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TMSS Medical College Journal (TMCJ)

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- Type manuscripts double-spaced, on a good quality A4 sized paper, including references, figures with legends and tables on one side of the page only.
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- The abstract should cover Background and Purpose (description of rationale for study); Methods (brief description of methods); Results (presentation of significant results); and Conclusion (succinct statement of data interpretation) in a running manner and not under separate headings.

The Text

The following are typical main headings:

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- **Introduction:** Summarize the rationale for the study with pertinent references. The purpose(s) of the study should be clearly stated.
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- **Results:** Present only important results/observations in logical sequence in the text, tables or illustrations with relevant statistics.
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Tables

- Each table must be typed on a separate sheet and double-spaced. The table number should be Roman, followed by a brief informative title. Place explanatory matter in footnotes. For footnotes use symbol in this sequence. *, **, t, tt" etc.

Figures

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Editorial

Why BRCA Mutation Testing for Breast Cancer?

Dr. DM Arifur Rahman, Prof. Moudud Hossain Alamgir

Breast cancer is a group of heterogeneous tumors with a wide spectrum of morphologic subtypes and biologic behaviors.[1] One of the major challenge in the treatment of breast cancer is to identify subgroups of breast cancer patients who will benefit from a particular adjuvant therapy regimen, with the goal of minimizing overtreatment or undertreatment.[2, 3]

Contemporary management approachs for breast cancer depends on consideration of a group of key clinicopathologic factors that include patient age, menopausal status, tumor size, histologic type, lymphovascular invasion, lymph node staging, tumor grade, and evidence of distant metastasis along with the estrogen receptor (ER), progesterone receptor (PR), and human epidermal growth factor receptor 2 (HER2) status of the tumor.

Familial breast cancer is another area of concern as 10% to 20% women with breast cancer also have an affected first degree relative (parent, sister, or daughter).[4] Meta-analysis has reported that the rate of lifetime risk of breast cancer is in the range of 47% to 66% for BRCA1 mutation carriers and 40% to 57% for BRCA2.[5, 6] BRCA1 and BRCA2 have a major role in DNA repair. Genetic deletion of these genes results in genomic instability.[7, 8]

Because BRCA mutation carriers having significant breast cancer risk, they are ideal candidate for interventions aimed at cancer prevention or cancer risk reduction. These interventions can include frequent screenings with mammograms, screenings with magnetic resonance imaging, chemoprevention with tamoxifen, and prophylactic oophorectomy or mastectomy.[9, 10, 11]

Recent understanding about the molecular biology of BRCA1 and BRCA2 reveals that cells with mutations in these genes are sensitive to blockade of poly ADP ribose polymerase (PARP) and the alternative base-excision DNA repair (BER) pathway. Studies show promising result in platinum-based chemotherapeutic agents and of PARP inhibitors for treatment of breast cancers with BRCA1 or BRCA2 mutation. [12]

NCCN guideline published the indications for BRCA testing. Most important indications include: breast cancer diagnosed at the age of 45 or less, tripple negative breast cancer diagnosed at the age of sixty or less, two first-degree relatives under the age of 50 years with a diagnosis of breast cancer, three or more first- or second-degree relatives with breast cancer regardless of age at diagnosis, a combination of first- or second-degree relatives with breast or ovarian cancer, individuals with any blood relative having BRCA mutation.[13]

In a nutshell, early intervention of a BRCA mutation can reduce familial breast cancer incidence and the clinical benefits of PARP inhibitor in BRCA-related diagnosed breast cancer pose the utmost importance BRCA testing in targeted population. As the cost of BRCA testing is within the limit of lower/middle income peoples of Bangladesh now, we strongly recommend BRCA testing for indicated population.

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Original Article

Evaluation of Serum Interleukin-6 Level among Moderate, Severe and Critical COVID-19 Patients Admitted in a Tertiary Care Hospital

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Abstract

Background: Coronavirus disease 2019 (COVID-19) is caused by the severe acute respiratory syndrome corona virus -2 (SARS-CoV-2). In COVID-19 patients an exaggerated and excessive release of proinflammatory cytokines (IL-6) occurs and may cause several severe manifestations. High interleukin-6 levels in COVID-19 patients suggest cytokine storm and are considered as a relevant parameter in predicting most severe cases of disease. Objectives: The study is aimed to assess IL-6 levels among hospital admitted COVID- 19 patients and evaluate their relationship with disease severity. **Materials and Methods:** Total 136 Rapid antigen test positive or RT-PCR positive COVID-19 patients from Department of Medicine of Sylhet MAG Osmani Medical College and Shahid Shamsuddin Ahmed Hospital, Sylhet from January 2021 to December, 2021 were enrolled in this study by convenient sampling technique. With all aseptic precautions 4ml of venous blood was collected from ante -cubital vein and the serum was separated by centrifuge process at 4000 rpm for 10 minutes and stored in the laboratory at -20ºC. Serum IL-6 was assayed by solid-phase chemiluminescent immunoassay. **Results:** In this study among 136 patients, 66(48.5%) were aged between 51-70 years and mean age was 49.59 ± 18.03 years. There were 65 (47.8%) male and 71 (52.2%) female patients. Out of 136 patients, 76(55.9%) were moderate cases, 43 (31.6%) were severe cases and 17 (12.5%) were critical cases. Mean age of moderate cases were 44.36 ± 18.53 years, severe cases were 52.36 ±14.34 years and critical cases were 64.65 ± 13.90 years. Interleukin-6 level was 6.06 ± 3.69 pg/ml in moderate cases, 44.71 ± 4.49 pg/ml in severe cases and 242.97± 21.48 pg/ml in critical cases and it was higher in critical cases than severe and moderate cases. **Conclusion:** This study showed IL-6 level is significantly associate with the severity of illness. So, it can serve as an effective marker for severity of the diseases that can help the physicians to correctly allocate the hospital admitted COVID-19 patients at an early stage and to identify critically ill COVID-19 patients.

Key words: Serum interleukin-6 level, Moderate, Severe and Critical COVID-19 patients.

Introduction

The Corona Virus Disease of 2019 (COVID-19) represents a global crisis caused by severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2). Corona virus was first isolated and named in the 1960s which belongs to the family Coronoviridae. It is a zoonotic virus that can spread between animals and humans. It is an enveloped virus with a helical nucleocapsid. It contains a nonsegmented, single stranded RNA genome with four classical viral structural proteins, these are: spike (S) protein, envelope (E) protein, membrane (M) protein, and nucleocapsid (N) protein.[1-4]

The novel corona virus (SARS-CoV-2) first broke in Wuhan, China in 31st December 2019. The World Health Organization declared the COVID-19 outbreak as a Public Health Emergency of International Concern on 30 January 2020, and as a pandemic on 11 March 2020. On 8 March 2020, Bangladesh has confirmed its first case of COVID-19 patients caused by SARS-CoV-2 virus.[5] On, January 2022; there have been 364,191,494 confirmed cases of COVID-19, including 5,631,457 deaths, reported to WHO. Among them, Bangladesh has confirmed a total 1,798,833 cases with 28,394 deaths.

Coronavirus initially undergoes viral replication in the respiratory tract and then spread to other organs and tissues. Then it enters the pulmonary alveolar epithelial cells through angiotensin converting enzyme receptor 2 (ACER2). The main mechanism for inflammation and organ damage is cytokine storm, especially in pulmonary vascular endothelial cells with increased inflammatory cytokines such as interleukin-6 (IL-6), interleukin-10 (IL-10) and interferon- γ (IFN-γ). Exaggerated and excessive synthesized cytokines like IL-6, IL-10 can lead to cytokine storm which is associated with disease severity of COVID-19 patients.[6-10]

The clinical manifestations of COVID-19 are wide-ranging, from asymptomatic, mild, and moderate to severe viral pneumonia such as acute respiratory distress syndrome (ARDS). COVID-19 patients with clinical sings of pneumonia (fever, cough, dyspnoea, fast breathing) but no signs of severe pneumonia (SpO2≥ 90% on room air) categorized as moderate case, patients with clinical sings of pneumonia (fever, cough, dyspnoea, fast breathing) plus one of the following: severe respiratory distress, respiratory rate> 30 breaths/min or SpO2< 90% on room air categorized as severe case (Severe Pneumonia) and severe COVID-19 case with any of the following criteria: respiratory failure and requiring mechanical ventilation, sepsis, septic shock, ARDS, any organ failure that requires ICU care categorized as Critical cases (Cases requiring ICU care).[11] But some COVID-19 patients experience respiratory deterioration over a short period of time during their clinical course. Thus, it is essential to identify patients who are likely to develop severe condition as early as possible.[6,7,12] Several blood markers could predict respiratory failure in COVID-19 patients. Some inflammatory cytokines could distinguish disease severity in COVID-19. In some patients, the general condition dramatically worsens within a couple of days with severe respiratory failure. Therefore, it is of high priority to identify reliable blood markers which could predict respiratory illness in the short term in clinical settings. In COVID-19 patients with cytokine release syndrome (CRS), interleukin-6 (IL-6), IL-10, and interferon (IFN)-γ are consistently elevated. In COVID-19 patients IL-6 contributes to many of the symptoms, such as the production of acute phase reactants by hepatocytes, activation of the extrinsic coagulation pathway and production of vascular endothelial growth factor (VEGF), leading to endothelial inflammation. IL-6 play a pivotal role in the pathophysiology of lung damage in COVID-19 patients. High level of serum IL-6 have been observed in many patients with cytokine storm in severe COVID-19. COVID-19 patients with comorbidities with high IL-6 levels at admission are at increased risk of developing a severe from of the diseases, requiring mechanical ventilation and ICU and progressing to respiratory distress syndrome and multiorgan failure.[13-17] In a meta-analysis including nine studies reporting that mean IL-6 levels were more than three times higher in patients with complicated COVID-19 compared with mild or moderate diseases. The concentration of IL-6> 24pg/ml at initial assessment predicted the development of hypoxemia requiring hospitalization.[18] So, by this study we can evaluate serum IL-6 level among hospital admitted COVID-19 patients and can make an association of IL-6 with severity of the diseases in hospital admitted COVID-19 patients and can help in further management of patients.

Materials and Methods

This cross-sectional observational study was conducted in the department of Microbiology and Virology in collaboration with Department of Medicine of Sylhet MAG Osmani Medical College and Shahid Shamsuddin Ahmed Hospital, Sylhet from January 2021 to December 2021. After obtaining ethical clearance, total 136 Rapid antigen test positive or RT-PCR positive COVID-19 patients were enrolled in this study by convenient sampling technique. With all aseptic precautions 4ml of venous blood was collected from ante -cubital vein. Then serum was separated by centrifuge process at 4000 rpm for 10 minutes and stored in the laboratory at -20ºC. Serum IL-6 was assayed by solid-phase chemiluminescent immunoassay. Data were recorded in a pre-designed

structured data collection form. One way ANOVA and unpaired t-test was applied to analyse the data by using SPSS version 26.

Results

In this study the age of the patients ranged from 18 years to 90 years. The mean age of the patients was 49.59 (SD± 18.03) years.

