0.01
Results vs. associated lesion	-0606	Yes	0.002
Results vs. head diameter F	0.365	NS	0.08

Significant statistical differences were seen between the injured and normal elbow with radial head diameter (P<0.0001), valgus angle of the elbow (P<0.0001), elbow flexion-extension ROM (P<0.01) [due to the reduction of flexion which is correlated with poor results (P<0.003)], and with loss of pronation-supination ROM (P<0.0003) [the reduction of pronation and supination were both correlated with poor results (P<0.01)] (Table 3).

Discussion

This observational retrospective study was done in Satkhira Medical College Hospital from 2014 to 2017. Twenty-four cases satisfied all the inclusion criteria and were evaluated clinically and radiologically at a mean follow-up 3 years. There were 11 boys and 13 girls with a median age of 7 years, the right arm was involved in 16 patients and the left in 8. Average angulation of Radial neck at surgery was 77.7 degrees. We had poor outcome in 5 patients. 6 patients had premature closure and 3 had necrosis (table 1). Associated lesions of the patients is shown in table 2 which shows there were 2 patients with open fracture and/or dislocation and 4 had Olecranon fracture.

We feel that open reduction is indicated when the head of the radius is completely displaced and without contact with the rim of the metaphysis. The management of obviously displaced radial neck fractures in children remains a challenge in pediatric orthopedics.

There is a general agreement that conservatively treated moderate and severe displaced radial neck fractures with an angulation > 30 degrees can result in a decreased range of motion (ROM) and increase the risk of avascular necrosis [10, 13]. A series of surgical procedures have been reported, including percutaneous or intramedullary fixation and open or closed reduction. Even minimal contact was noted in other series to help obtain a closed reduction with a Kirschner wire or an intramedullary elastic nail. In our series, the degree of angulation was always >60 degrees and about 90 degrees in most cases.

In our cases, residual radial head deformity due to premature closure of the growth plate and avascular necrosis were correlated with a functional deficit. Associated elbow injury was coupled with a negative prognosis. In our series, about 25% of patients had fair and 20% had poor results. Outcomes were good in 55% and felt to represent a better outcome than if the fracture remained no anatomically reduced with residual angulation and/or displacement of the radial head.

Loss of motion, the primary cause of poor results, is felt to be secondary to a combination of loss of joint congruity and fibrous adhesions [13-18]. Open reduction was performed to provide an anatomic reduction with minimal trauma of soft tissue around the fracture The bloody supply of the radial head is precarious, and meticulous dissection with preservation of soft tissue attachments to the metaphyseal spike may improve the results.7 In our series, the head was repositioned as gently as possible removing interposed structures that blocked reduction. We found the head fragment to be stable after reduction and internal fixation was not performed. Complication relative to internal fixation to the fragment blood supply and particular surface was avoided without loss of reduction. Acceptability of reduction has to be related to the type of proximal fragment dislocation and displacement and age of the patient, with a younger child having greater potential of remodeling.

Recent works report that closed techniques, especially intramedullary nailing, can be successful for severely displaced fractures, but

about 10% of cases still needed open reduction [14] The learning curve to gain expertise in this method is significant. Comparison with other papers on open reduction treatment was difficult, as they did not use similar classification methods of the fractures nor outcome measures at follow-up with metrics used in the current paper. The limit of the study is to be a retrospective review without comparing different methods and strategy of treatment. However, this treatment must be performed carefully to protect the superficial branch of the radial nerve and the radial physis. Intramedullary nailing has acceptable indirect reduction and preserves the lateral periosteum and the epiphyseal vascular supply; both of these are associated with internal fixation, which prevents displacement before fracture healing.

Conclusion

In our opinion, proximal radial fractures with totally displaced proximal fragments and residual angulation, especially if associated with a lateral shift, for which closed or percutaneous reduction is not successful should be treated with open surgery. Open reduction should be performed with minimal injury to osteo-chondral, ligamentous, and muscular structures to reduce complications associated with this injury. The causes of poor results in these significant fractures appear related to the major focal trauma to the bony and soft tissues in this area.

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