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Editorial

- Threshold Age for Doing Upper Gastrointestinal Tract Endoscopy to Screen Early Gastric Carcinoma of Bangladeshi Dyspeptic Patients: 40 years vs. 60 years
Nikhil Chandra Nath 1

Original Articles

- Cadaver Study of the Diameter of the Cricoid Cartilage in Different Age Groups in A Bangladeshi Population
Ara A, Ara ZG, Begum T, Rahman MS, Mili DA 3
- Ultrasonography in the Diagnosis of Wilms' Tumor in Children
Mokarabin M, Debnath PK, Hasan MM, Siddiqui MAB, Rahman MS, Mahmud A 8
- Health Related Quality of Life in Patients Receiving Continuous Ambulatory Peritoneal Dialysis (CAPD)
Nath PKD, Iqbal MM, Iqbal S, Alam KS, Anwar MR, Chowdhury MFH, Hossain M, Saha SK, Bashir MA, Hossain MS 14
- Hepatoprotective Effect of Ethanolic Extract of *Capsicum Annuum L.* (Red Variety) on Paracetamol Induced Hepatotoxicity in Long Evans Rats
Sultana S, Khanam M, Nahar K, Israt UH, Ahmed S, Jahan I 19
- Association of Meniscal Injury in Anterior Cruciate Ligament Deficit Knee and Outcome After Surgery
Asaduzzaman M, Khanam M, Harun ME, Islam MT 24
- Thyroid Function Abnormalities Among Pemphigus Vulgaris Patients
Alam AKMM, Hoq AJMS, Ahmed MI, Ahmed ARS, Snigdha KSR, Hamid MA, Sayem MAS 29

Review Articles

- Newborn Care During Covid-19 Pandemic
Alo D 34
- Flipped Classroom Approach in Anatomy Teaching and Learning in Undergraduate Medical Education in Bangladesh
Nurunnabi ASM, Kamal AHMM, Perven HA, Afroz H, Chakma S, Talukder MAS, Tapu TT 41

Case Reports

- Rhabdomyolysis with Acute Renal Failure in Falciparum Malaria: A Case Report
Islam KJ, Haque MM, Rahman MS, Islam MK 46
- Tuberos Sclerosis: An Incidental Finding in A Woman with Long Standing Abdominal Distension and Heartburn
Sultana F, Uddin MM, Ahmed L, Chatterjee S, Ahmed R, Deepa ZS 50

Instruction to the Authors

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Threshold Age for Doing Upper Gastrointestinal Tract Endoscopy to Screen Early Gastric Carcinoma of Bangladeshi Dyspeptic Patients: 40 years vs. 60 years

Dyspepsia is a Greek word for “bad digestion”. Dyspepsia means a symptom or set of symptoms that is considered to arise from the gastroduodenal regions. The dyspeptic symptoms are upper abdominal pain, epigastric burning, postprandial fullness, early satiety, bloating, belching, discomfort, nausea, and vomiting. Dyspepsia for more than 4 weeks needs extensive clinical evaluation.¹ Worldwide prevalence of dyspepsia is 30%.¹ The prevalence of dyspepsia in the general population is 41% in Bangladesh.² Among the uninvestigated dyspepsia 30% is due to organic causes.¹ Gastroduodenal and pancreatic biliary disorders are the main culprit of gastrointestinal dyspepsia.

ACG (American College of Gastroenterology) and CAG (Canadian Association of Gastroenterology) recommend age cut off 60 years and older as an alarming symptom of dyspepsia. Whereas in the NICE (National Institute for Health and Care Excellence) guideline the age threshold is 55 years old or over. Other alarm features of dyspepsia are gastrointestinal bleeding or anaemia, progressive dysphagia or odynophagia, persistent vomiting, unintentional weight loss, family history of gastric or esophageal carcinoma, palpable lump or lymph node or imaging abnormality and history of drugs (NSAIDs, Aspirin).¹ Upper GI endoscopy is mandatory for dyspeptic patients who have alarm symptoms. Sixty percent of gastric carcinoma patients have dyspepsia. Cancers of the stomach are more frequently diagnosed in developed nations and predominantly in older age. In Bangladesh and India, the gastric cancer incidence and mortality has increased possibly due to aging of

our population as well as improved diagnostic facilities. Survival rate of gastric carcinoma in our country have remained low. Significant numbers of carcinoma stomach in age less than 40 years have been observed in east and East Asia.