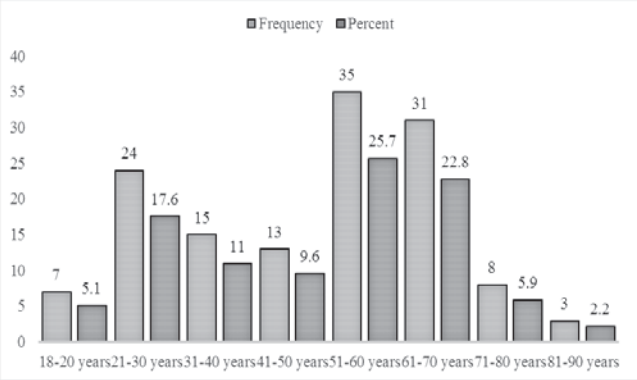

Figure-1: Distribution of the patients according to age group (n=136)

Figure 1: Shows out of 136 patients, majority 35(25.7%) were aged between 51-60 years followed by 31 (22.8%) were in the age group of 61-70 years.

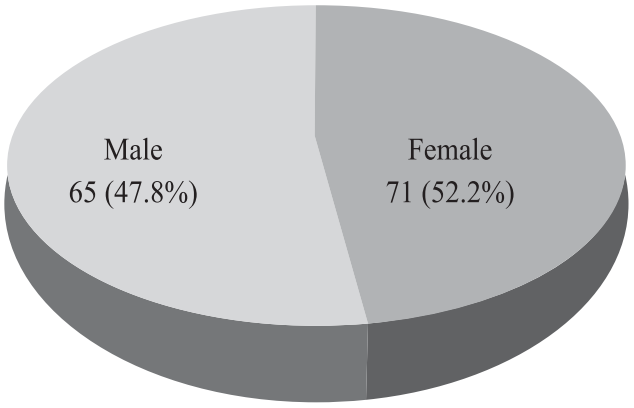

Figure-2: Distribution of the patients according to Gender (n=136)

Figure 2: Shows out of 136 COVID-19 patients, male patients were 65 (47.8%) and female patients were 71 (52.2%).

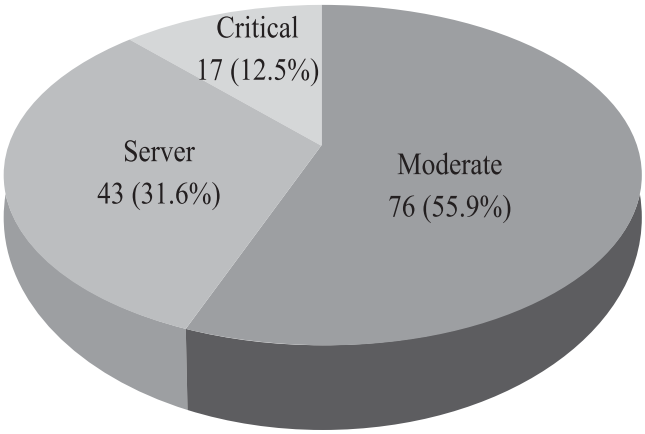

Figure-3: Distribution of the COVID-19 patients according to disease severity.

Figure 3: Shows out of 136 patients, moderate cases were 76 (55.9%), severe cases were 43 (31.6%) and critical cases were 17 (12.5%).

Table-I: Distribution of age of the COVID-19 patients among severity of the diseases

Age (year)	Severity			*p-value
	Moderate	Severe	Critical	
Mean	44.36	52.36	64.65	p<0.001
± SD	± 18.53	±14.34	± 13.90	

*One way ANOVA was applied to analyse the data

Table I: Shows the mean age of moderate cases was 44.36 ± 18.53 years, severe cases was 52.36 ±14.34 years and critical cases was 64.65 ± 13.90 years and the difference of the age of the patients of different group was statistically significant (F=11.360; p<0.001).

Table-II: Comparison of IL-6 level among moderate, severe and critical COVID-19 patients:

Interleukin-6 level (pg/ml)	Severity			*p-value
	Moderate (76)	Severe (43)	Critical (17)	
Mean	6.06	44.71	242.97	p<0.001
± SD	± 3.69	± 4.49	± 21.48	

*One way ANOVA was applied to analyse the data

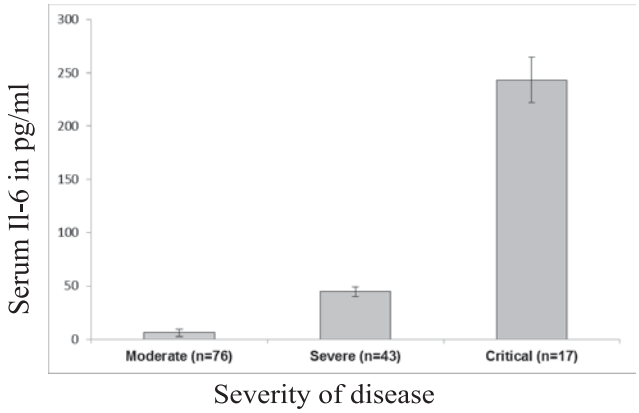

Figure-4: Comparison of interleukin-6 level among severity of COVID-19 patients

Table II and figure 4: Shows IL-6 level were 6.06 (SD± 3.69) pg/ml, 44.71 (SD± 4.49) pg/ml and 242.97 (SD± 21.48) pg/ml in moderate, severe and critical cases of COVID 19 patients respectively. IL-6 level was significantly differed among the severity of cases ($F=318.641$; $p<0.001$) and the difference was statistically significant.

Discussion

The present study conducted to assess IL-6 level of moderate, severe and critical COVID-19 patients. In this study the age of the patients ranged from 18 years to 90 years and the mean age was 49.59 (SD± 18.03) years. In Cruz[6] mean age was 45.24 (SD± 13.97) years and in Vultaggio[19] the mean age was 63 (SD± 15) years. The majority 66 (48.5%) of the patients were aged between 51-70 years.

There were 65 (47.8%) male and 71 (52.2%) female cases with a ratio of male and female 1:1.1 in this study. Gender distribution was reported by Liu[14] in China, where 46.98% male and 53.02% female and in Cruz[4] where male patients 52%, female patients 48%. The gender ratio of the study subjects was almost same. Men and women had the same prevalence in COVID-19 in Jiang[9].

In the present study out of 136 patients 76 (55.9%) were moderate cases, 43 (31.6%) were severe cases and 17 (12.5%) were critical cases of COVID-19. (Patient's categorization: moderate, severe and critical case according to national guideline 9th edition: page 1 & 2). The case distribution was reported by Azmy[20] in New Haven, USA where moderate case was 48%, severe case was 30% and critical case was 22%.

In this study the mean age of moderate cases was 44.36 ± 18.53 years, severe cases were 52.36±14.34 years and critical cases was 64.65±13.90 years. Similar observation was recorded by Gong[12] in China where the mean age of moderate cases was 45.29±13.08 years, severe cases was 60.41±9.80 years and critical cases was 65.88±13.61 years. So, mean age of patients was higher in critical case, than severe and moderate cases.

In the present study interleukin-6 level were 6.06± 3.69 pg/m in moderate cases, 44.71±4.49 pg/ml in severe cases and 242.97±21.48 pg/ml in critical cases of COVID 19 patients respectively. Mean value of IL-6 was higher in critical cases, than severe and moderate cases. A study Vultaggio[21] in Chin showed the mean interleukin-6 level was 15.7±15.60 pg/ml in moderate cases, and 53.63±63.8 pg/ml in severe and critical cases, 27±40.9 pg/ml in all cases of COVID-19 patients respectively. Another study Azmy[20], in New Haven, USA showed interleukin-6 level was 19.5pg/ml in moderate cases, 21.20 pg/ml in severe cases of COVID 19 patients respectively. IL-6 values in critically ill COVID-19 patients were admitted to the ICU was 336 pg/ml in Gorham, California. So, IL-6 level was significantly higher in critical cases compared to moderate and severe cases.

Conclusion

Coronavirus disease 2019 (COVID-19) was caused by a new strain of beta coronavirus, SARS-CoV-2. Worldwide it is emerging as a huge threat to human health and the mortality rate is higher among severe and critical cases. Cytokine storm causes systemic inflammation, ARDS and multi-organ disfunction in COVID-19 patients. The current study indicates that high IL-6 levels suggest a cytokine storm which may play a major role in the pathophysiology of this disease and are considered as a relevant parameter in predicting most severe cases of disease. In this study

IL-6 level was significantly higher in critical cases compared to moderate and severe cases who needed more intensive care and treatment, due to severe lung damage. IL-6 level was significantly differed among the moderate, severe and critical COVID-19 patients. Therefore, IL-6 could be a potential marker for disease monitoring in hospital admitted COVID-19 patients. Targeting IL-6 may be effective in treating inflammatory cytokine storm by using anticytokine therapeutic during disease progression. A better understanding of IL-6 in the pathogenesis of COVID-19, especially in the critical cases, may help us to manage the disease.

Limitations of the study

1. Association and correlation with other inflammatory markers were not included in this study.
2. A more detailed recording of IL-6, as well as its upstream and downstream parameters, may help clarify this ambiguity.

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Original Article

Correlation of Handgrip Strength and Body Mass Index of Adult Healthy Females of the Slum Area in Dhaka City

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Abstract

Background: Handgrip strength is used as an indicator of overall physical strength. On the other hand, Body Mass Index (BMI) is a simple and convenient method to measure someone's physical status. Therefore, BMI may affect the handgrip strength and very few studies especially in Bangladesh have shown the correlation of BMI with handgrip strength. **Objective:** The aim of present research was to test the correlation between the handgrip strength and BMI of adult healthy females of the slum area in Dhaka city. **Materials and Methods:** In the present research, 100 adult females aged between 18 to 45 years, residing in different slums in Dhaka city of Bangladesh were the participants. BMI was calculated from participant's height and weight. The dominant handgrip strength was measured using a digital handgrip dynamometer. The associations of the dominant handgrip strength with the height, weight and BMI were tested using Pearson's correlation coefficient test. **Results:** The Correlation coefficient of the dominant handgrip strength (DHGS) with the height ($r = 0.400$) and weight ($r = 0.412$) of 100 Bangladeshi slum females reach up to positive and strong significant level (< 0.01). There is also a positive and significant correlation (< 0.05) with the dominant handgrip strength with BMI ($r= 0.303$). **Conclusion:** The finding of present research support that, the dominant handgrip strength was positively associated with BMI of slum females.

Key words: Handgrip strength, Handgrip dynamometer, Body Mass Index, Slum females.

Introduction

Handgrip strength is usually used to assess the overall general strength of the body to determine the working capacity and nutritional status.[1] The power of hand grip is result of forceful flexion of all finger joints with the 'maximum voluntary force' that the subject is able to 'exert under normal biokinetic conditions', which uses several muscles in hand and forearm.[2] Moreover, the integrity and proper fitness of the musculoskeletal system of the upper limb, important issue to carry out daily activities and hand gripping strength.[3] BMI (Body Mass Index) is an important index to measure someone's nutritional status and the handgrip strength is a good predictor of an individual's nutritional status. In addition, it is established that the handgrip strength is strongly related to height, weight, Body Mass Index (BMI), physical activity.[4] Smith et al[5] have found a direct correlation in handgrip strength and overall body strength upon very old and oldest females. It is reported that handgrip strength is also important in determining the efficacy of different treatment strategies of hand and hand rehabilitation.[4]

According to a report from the Bangladesh Bureau of Statistics (BBS), labor force participation for women is 36% in compared to 82.5% for men. However, the size of female labor force increased 4.6%, while male labor force increased by 1%.[6] Now besides the male, the females also give the big hand to support their family economically. Thus, female laborer is a great source of working manpower of Bangladesh in many industries, construction works, field works and even in household works. For their low economic condition they live in slum area of Dhaka city. Here, they are suffering for

unhealthy living condition in every phase of their life. Maximum slum females have no education and they do various type of work according to her capability. They work in garments, industries, construction sites, cook in hotels, as a housemaid in various house. In addition, they work for long hours from morning to evening and besides the outside jobs they have to do all the household works too. Some of the family is run by the female's income. But still, they are not aware of their health issues. Moreover, some of the female's nutritional status is below average, they do not take balance diet as daily requirement. Thus, their health issues are often neglected. The poor nutritional status and week physical condition as the main reason of high rate of daily absence in work. However, wellbeing and proper fitness of musculoskeletal system is one of the important factors to carryout daily activities[8] and laborers require more physical strength to perform their daily work efficiently. Thus, without adequate handgrip and forearm strength, the works do not meet its desired success. Since, females of the slum areas in Dhaka city are the important source of work force in Bangladesh. But there are few researches in Bangladesh, which enrolled among the slum females. Therefore, this research was initiated to test the hypothesis that there is a correlation between the handgrip strength and BMI of adult healthy females of the slum area in Dhaka city.

Materials and Methods

The research was cross-sectional and carried out on 100 adult's Bangladeshi females aged between 18 to 45 years, residing different slum areas at Mirpur in Dhaka city. The research was conducted from March 2019 to February 2020. All measurements were taken during a particular time (3 pm to 6 pm) of the day to prevent diurnal variations. Data analysis was carried out in the Department of Anatomy, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka. In the present research, right-handed participant was selected. Participants with the history and physical features of any congenital anomaly, genetic disorder, neurological disorder, endocrine disorder, autoimmune disorder, trauma, surgery, musculoskeletal impairment that can affect the hand anthropometry was excluded from the current research. The ethical clearance was obtained from Institutional Review Board of BSMMU.

To measure the height participant was requested to be barefooted and remove any hair ornaments, jewelry, buns, or braids from the top of the head. The participant was asked to stand with her heel together, toes apart and her back as straight as possible. So that, her heels, buttocks, shoulders and the head touched the wall to measure the stature. The participant's head was positioned in the Frankfort horizontal plane and the arms were hung freely by the sides with the palm facing towards the thighs. Then, a steel plate was placed against the head and wall to determine maximum height or stature on the wall, and this was marked by black eye pencil. The participant was then told to step away from the wall. The stature was then measured from the floor to the marked point on the wall with a measuring steel tape. To measure the weight participant was requested to be barefooted and to wear light cloths, then asked to stand upon a portable weight machine. Then, the weight was recorded in kilograms. Then, Body Mass Index (BMI) was calculated as body weight measured in kilogram divided by square of body height measured in meter. It was calculated using the formula: BMI = weight (kg) / height (m)^2

The handgrip strength of dominant hand was measured using a standard adjustable digital handgrip dynamometer (Camry, Model no. EH 101). Before taking the measurement, the participant was asked to stand comfortably with the shoulder adducted and neutrally rotated and elbow in full extension. After taking a deep breath, the participant was requested to hold the handgrip dynamometer freely in dominant hand without any support, and not touching her trunk. Then, the participant was asked to squeeze the handle of dynamometer with maximum strength as hard as possible without moving the body and hold it for 4- 5 seconds. The instrument automatically records the highest measurement in kilogram during the whole procedure and displays that in monitor. After 30 seconds break the participant was again requested to repeat the procedure.

The statistical analysis was performed using SPSS software (version 24.0) and the associations of the dominant handgrip strength with the BMI was tested using Pearson's correlation coefficient test.

Results

Table-I: Work descriptions of the females in the slum areas of Dhaka city

Female participants (n = 100)			
Occupation	Frequency (n)	Occupation	Frequency (n)
Housemaid	45	Garment worker	30
Hotel worker	2	Housewife	9
Construction site worker	2	Cook	5
Hospital cleaner	1	Shopkeeper	4
City corporation worker	1	College student	1

Table I shows work descriptions of the females in the slum areas of Dhaka city of the present research. Among the participants 45% were housemaid, 30% were garment worker and rest were from different occupation. Most of them were illiterate (99%) and a very few were educated (1%).

Table-II: Values of the height, weight, BMI and dominant handgrip strength of females (n =100)

Variables	Range	Mean (±SD)
Height of participants (cm)	140.5 - 167.0	149.74 (±4.84)
Weight of participants (kg)	37.50 - 70.50	52.90 (±7.92)
Body Mass Index (kg/m2)	18.2 - 30.0	23.54 (±2.99)
Dominant handgrip strength (kg)	18.03 – 37.8	25.59 (±3.24)

Table II represents the mean values as well as ranges of the height, weight, BMI and dominant handgrip strength of 100 adult females in slum areas in Dhaka city. The mean height was 149.74 cm, mean weight was 52.90 kg and mean BMI was 23.54. The mean dominant handgrip strength was 25.59 kg.

Table-III: Correlation coefficient of the dominant handgrip strength (DHGS) height, weight, and BMI of Bangladeshi females in the slum areas of Dhaka city

Variable	Correlation coefficient (r)	Significance (p value) of correlation with DHGS
Height of participants (cm)	+0.400	0.004
Weight of participants (kg)	+0.412	0.003
Body Mass Index (kg/m2)	+0.303	0.032

The Correlation coefficient of the dominant handgrip strength (DHGS) with the height 0.004 and weight 0.003 and they reach up to positive and strong significant level (< 0.01) (Figure 1, 2). There was also a positive and significant correlation (< 0.05) with the dominant handgrip strength with BMI have shown in table III and Figure 3.

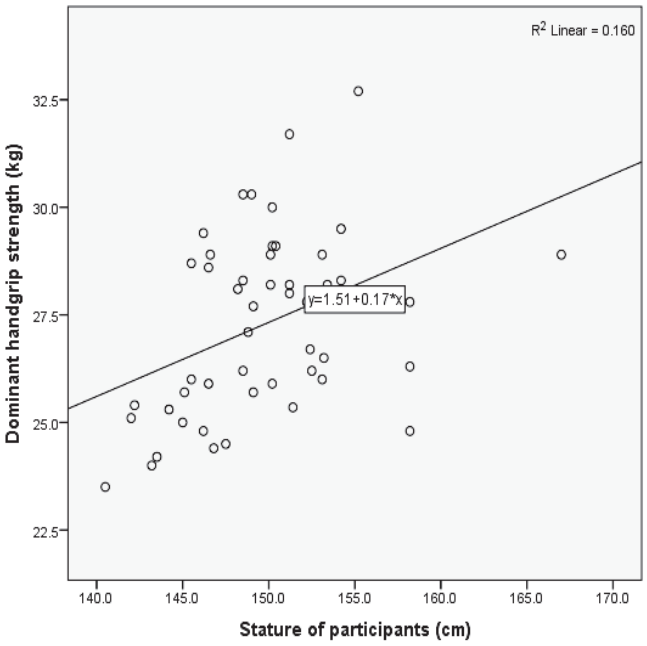

Figure- 1: Significant positive correlation (r = +0.400, r2 = 0.160, p= 0.004) of the dominant handgrip strength with height of participants

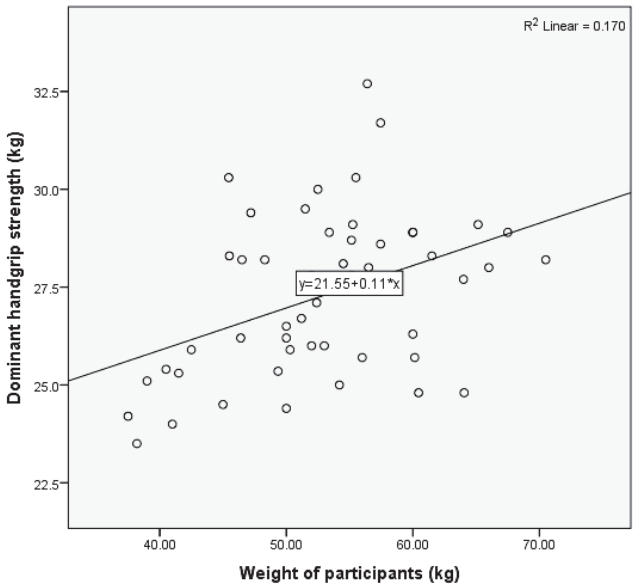

Figure- 2: Significant positive correlation (r = +0.412, r2 = 0.170, p = 0.003) of the dominant handgrip strength with weight of participants

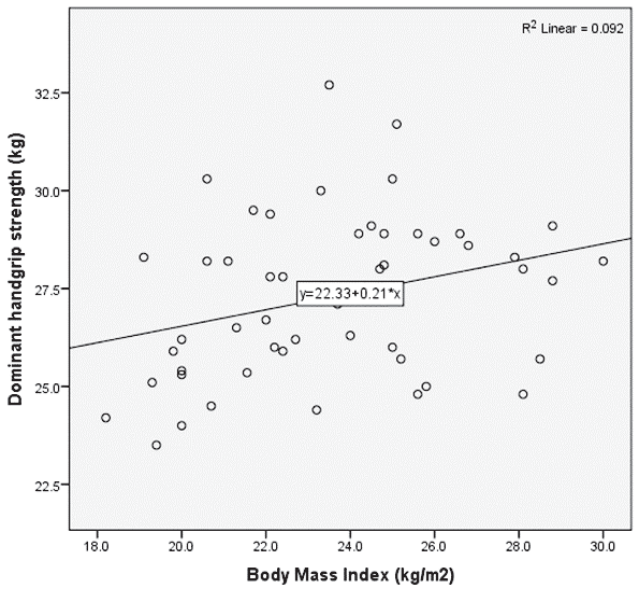

Figure- 3: Significant positive correlation (r = +0.303, r2 = 0.092, p = 0.032) of the dominant handgrip strength with BMI

Discussion

In present research, the Bangladeshi females in slum areas in Dhaka city were in poor socio-economic condition but healthy. No participant was found to have low BMI (< 18.00); thus, their mean BMI was 23.54. Here, there was positive significant correlation between the dominant handgrip strength with height, weight and BMI independently. It has been thought that handgrip strength is a possible predictor of overall body strength. Several researchers have shown different findings in association of handgrip strength with stature, weight, and BMI. Some studies have reported positive correlation between height and handgrip strength across adult to elderly population. It has been reported that handgrip strength was positively associated with BMI[8]. Again, evidence has shown in the findings of the previous researches[9-15] that there were strong correlations between grip strength and weight, height, and BMI as like this present research. So, the greater heights that would lead to longer arms, with greater lever arm for force generation, resulting in an efficient amount of force[3]. Generally, people with large measurements in their body have a great strength and handgrip strength is an indicator to measure the strength[11]. Because of, it was established that, physical activity has a strong association with body strength, shape, size, form and measurements of an individual[16]. Again, a research conducted by Seoty at el17 on 254 female garment workers in Dhaka city and found that handgrip strength had a positive association with BMI, height and weight but non-significant. Mitsionis et al[18] however reported association between BMI and dominant handgrip strength in females, which partially support present research. Thus, differing BMI in individuals of the same age and gender could mediate differences in outcome of hand grip strength.

On the other hand, present research finding contrasts with the finding of some researchers[19-21], they reported that BMI does not influence handgrip strength. Similarly, it was found that handgrip strength is not significantly associated with height and weight of 180 Indian population[22]. The contradictory findings of the previous researches in association between the handgrip strength and BMI are difficult to

explain, even they could not mention the explanation. Again, a research had conducted in North India on 100 female laborers and 100 sedentary women and result was the dominant handgrip strength was greater in sedentary women than the laborers group; because, the laborers were malnourished (low BMI) and suffered by diseases related to it despite of high physical activities of female laborers[23]. But in present research the females in slum areas of Dhaka city, were not in low BMI (<18); here maximum females work regularly and repeatedly using their hand. Many daily activities which involve flexor muscles of forearm and hand, causes increased muscular mass and thus more handgrip strength[24]. Hence, when the muscle mass is more, the number of muscle fiber and length are also more. Again, a muscle with a large cross sectional area is able to produce maximal force during working[25]. Therefore, here physical activity and more usage of hands also influences to increase handgrip strength.

The limitation of the present research was its population size. Though it was cross-sectional, participants were not grouped into their works and but it provides a hint of positive correlation between the dominant handgrip strength and BMI of female slums of Dhaka city. This finding may be useful in the process of laborer selection in industries and physical therapy treatment of musculoskeletal disease.

Conclusion

From the result, it could be concluded that the present research support the significant and positive correlation between the BMI and the dominant hand grip strength, which needs advanced evaluation.

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Original Article

Axial Length of Eyeball in Emmetropic Eye –A study in Rajshahi Medical College Hospital

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Abstract

Introduction: Axial length is one of the most important parameter for optometry and oculoplastic surgery. This variable is very crucial in biometry for the measurement of the power intraocular lens accurately in cataract surgery. Many studies were carried out in various populations to determine axial length in emmetropic eye. However, there is only one study on axial length measurement in emmetropic eye in Bangladesh. This study aimed to determine the axial length in emmetropic eye in Bangladesh. **Materials and Methods**: This descriptive cross sectional analytical study was conducted among 200 emmetropic eye of Bangladeshi people who were attend with the patient, in department of Ophthalmology in Rajshahi Medical college between from july 2017 to june 2018.Data was collected through face to face interview, checking visual activity by Snellen chart and axial length of eyeball by A scan ultrasonography. **Results**: The mean ±SD age of participants was 36.5(±14.5) years. Participants are almost equal in sex distribution. The mean axial length of right and left eye was 23.07±0.69 mm and 23.02± 0.66 mm respectively and significant ($p< 0.001$). **Conclusion**: Optical parametry is a non-invasive diagnostic and assessment tool. So axial length measurement is help in the actual measurement of intra ocular lens inplantation of cataract surgery and it also provide supplementary information to researcher domain in the actual measurement of intraocular lens inplantation in cararact surgery and may also provide supplementary information to researcher domain.

Key words: Axial length, Cataract, Emmetropic eye.

Introduction

Eye is the most important sense organ and organ of vision in human. Usually eye is so contracted that the parallel rays coming from distant object is focused at the level of retina when accommodation is at rest[1]. This type of eye is known as emmetropic eye and its visual acuity is 6/6.To achieve 6/6 visual acuity, the axial length should be such that the light rays are accurately focus on retina being refracted through the cornea and lens.[2] Measurement of axial length is important in several clinical specialties including ophthalmology specially in oculoplastic surgery. The axial length measurement is one of the main component for calculating the accuracy of intraocular lens power. Axial length is an important biometric factor that affecting refractive status. The axial length is the distance between anterior surfaces of cornea to fovea or retinal Bruch's membrane.[3,4] There is an only one study on axial length measurement in emmetropic eye in Bangladesh[2]. Other studies in different countries, it was observed that axial length varies in different population. So this study may help in studying orbito-cranial growth patterns, pathological diagnosis, and surgical managements of cataract surgery and manufacturing of spectacles.

As there was limited study on the context in our population, further study is need in larger population in Bangladesh need to be contemplated on axial length in emmetropic eye.

Materials and Methods

This is a cross sectional analytical study. Data was taken from department of Ophthalmology, Rajshahi Medical College Hospital with the collaboration of Department of Anatomy, Rajshahi Medical College. This study was done from July 2017 to June 2018.

Sample was collected from people who had 6/6 visual acuity came in Ophthalmology dept. at Rajshahi Medical College Hospital during the study period of one year. Sample size was determinate by this formula's= Z^2Sd^2/E^2. Here: the minimum sample size of this study was 141. To enhance the validity of the findings 200 sample were taken. Purposive random sampling was used to select sample population. A survey questionnaire was prepared to collect data. Data was collected through face to face interview, checking visual acuity by Snellen chart and axial length measured by A Scan ultrasonography. Ethical permission was taken from the Institutional Review Committee of Rajshahi Medical College, Rajshahi. Data were expressed as mean ± SD and statistical significance of difference among the group was calculated by unpaired student's t test. After completion of data collection, they were checked, verified to reduce error. The data was analyzed with the help of a computer based on SPSS software program version 16.0 for windows. After entry into the computer results were analyzed according to objectives and variables of the study. P value <0.05 was considered as significant.

Results

The present study was intended to find out the axial length of eyeball in emmetropic eye on a total of 200 healthy adult people. This variable was measured by A Scan Ultrasonography. The findings obtained from the study were presented below

Table-I: Age distribution of the participants (n = 200)

Age distribution	Frequency(n)	Percent (%)
21-30	117	58.5
31-40	75	37.5
41-50	7	3.5
51-60	1	.5
Total	200	100

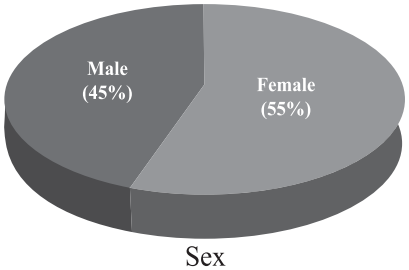

Fig 1: Distribution of participants by their sex (n = 200)

Table- I showed that of all participants, the majority 58.5 % (117) were in the age group 21 to 30 years and the minority participants 0.5 % (1) from 51 to 60 years. Among the participants female and male ratio was 11:9 where female 55% and male 45% (Figure-1).

Table-II: Frequency of right axial length

Right axial length in mm	Frequency(n)	Percent (%)
21-21.5	5	2.5
21.51-22	10	5.0
22.01-22.5	21	10.5
22.51-23	53	26.5
23.01-23.5	59	29.5
23.51-24	36	18.0
24.01-24.5	12	6.0
24.51-25	4	2.0
Total	200	100.0

Table-III: Study of right axial length.

Right axial length (mm)	n	Minimum	Maximum	Mean±SD	S.E	Variance
	200	21.08	24.97	23.07±0.69	.04940	.488

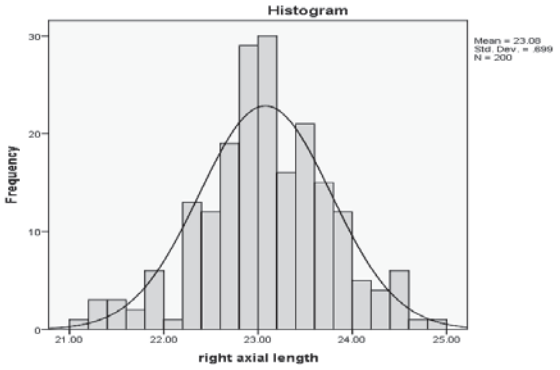

Figure-2: Histogram showing the normal distribution of right axial length

Table II delineated that majority of the sample population fall in the frequency of right axial length 22.51 to 23.50 mm. Table III also represent the study of right axial length in which, range was 21-25 mm, standard error, standard deviation and variance were 0.049, 0.69, and 0.48 respectively. The mean right axial length was 23.07±0.69 mm. The histogram also shows that the normal distribution of right axial length. (Figure- 2).

Table-IV: Frequency of left axial length

Left axial length in mm	Frequency (n)	Percent (%)
21 -21.5	6	3.0
21.51-22	10	5.0
22.01-22.5	22	11.0
22.51-23	66	33.0
23.01-23.5	49	24.5
23.51-24	35	17.5
24.01-24.5	8	4.0
24.51-25	4	2.0
Total	200	100.0

Table-V: Distribution of left axial length

Left axial length(mm)	n	Minimum	Maximum	Mean±SD	S.E	Variance
	200	21.15	24.82	23.02±0.66	.04727	.447

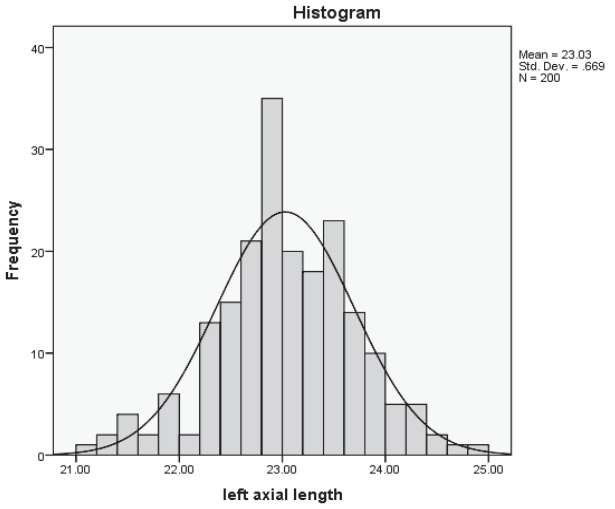

Figure-3: Histogram showing the normal distribution of left axial length

Table IV and V reported that the frequency of left axial length in which 22.51 to 23.5 mm carries majority portion of population. The standard deviation, standard error and variance were 0.047, 0.66, and 0.44 respectively. The mean left axial length was 23.02±0.66 mm. Histogram showing the normal distribution of left axial length (Figure- 3)

Discussion

Measurement of axial length of eyeball and is a well-established diagnostic aid for different clinical condition in ophthalmology. This present study was based on optical parametric measurement, which included 200 adult individual who had 6/6 visual acuity without any aid in northern part of Bangladesh. The range of the age in this study was 21 to 52 years. The sample population was selected above 18 years to avoid the chance of primary refractive error. Majority of the participant's (58.5%) age range was 21 to 30 years as secondary refractive error usually absent in this age group. This study coincides with the study of Abdul *et al*,[5] and Sudhan, M[6], they observed that on 102 participant's age within 14 to 60 years of age where 46 % participants were 21 to 30 years of age. So the age range of the participants of that study was similar with the present study. The lowest age group was in 4th and 5th decade, which was only 4% because after that age incidence of secondary refractive error and various systemic diseases became more. So frequency of participants declined in that age group.

In the present study it was observed that the mean axial length of right and left eye was 23.07±0.69 mm and 23.02±0.66 mm respectively. The result was supported by other four studies in India, in which according to Abdul *et al*, [5] the mean average of axial length was 23.52±0.96 mm, according to Sudhan, M[6] the mean axial length was right eye 23.52±0.96 mm and left eye 23.52±0.84 mm, according to Roy *et al,*[7] the mean axial length was right eye 23.35±0.87 mm and left eye was 23.23±0.64 mm and according to Solu *et al,*[8] the mean axial length was 22.37±0.83 mm. The results of their study were similar with the present study ($p>0.05$). A study also done on similar context in Nigeria, by Laymu *et* al,[9] It was found that the mean axial length was 23.49±0.44mm which was coincides with this study.

The present study was well correlated with another study done by Hoque E,[2]. in Bangladesh where the

axial length was 22.86 ±0.73 mm which was similar and not significantly different ($p>0.05$) with the present study. Because the study was also done in same population, almost same age group and using same instrument A scan ultrasonography.

Conclusion

Optical parametry is a noninvasive diagnostic and assessment tool. It is a promising method in studying in different ophthalmic measurement. This study revealed that axial length is an important factor to maintain 6/6 visual acuity for emmetropic eye. The axial length of eyes might be utilized in various applications in medical science including ophthalmology, specially in measuring the power of intraocular lens accurately in cataract surgery and other ocular surgery. The findings of the study might provide supplementary information to other researcher in this domain.

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Original Article

Landmark of Sacral Hiatus and its Clinical Significance in Caudal Epidural Block

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Abstract

Background: Anatomy of sacral hiatus has clinical importance during caudal epidural block. Single bony landmark may not help in locating sacral hiatus because of anatomical variation. This study determines the landmarks for CEB (Caudal epidural block) along with the apex of sacral hiatus and equilateral triangle, were measured. So, the knowledge of anatomy of sacral hiatus is significant while administration of caudal epidural anesthesia and it may help to improve its success rate. **Materials and Methods:** This study was performed on 57 out of 60 dry adult human sacra of unknown sexes from the stocks of Anatomy laboratory of Sylhet MAG Osmani Medical College, Sylhet from July 2017 to June 2018. Sex determination of the collected unknown sacra was done by using discriminant function analysis and found 28(49.12%) male and 29(50.88%) female using digital slide calipers and measuring tape different parameters were measured. **Results**: Right and left superolateral sacral crests of the sacrum were taken as two points on dorsal surface of sacrum (forming the base of a triangle) because posterior superior iliac spines impose on the superolateral sacral crests. The distance between the two superolateral sacral crests (base of a triangle) were 60.13mm (range 57-70 mm), the distance between the right Superolateral sacral Crest and the apex were 76.11 mm (range, 56-94mm), the distance between the left Superolateral sacral Crest and the apex 78.53 mm (range, 56-102mm) respectively. Students t'test was applied to reach the level of significance where necessary. A probability value (p) of less than 0.05 was considered statistically significant. **Conclusion:** The apex of sacral hiatus and equilateral triangle that is located between the apex of sacral hiatus and superolateral sacral crests was found. That will certainly be use in determining the location of the sacral hiatus during CEB.

Keywords: CEB (Caudal epidural block); Sacrum, Sacral apex, Sacral hiatus.

Introduction

For analgesia and anesthesia in various clinical procedures, we need caudal epidural block which involves injection of a drug into the epidural space through the sacral hiatus. The sacral hiatus is an arched defect in the posterior wall of the sacral canal formed by the failure in fusion of the laminae of the fifth (and sometimes fourth) sacral vertebra dorsally. The remnants of the inferior articular processes of the fifth sacral vertebra elongate downward on both sides of the hiatus, extending from its apex as the sacral cornua[1]. Sacral cornua felt at the upper end of natal cleft 5 cm above the tip of the coccyx[2]. The dural sac and subarachnoid space usually extends to the level of the S2 segment of the sacrum but the dural sac may ends as high as the L5 or to S3. Entry into sacral canal should be safe to prevent dural sac puncture and protect surrounding structures.[3, 4] The sacral hiatus and the cornua are palpable landmarks employed in caudal epidural injections.[5, 6] But in case of obese and adults it is sometimes difficult to determine the anatomical location of the sacral hiatus and the caudal epidural space[7]. Incorrect needle placement has been reported to occur in up to 36% of cases, even with experienced operators.[8] The success rate of CEB is based on

determination of the landmarks by the clinician. The main goal of this study was to identify additional anatomical landmarks in cases where the sacral cornua could not be identified and measurements that may enhance the location of the apex of the sacral hiatus in practical solution for CEB. Measurements on dry sacral bones determine anatomical landmarks that may be used during CEB procedures.

Materials and Methods

This study was performed on 57 out of 60 dry adult human sacra of unknown sexes from the stocks of Anatomy laboratory of Sylhet MAG Osmani Medical College, Sylhet from July 2017 to June 2018. Sex determination of the collected unknown sacra was done by using discriminant function analysis and found 28 (49.12%) male and 29 (50.88%) female. Ethical clearance was taken from the Ethical Board of Sylhet MAG Osmani Medical College, Sylhet. By using digital slide calipers and measuring tape different parameters were measured. Morphometric measurements relating to the sacral hiatus, were obtained such as superolateral sacral crests of the sacrum were used as landmarks in the measurements as the posterior superior iliac spines, which are readily palpable on the body surface of a patient. As the dural sac terminates around the level of S2, the distances from the apex and base of the sacral hiatus to the level of the S2 foramina were also measured.

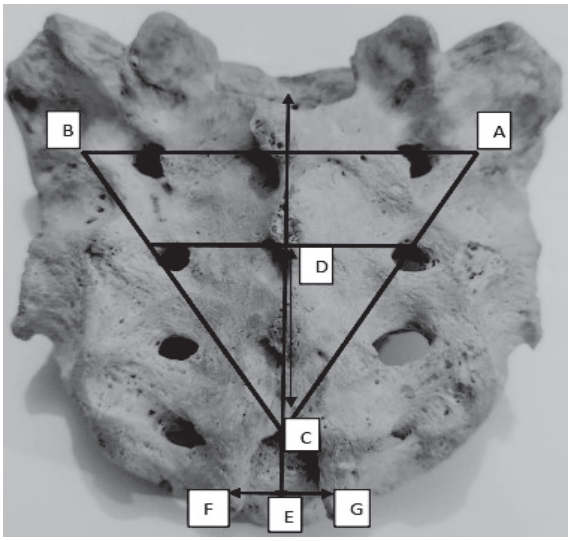

Fig-1: Morphometric measurements of sacrum

Fig-1: Morphometric measurements of sacrum

So, the morphometric measurements are 1. Length of sacral hiatus (CE); 2. Anterior-posterior diameter of sacral hiatus at the apex; 3. Location of Apex of the Sacral Hiatus; 4. Location of Base of the Sacral Hiatus;5. Distance between Right Superolateral Crest and Apex of Sacral Hiatus (AC);6. Distance between Left Superolateral Crest and Apex of Sacral Hiatus (BC),7. Distance between two superolateral crests (AB); 8. Transverse diameter (width) of sacral hiatus at the level of base or intercornual distance (FG); 9. Distance between apex to level of S2 foramina (CD) and base to level of S2 foramina (ED). Data were processed manually and analyzed with the help of SPSS (Statistical package for social sciences) Version 22.0. Quantitative data were expressed as mean and standard deviation; whereas qualitative data were expressed as frequency and percentage. Students‘t’ test was applied to reach the level of significance where necessary. A probability value (p) of less than 0.05 was considered statistically significant.

Results

Table-I: Length, anterior-posterior diameter at the apex of sacral hiatus (n=57)

Sex	Length of sacral hiatus Mean±SD	Anterior-posterior diameter of sacral hiatus at the apex Mean±SD
Male& Female	25.68±8.35 (13-49)	5.24±1.94 (0.3-10.4)
P value	P<0.001	P<0.001

The mean length of sacral hiatus found 25.68 mm and anterior-posterior diameter of sacral hiatus at the apex found 5.24 mm. So, the measurement of length of sacral hiatus and anterior-posterior diameter of sacral hiatus at the apex was statistically significant (P<0.001).

Table -II: Location of Apex of the Sacral Hiatus Different Level (n=57)

Sl. No	Length of Sacral Hiatus (mm)	n	Percentage (%)
01	0-10	8	14.04
02	10-20	28	49.12
03	20-30	14	24.56
04	30-40	5	8.77
05	40-50	2	3.51
Total		57	100

Length was measured form the middle of apex to the middle of base of sacral hiatus and maximum (49.12%) cases it was between (10-20) mm.

Table -IV: Location of Base of the Sacral Hiatus at Different Levels (n=57)

Sl. No	Level of Base	n	Percentage (%)
01	Coccyx	09	15.79
02	5th Sacral Vertebra	48	84.21
03	4th Sacral Vertebra	-	-
Total		57	100

Location of Base of the sacral hiatus was maximum at the level of 5th Sacral Vertebra (84.21%) and there was a remarkable location of base of sacral hiatus at the level of Coccyx (15.79%).

Table -V: Distance between Right & Left Superolateral Crest and Apex of Sacral Hiatus (n=57) and distance between two Superolateral sacral Crest (n=57)

Measurement Parameter (mm)	Mean±SD	Median	Maximum	Minimum
Right superolateral sacral crest and sacral hiatus apex	76.11±15.6	86.33	94.33	56.00
Left superolateral sacral crest and sacral hiatus apex	78.53±13.95	79.01	102.00	56.00
Distance between two superolateral crests	60.13±2.99	59.68	70.30	57.00

The distance between the right Superolateral sacral Crest and the apex was 76.11 mm (range 56-94 mm) the distance between the left Superolateral sacral Crest and the apex was 78.53 mm (range 56-102 mm). The average distance between the two superolateral sacral crests (the base of the triangle) was 60.13 mm (range 57-70 mm).

Table -VI: Transverse diameter (width) at the level of cornua (n=57)

Transverse width in (mm)	Number	Percentage (%)	Mean±SD (mm)
0-5	2	3.51	12.54±3.96
6-10	19	33.33	
11-15	22	38.60	
>16	14	24.56	
Total	57	100	

The transverse diameter (width) at the level of base of sacral hiatus 12.54 mm. In 38.60% sacra it was 11-15 mm and in 33.33% sacra it was 6-10 mm.

Table -VII: Distance between apex to level of S2 foramina and base to level S2 foramina (n=57)

Measurement Parameter (mm)	Mean±SD	Median	Maximum	Minimum
Apex to S2 foramina	30.27±9.15	28.95	42.87	17.35
Base to S2 foramina	54.01±2.66	53.56	59.68	50.29

Average distance between sacral apex to level of S2 foramina was 30.27 mm (range 17-43 mm) and distance between sacral base to level of S2 foramina was 54.01 mm (range 50-60 mm).

Discussion

The average length of sacral hiatus was 25.68 mm (range 13-49 mm) which was consistent with the study by Patil Dhananjay et al (2012).[12] Anteroposterior diameter of sacral canal at the level of apex needs to be sufficient enough to admit the needle into sacral canal. In present study, it ranges from (0.3-10.4) mm which was correlated with the study of Anjali Aggarwal et al (2009).[7]

For successful Caudal Epidural Block, identification of sacral hiatus is mandatory by palpating the sacral cornua and after that the most frequently used technique to identify the caudal epidural space is based on feeling the 'pop' on penetrating the sacrococcygeal membrane.[9, 10,] Sekiguchi et al (2004)[3] and Nagar (2004)[11] reported that sacral cornua is covered by subcutaneous fat and cornua were flat bilaterally, that's why cornua cannot act as a landmark. For the exact location of dura, knowledge of level of apex of sacral hiatus is very important, in low apex it requires long needle. On the other hand, apex is higher; more precaution should be taken while deciding length of the needle to be introduced into the canal. In most of the studies apex was located against S4 like ours with the incidence ranging from 60 to 68%. And lowest in number at 2nd Sacral Vertebra (1.75%), 3rd Sacral Vertebra & 5th Sacral Vertebra was found (19.30%) & (14.04%) in our cases that was close by Anjali Aggarwal et al (2009)[7] and Singh et al (2016).[14]

The range of length of sacral hiatus varied widely in all studies. In our study, the lower range was close to that reported by Nagar (2004)[11], but the upper range of this measurement in Nagar (2004)[11] series was much higher than ours. Thus, longer hiatus facilitates the entry into sacral canal. At the same time, it indicates reduced distance between apex of sacral hiatus and termination of dural sac thus increasing the possibility of needle puncturing the dural sac. In addition, shorter hiatus especially in obese patient because of overlying fat, may prove difficult for locating sacral hiatus. It was shorter than 10 mm in 14.04% in our study as similar to 10% Nagar (2004).[11] In all studies, location of base varied from S4 to coccyx. In our study base was seen most commonly against S5 in 84.21% cases and lowest location of the base was at coccyx in 15.79% in the present, whereas 72.6% and16% in Nagar (2004)[11] Additional measurements are distance between two superolateral sacral crest (base of the triangle) 60.13 mm (range 57-70.30 mm), distance between right superolateral sacral crest and sacral hiatus apex 76.11 mm (range 56-94 mm), distance between left superolateral sacral crest and sacral hiatus apex 78.53 mm (range 56-102 mm) forming nearly an equilateral triangle between superolateral sacral crest and sacral hiatus apex in most of the sacrum. This equilateral triangle can act as guide to the

location of the apex of sacral hiatus during caudal epidural block and clinicians can avoid problem of failure in needle placement. Our study is similar to the studies by Anjali Aggarwal et al (2009)[7], and Patil Dhananjay et al (2012).[12] In present study, transverse width of sacral hiatus at the level of base 12.54 mm which was consistent with the study by Dipali Rani Pal et al (2012).[13] Average distance between sacral apex to level of S2 foramina was 30.27 mm (range 17-43 mm) and distance between sacral base to level of S2 foramina was 54.01 mm (range 50-60 mm). Dural sac in adults terminates most commonly at S2. So, the distance between apex of hiatus and S2 level decides the length of the needle that can be safely introduced into the canal.

Conclusion

The equilateral nature of the triangle formed between the two superolateral sacral crests and the apex of sacral hiatus will be of practical benefit to the clinician in determining the location of the sacral hiatus during CEB. So, the most important anatomical landmarks for performing CEB are: sacral cornua, triangle formed by right and left superolateral sacral crest and apex of sacral hiatus, distance between apex of sacral hiatus and S2 level, anteroposterior depth of sacral canal at apex of sacral hiatus and intercornual distance. These landmarks may increase the probability of needle placement into the sacral canal.

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Original Article

Comparative Study between General Anesthesia and Spinal Sub-Arachnoid Block for Cholecystectomy in a District Level Hospital of Bangladesh

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Abstract

Background: Open cholecystectomy is now routinely done in district level hospitals in our country. Both general anesthesia (GA) and spinal sub-arachnoid block (SAB) can be used for this. GA has some side effects, costly, needs expertise and apparatus. SAB is cheap and has less complications. **Objective:** The objective of this study is to find out the suitability of GA and SAB in district level hospital. **Materials and Methods:** In this prospective study, total 90 cases were included and all were admitted in 250 Bedded General Hospital, Naogaon between January 2019 and December 2020. All cases were divided into two groups. In group GA 45 cases were operated under GA and in group SAB another 45 cases were operated under SAB. Data were collected in a pre-designed questionnaire and analyzed by computer based software and results were presented in tabulated form. **Results:** Each group had 45 patients. Mean age were 42.3±12.17 years and 41.4±11.8 years in GA group and SAB group respectively. 75.6% were male in GA group and 80% in SAB group. 71.1% and 66.7% cases in ASA Grade I in GA and SAB group respectively. In GA group, 37.8% had diabetes mellitus, 33.3% had hypertension and in SAB group, it were 33.3% and 26.7% respectively. In GA group, mean duration of surgery was 24.8±1.2 minutes with 39.64±4.39 minutes total elapsing time. In SAB group it were 23.46±2.02 minutes and 35.64±2.31minutes respectively. In GA group, 57.8% had shoulder pain, 22.2% had PONV and no patient had headache or urinary retention. But in SAB group, 13.3% had urinary retention and 8.9% had headache. SAB patients had more pain at 6th hour post-operatively. Average cost of anesthetic drugs in SAB was 142.22±13.80 taka and that of GA was 1220±42.50 taka. **Conclusion:** As SAB has less complications, needs less expertise and remarkably cheap. It is more preferable than GA at district level hospitals in Bangladesh.

Key words: Anesthesia for cholecystectomy, Anesthesia in district level hospital, Cholecystectomy in Bangladesh

Introduction

Laparoscopic approach is the standard choice for cholecystectomy.[1] But in our country specially at district and upazilla level open cholecystectomy is still done routinely due to lack of access to necessary equipment, shortage of expert manpower and patient`s financial condition is also an important factor.[2]

In our country, for open cholecystectomy anesthesiologists use mainly two types of anesthesia- General Anesthesia (GA) and Spinal Subarachnoid Block (SAB). Though GA is the gold standard[3] it needs special care and expertize for intubation and also needs special equipments. This procedure is also costly as it uses several drugs including gases. There are some drawbacks of GA. These are basal atelectasis, post-operative paralytic ileus, aspiration of gastric contents, longer stay time at post-operative ward and increased mortality and morbidity.

On the other hand, SAB provides selective blockade of surgical site and has some advantages. In SAB, patient can maintain spontaneous respiration (no need of artificial ventilation), reduced incidence of paralytic ileus, creates some hypotension that reduces wound bleeding and above all it is relatively cheap as it needs few drugs and no extra instruments.[4] The

disadvantages are- a challenge to face hypotension and rarely accidental high blockade that may need ventilation. The present study was done to compare the suitability of GA and SAB for open cholecystectomy in district level hospitals in terms of post-operative pain free interval and analgesic requirement, costing, patients` and surgeons` satisfactions.

Materials and Methods

Our study was carried out on 90 patients admitted in 250 Bedded General Hospital, Naogaon for open cholecystectomy (from January 2019 to December 2020). All patients were adult, both male and non-pregnant female of ASA group I & II. After decision for open cholecystectomy, routine investigations for anesthesia like CBC, RBS, S. Creatinine, ECG, CXR PA view and Liver function tests were done. Patients with any contraindication to GA or SAB were excluded from this study. Written informed consents were taken from all patients. Tab. Diazepam 5mg was given orally as premedication at night before surgery and patients were kept fasting for 6 hours before surgery. In this study, total 90 patients were divided in to two groups randomly. Group-G (patients requiring GA, n= 45) and Group-S (patients requiring SAB, n= 45). Patient`s baseline physiological parameters (pulse, BP, respiratory rate, temperature, weight) were recorded before operation. After IV cannulation with 18G cannula standard rules were followed for fluid replacement during surgery and post-operative period. Operation was done through right subcostal incision. In Group-S, under all aseptic precaution sub-arachnoid space was approached through L_1-L_2 space with 27G spinal needle in sitting position. 4 ml (0.5%) of Bupivacaine Heavy (20mg) was injected into the sub-arachnoid space and patient`s position was changed to supine position immediately. Pain sensation was tested in the desired surgical field before starting the operation. Intra-operatively, analgesics, sedatives, antiemetic and ephedrine were used as par requirements of the patients. In Group-G, induction of anesthesia was done with thiopental sodium (5 mg/kg). Suxamethonium (2 mg/kg) was used to facilitate intubation. Veccuronium was used as muscle relaxant. Anesthesia was maintained with Halothane, Nitrous Oxide and Oxygen. For reversal, neostigmine (.01 mg/kg) and atropine were used. Post-operatively, anti-emetics and analgesics were used as par requirements of the patients. Before starting the study ethical clearance was taken from the Superintendent of 250 Bedded General Hospital, Naogaon

Results

Table - I: Baseline characteristics of the study patients (n=90)

Baseline characteristics	General Anesthesia (n=45) Mean±SD		Spinal Anesthesia (n=45) Mean±SD		P value
Age (years)	42.3±12.17		41.4±11.8		0.71^{ns}
Sex					
Male	34	75.6%	36	80%	0.61^{ns}
Female	11	24.4%	9	20%	
BMI (kg/m^2)	23.65±4.16		24.12±5.12		0.63^{ns}
ASA grade					
I	32	71.1%	30	66.7%	0.57^{ns}
II	13	28.9%	12	26.7%	
III	0	0	3	6.7%	

Table - I shows the baseline characteristics, male was found 34 (75.6%) in general anesthesia group and 36 (80.0%) in spinal anesthesia group. Mean age was 42.3±12.17 years and 41.4±11.38 years in general and spinal anesthesia group respectively. Mean BMI was 23.65±4.16 kg/m2 in general anesthesia group and 24.12±5.12 kg/m2 in spinal anesthesia group. ASA grade I was found 32 (71.1%) in general anesthesia and 30 (66.7%) in spinal anesthesia group. The difference was not statistically significant ($p>0.05$) between two groups.

All patients were diagnosed cases of chronic calculus cholecystitis. No case of acute or acalculus cholecystitis or gallbladder mass was included in this study.

In our study, diabetes mellitus was found 17 (37.8%) cases in general anesthesia group and 15 (33.3%) in spinal anesthesia group. Hypertension was 15 (33.3%) and 12 (26.7%) in general and spinal anesthesia group

respectively. COPD was 2 (4.4%) in general anesthesia group and 5 (11.1%) in spinal anesthesia group. The difference was not statistically significant (p>0.05) between two groups.

Table- II : Mean duration of surgery and total time (n=90)

Duration (min)	General anesthesia (n=45) Mean±SD	Spinal anesthesia (n=45) Mean±SD	p value
Duration of surgery	24.8±1.2	23.46±2.02	0.03^{s}
Total duration	39.64±4.38	35.64±2.31	0.02^{s}

Table -II shows that mean duration of surgery and total elapsing time.

Table- III : Distribution of patients by post-operative adverse events (n=90)

Post -operative adverse events	General Anesthesia (n=45)		Spinal Anesthesia (n=45)		P value
	n	%	N	%	
Shoulder pain	26	57.8	11	24.4	0.004^{s}
Nausea/vomiting	10	22.2	3	6.7	0.03^{s}
Urinary retention	0	0.0	6	13.3	0
Headache	0	0.0	4	8.9	0
Hypotension	2	4.4	2	4.4	1.0^{ns}
Paralytic ileus	2	4.4	3	6.7	0.34^{ns}

Table - I shows the baseline characteristics, male was found 34 (75.6%) in general anesthesia group and 36 (80.0%) in spinal anesthesia group. Mean age was 42.3±12.17 years and 41.4±11.38 years in general and spinal anesthesia group respectively. Mean BMI was 23.65±4.16 kg/m2 in general anesthesia group and 24.12±5.12 kg/m2 in spinal anesthesia group. ASA grade I was found 32 (71.1%) in general anesthesia and 30 (66.7%) in spinal anesthesia group. The difference was not statistically significant (p>0.05) between two groups.

All patients were diagnosed cases of chronic calculus cholecystitis. No case of acute or acalculus cholecystitis or gallbladder mass was included in this study.

In our study, diabetes mellitus was found in 17 (37.8%) cases in general anesthesia group and 15 (33.3%) in spinal anesthesia group. Hypertension was 15 (33.3%) and 12 (26.7%) in general and spinal anesthesia group respectively. COPD was 2 (4.4%) in general anesthesia group and 5 (11.1%) in spinal anesthesia group. The difference was not statistically significant (p>0.05) between two groups.

Table- IV: Post-operative pain evaluation (n=90)

Time (hours)		General anesthesia (n=45)	Spinal anesthesia (n=45)	p value
		Mean±SD	Mean±SD	
VAS	At baseline	8.1±0.7	0.7±0.1	<0.001^{s}
	2 hours	6.9±0.6	0.8±0.2	<0.001^{s}
	4 hours	5.8±0.9	1.8±0.8	<0.001^{s}
	6 hours	4.1±0.6	4.0±0.7	0.46^{ns}
	12 hours	3.2±0.8	1.1±0.8	<0.001^{s}
	24 hours	2.1±0.5	0.6±0.4	<0.001^{s}

ns=not significant
s=significant

Table- IV shows, all pain levels were significantly low in spinal anesthesia group except post-operative 6th hour than general anesthesia group.

Our study showed a significant difference in stay period in post-operative ward. In general anesthesia group average stay in post-operative ward was 6.89±1.23 hour and in spinal anesthesia group 4.56±0.85 hour. This difference was significant statistically as p<0.05.

This study showed an interesting finding regarding the average cost of anesthetic drugs used during anesthesia. In general anesthesia it was 1270.00±42.50 Taka and in spinal anesthesia it was 142.22±13.80 Taka. This difference is statistically significant (p<0.05).

Discussion

Though laparoscopic cholecystectomy is the method of choice for cholecystectomy, open cholecystectomy is also extensively practiced in our country especially at district and upazilla level due to shortage of expert

manpower. Anesthesiologist usually prefer general anesthesia for open cholecystectomy due to easy control over patient and surgeons prefer it due to good muscle relaxation. As expertize is developing, both surgeons and anesthesiologists are now preferring spinal subarachnoid block (SAB) due to easy procedure, less post-operative hazards and less costly. In this study the mean ages of patients were 42.3±12.17 years and 41.4±11.8 years in GA group and SAB group respectively. The difference was not statistically significant (p>0.05) between two groups. Similar observation was found by Donmez et al.[5] They showed that the mean age were 45±13 years in GA group and 45±14 years in SAB group. The difference was not statistically significant (p>0.05) between two groups. In a study in Nepal by Koju RB et al.[6] showed the mean age 42.05±12.4 years in GA group and 44.60±12.73 years in SAB group. The difference was also not statistically significant (p>0.05) between two groups.

Male was found 34(75.6%) in GA group and 36(80%) in SAB group. The difference was not statistically significant (p>0.05) between two groups. The study of Koju et al.[6] in showed increased number of patients in both GA and SAB groups. This may be due to selective referral of male patients to government hospital as privacy of female patients is somewhat less in government hospitals.

In present study, the mean BMI was 23.65±4.16 kg/m^2 in GA group and 24.12±5.12 kg/m^2 in SAB group. The difference was not statistically significant (p>0.05) between two groups. Almost similar observation were found in the studies of Yu et al.[7], Donmez et al.[5] and Koju et al.[6] Patients with high BMI were not included in this study as district level hospitals are usually not equipped with ICU or HDU.

In this study ASA grade I was found 32 (74.11%) in GA group and 30 (66.7) in SAB group. The difference was not statistically significant (p>0.05) between two groups. Similar observation was found in the study of Donmez et al.[5] and Koju et al.[6]

Regarding the co-existing morbidity, diabetes mellitus was found 17 (37.8%) in GA group and 15 (33.3%) in SAB group. Hypertension was 15 (33.3%) in GA group and 12 (26.7%) in SAB group. COPD was 2 (4.4%) in GA group and 5 (11.1%) in SAB group. The difference was not statistically significant (p>0.05) between two groups. These figures were almost similar to other studies.[5]

Regarding the duration of surgery, the mean duration of surgery was 24.8±1.2 min in GA group and 23.46±2.02 min in SAB group. Mean total elapsing time was found 39.64±4.38 min and 35.64±2.31 min in GA and SAB group respectively. Both mean duration and total elapsing time were statistically significant (p<0.05). But in Yu et al.[7] study, there was no statistically significant difference in mean operating time in GA and SAB groups. In our study the significant lower operating time in SAB group may be due to relatively less bleeding in the operating field, as there was hypotension induced by SAB anesthesia. Total surgical time in GA group is more than that of SAB group. It is because, GA group patients need reversal of general anesthesia after surgery. SAB group patients do not need any reversal after surgery. In another study[8], the surgery time both in GA and SAB were higher. In our study, the lower operating time may be due to high cumulative experience of the surgeons as all operations were done by senior level surgeons.

In this study, shoulder pain was found 36 (57.8%) n GA group and 11(24.4%) in SAB group which was statistically significant (p>0.05) between two groups. Paralytic ileus and hypotension were not statistically significant (p>0.05) between two groups. Nausea and vomiting was common in GA group and was statistically significant (p<0.05) between two groups. But urinary retention and headache were common in SAB group. We did not found any such case in GA group. This is due to totally different technique of anesthesia. SAB directly involves sub-arachnoid space and central nervous system and induce anesthesia in lower half of the body. As there is no reversal, the duration of anesthesia is unpredictable. Similar incidence was also found in some other studies.[5, 7,9] These events are related to type of anesthesia, not directly to the surgery.

In this study, postoperative pain levels were significantly low in spinal anesthesia group except postoperative 6th hour than GA group. The reduced pain in the SAB group may be due to a persistent neuraxial blockade by spinal anesthesia. Two studies comparing the spinal anesthesia and general anesthesia for laparoscopic cholecystectomy by Tiwari et al.[10] and Tzovaras et al.[11] reported the better postoperative pain control and lower analgesic requirement in spinal anesthesia than general anesthesia due to lasting analgesic effect. In these two studies VAS levels at 6th and 8th hours after the surgery were lower than our study. This difference is considered that it could be related with methodological difference between the studies. The difference of the two studies from our study is standard postoperative intravenous analgesia and if needed additive opioids usage for patients.

Regarding the mean stay period in postoperative ward, we found 6.89±1.23 hour in GA group and 4.56±0.85 hour in SAB group. This difference was statistically significant ($p<0.05$) between two groups. In a study by Ganter MT et al.[12] the average length of stay postoperative ward was 5.7±5.9 hour and it was in between GA and SAB groups of our study. The shorter stay period in SAB group was due to the fact that SAB involved only lower half of the body sparing the respiratory system. In case of GA patients need mechanical ventilation and had a high incidence of PONV.[13, 14] So they needed longer time to become stable to shift to surgical ward.

In this study we found an important observation. This study showed that the mean cost of anesthetic drugs in GA group was 1220.00±42.50 Taka and in SAB group it was 142.22±13.80 Taka. In a study by Shitong et al.[15], the cost of GA and SAB were 145.25$ and 104.18$ respectively. This means, the cost of GA was almost 1.4 times that of SAB. But in our study it was 8.6 times than that of SAB. So we found, the cost of SAB is always lower than that of GA, but in our study it was remarkably low.

Conclusion

Open cholecystectomy can be done under both GA and SAB. Both are safe with few complications. SAB is much cheaper than GA. SAB also needs less postoperative care. In district and upazilla level hospitals where facilities are less available, SAB is the better than GA in all respects. This cheap anesthesia can also be introduced in tertiary level hospitals. Yet to be studied further.

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Original Article

Clinical Profile of Patients with Osteoarthritis of the Knee in a Tertiary Care Hospital in Bogura

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Abstract

Background: Osteoarthritis of the knee is one of the most common degenerative joint diseases and is responsible for a huge burden of pain and physical disability. **Objectives:** This study was done to identify clinical profile of patients with osteoarthritis of the knee. **Materials and Methods:** It is a cross-sectional study done in physical medicine and rehabilitation outpatient department (OPD) of TMSS Medical College Hospital for a period of six months from 1st March 2019 to 31st August 2019. **Results:** In this study, total number of patients were 560 (five hundred sixty), out of them 326(58.2%) were male and 234(41.8%) were female. Most of the patients of were in the age group of 50 years to 59 years. Maximum number of females in the age group of 40 years to 50 years was affected. Most of the males were affected in the later ages, between 55 years to 65 years. Most of the patients were middle class 69.1% and housewives 36.1%. Most patients gave the history of gradual onset of the pain 88.1%. Most of the patients had no morning stiffness in the knee 89.5%. Maximum patients had intermittent pain 61.4% but 38.6% patients noticed constant pain. Most of the patients 51.8% also noticed no swelling. **Conclusion:** By this study, it can be concluded that OA knee is more common in males and mostly manifests around the 5th decade.

Keywords: Osteoarthritis, Knee, Clinical profile

Introduction

Osteoarthritis is the most important of the rheumatic diseases and is responsible for a huge burden of pain and physical disability.[1] Osteoarthritis is characterized by both degeneration of articular cartilage and simultaneous proliferation of new bone, cartilage, and connective tissue.[2] It is the most prevalent form of arthritis and it is the principal cause of disability in the elderly.[3-6] The area of local damage occurs in those parts of the joint subjected to maximal mechanical load.[7] This in addition to the epidemiologic associations with trauma and abnormal joint biomechanics makes it clear that OA is a mechanically driven disorder. The process of abnormal tissue turnover with loss of cartilage volume and on increase in bone and capsular tissue, are chemically mediated.[7] Mild OA of the knee is extremely common, mainly affecting middle aged and elderly women.[8] The knee is a complex joint, with three major compartments: the medial and lateral tibio-femoral joints and the patello-femoral joint. Each of these areas can be affected by OA separately, or in any combination. Maximum evidence of cartilage damage is usually found on the lateral facet of the patella in the patello-femoral OA, and on the tibial plateau area least well protected by the meniscus in tibio-femoral disease.[9] Obesity is very strongly associated with knee OA, particularly in the older female group.[9] Pain on walking, stiffness of the joint and difficulty with steps and stairs are the major symptoms. The physical signs depend on the distribution and severity of the OA within the joint. Wasting of the quadriceps muscle, bony swelling, and tenderness on and around the joint line, painful limitation of full flexion and course crepitus are the usual signs. Medial compartment disease often results in a varus deformity, a very common finding in knee OA.[10]

A wide variety of treatments are available for those who suffer from OA of the knee. To improve quality of

life, we should know the problems and condition of the patients of OA knee joints. For this purpose we studied clinical profile of OA knee.

Materials and Methods

It is a cross-sectional study done in physical medicine and rehabilitation outpatient department (OPD) of TMSS Medical College Hospital for a period of six months from 1st March 2019 to 31st August 2019. The patients were selected according to the clinical criteria developed by the American College of Rheumatology (ACR) [10] which is as follows:

1. Knee pain for most days of prior month.
2. Crepitus on active joint motion.
3. Morning stiffness of the knee < 30 minutes.
4. Age > 30 years.
5. Bony enlargement of the knee on examination.
6. Bony enlargement.

OA knee was considered to be present when: 1, 2, 3, 4, or 1, 2, 5 or 1, 4, 6 were found. Nature of the study was discussed with the patients and their verbal consent was taken. History, clinical examination and x-rays were done. The numerical data were analyzed statistically with the help of SPSS windows-12 version.

Results

A total of 560 patients of OA knee were included in the study. Out of these, 326 (58.2%) were males and 234 (41.8%) were females (Figure-1). The male: female ratio was 1:0.72.

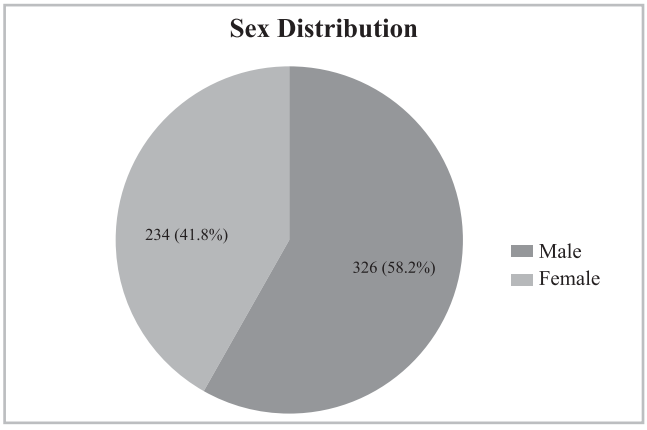

Figure-1: Sex distribution

Age: Most of the patients were in the age group of 40 years to 59 years (Figure-2). On the other hand, it was found that maximum females were affected in their earlier ages between 40 years to 50 years age; but most of the male persons were affected in their late ages between 55 years to 65 years age.

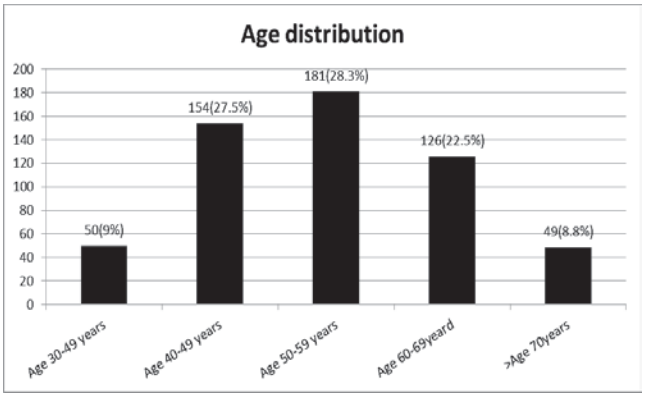

Figure-2: Age distribution

Occupation: A majority of the patients were cultivator 9.8%, labourers 7.1%, businessman 6.5%, teachers 4.2% and imams 1.9% (Figure-3).

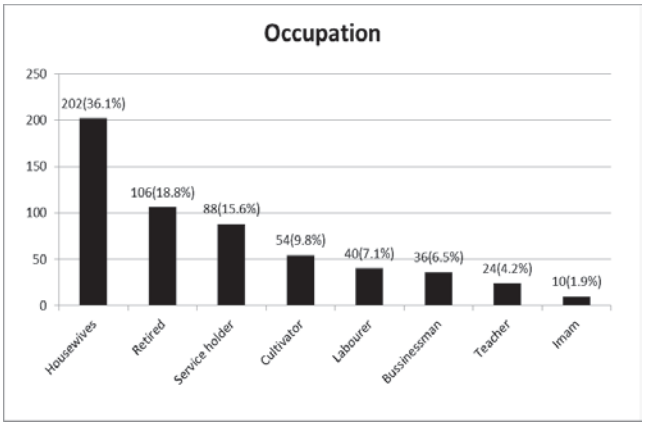

Figure-3: Occupation

Socio-economic condition: Most patients were in the middle class group 69.1%, their monthly income was in between Bangladeshi taka (BDT) 7000 to 15000. Some patients were poor 26.4%, their monthly income was less than BDT 6000 and a very few patients were rich 4.5 %, their monthly income was more than BDT 15000 (Figure-4).

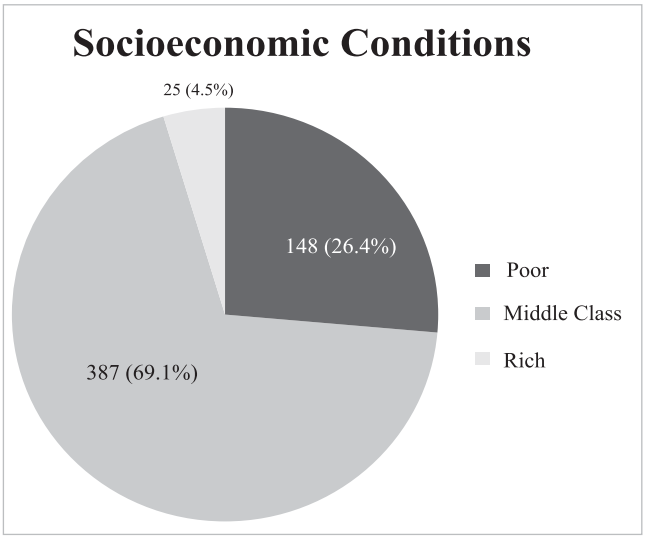

Figure-4: Socioeconomic conditions

Catchment area

Most of our study subjects 483(86.2%)) came from outside of Bogura city and the rest came from Bogura city 77(13.8%) (Figure-5).

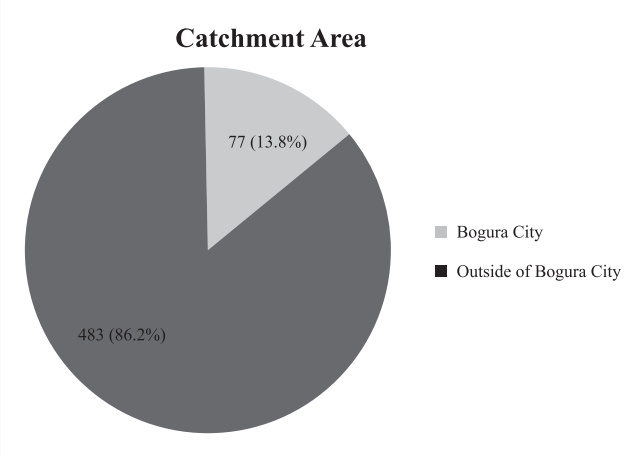

Figure-5: Catchment area

Clinical characteristics: Most patients gave the history of gradual onset of the pain 88.1%, some gave the history of sudden onset 6.7% and some gave the history of pain in the knee after trauma 5.2%. Most of the patients had no morning stiffness in the knee 89.5% and some had the morning stiffness 10.5% but it was less than one hour. Maximum patients had the pain intermittent in character 61.4% but 38.6% of patients had the pain constant in character. It was found that most of the study subjects were suffering from both sided knee OA 47.8%, 29.3% patients were suffering from right sided knee OA and 22.9 % patients were suffering from left sided knee OA. Most of the subjects 51.8% presented with no swelling, 38.7% showed unilateral and 9.5% showed bilateral involvement at presentation (Table-1).

Table-I: Clinical characteristic

Clinical characteristic:		Number	Percentage (%)
Onset	Gradual	493	88.1
	Sudden	38	6.7
	Post traumatic	29	5.2
Stiffness	No morning stiffness	501	89.5
	Gelling	59	10.5
Pain character	Intermittent	344	61.4
	Constant	216	38.6
Site	Both knee-	268	47.8
	Right knee	164	29.3
	Left knee	53	22.9
Swelling	No swelling	290	51.8
	Unilateral	217	38.7
	Bilateral	53	9.5

Discussion

In this study, total number of patients were 560, out of them 326(58.2%) were male and 234(41.8%) were female. The male: female ratio was 1:0.72. In a study at Chittagong, Bangladesh, it was found that 61 % of the patients were males and 39% were females.[11] In another study it was found that 64.80 % of the study subjects were males and 35.20 % were females.[12] This is in favour of the findings of our study. Although men and women are equally prone to develop knee OA, but more joints are affected in women than men.[13] The male preponderances may be due to more male attendance in the hospital than female because of social and religious belief. In our study, most of the patients of knee OA were at the age group of 40 to 59 years. In the other two studies, most of the subjects were of 50 years to 59 years age group.[11, 12] This is to some extent close as the result found in the present series. On the other hand, it was found in our study that most of the female patients were affected with OA-

knee in their earlier ages between 40 years to 50 years age; but most of the male patients were affected in their late ages between 55 years to 65 years age. This may be due to occupation of the female as they usually works with knee bent position in their house. In a study at Chittagong, Bangladesh, it was found that most of the patients of knee-OA were house wives 31.5%) [13]. This is in favour of the findings of the present study. Retired serviceman became the second 81.8 % in the present series. In two other studies, the same results were found. [11, 12] In our study, maximum patients were in the middle class group 68.5% and a very few patients were rich 4.5 %. This is so because most of the rich people are being consulted in private clinics. Regarding the sides affected by OA-knee, it was found in this study that most of the study subjects were suffering from both knees OA 47.8%, 29.3% right sided knee OA and 22.9% left sided knee OA. In a study in Chittagong, it was found that all the subjects were affected by OA- knee on both sides[14]. We also found most of the patient 51.8% were presentedwith no swelling of the knee.

Conclusion

We can say at conclusion that OA knee affects female patient at an earlier age than that of male. It is also evident from this study that it is a common degenerative joint disease among people of 5th and 6th decade.

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