A study was carried out by Islam et al. to find out patterns of gastric malignancies in Bangladesh. Among 1543 endoscopic gastric samples from malignancy suspected patients, 625 was adenocarcinoma of which the mean age was 43.14 year.³

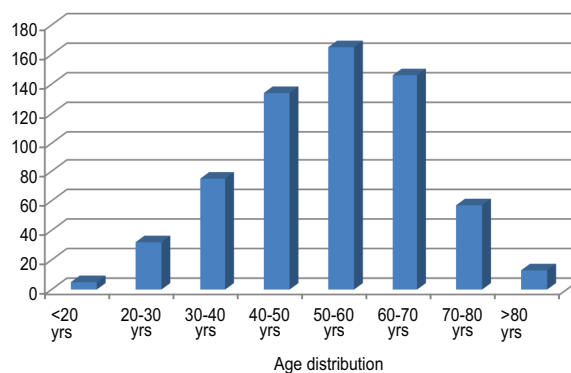


Fig-1: Age distribution for gastric adenocarcinoma (n=625) (Source: Islam et al., 2009)⁴

In Indian subcontinent, *H. pylori* infection prevalence is high, but incidence of gastric cancer is lower than east where the incidence of *H. pylori* infection is low. However, the incidence of younger age carcinoma stomach is similar to the east. The age recommendation of the west to do upper GI endoscopy is 60 years and older.¹ On the contrary the age cut off to do upper GI tract endoscopy in the east is 40 years and older.⁵

Table-I: Dyspepsia and Gastric carcinoma; Bangladesh vs. East vs. West³⁻⁵

Characteristics	Bangladesh	India	West	East
Prevalence of Dyspepsia	41%	30%	20-40%	5-30%
<i>H. pylori</i> Prevalence	90%(Healthy)	80%(Healthy)	20-40%	>50%
Gastric Carcinoma/1 lac	4.8	4.5	5	32
Carcinoma stomach in age<40 years	17.92%	14.4%	<1%	15%
5 years survival of Gastric Carcinoma	12.5%	6%	30%	60%
Recommendation age cut off of endoscopy	>40 Years?	>40 Years?	>60 Years	>40Years

Endoscopy allows direct visual examination of the gastric mucosa, and it allows for biopsy and histologic evaluation. In Japan, screening for gastric cancer is done annually for all residents aged 40 years and older with upper gastrointestinal (UGI) series which was initiated in 1983.⁵ Similarly, in Korea, endoscopy or UGI series is recommended every two years for individuals aged 40 years and older.⁵

Young age gastric carcinoma frequency in Bangladesh is more. So the age cut off for doing upper GI endoscopy to diagnose early gastric carcinoma in Bangladeshi dyspeptic patients should be 40 years. Early gastric carcinoma can be treated endoscopically and prognosis is good. In Bangladesh, it requires a single time visit only to specialists to do upper GI endoscopy. It does not need to repeat endoscopy if already done in the last 2 years unless worsening symptoms.

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Cadaver Study of the Diameter of the Cricoid Cartilage in Different Age Groups in A Bangladeshi Population

Ara A¹, Ara ZG², Begum T³, Rahman MS⁴, Mili DA⁵

ABSTRACT

Background: Accurate anatomic knowledge is essential in diagnostic and therapeutic procedures in the field of laryngology.

Objective: The present study aims to determine the diameter of cricoid cartilage and demonstrate differences among different age groups in a Bangladeshi population.

Materials and methods: This cross-sectional, descriptive study was done between October 2008 and March 2009. A total 60 human larynges were collected through purposive sampling from. Among them, 45 (male 23 and female 22) were collected from cadavers (9 to 60 years) at the autopsy laboratory of Department of Forensic Medicine & Toxicology, and 15 (male 6 and female 9) from stillborn infants of viable age (28 to 40 weeks of gestation) from Department of Obstetrics & Gynaecology, Mymensingh Medical College Hospital, Mymensingh, Bangladesh. The diameter of the cricoid cartilage was measured using slide calipers and the difference between age groups was determined by One-way ANOVA test.

Results: The mean±SD transverse diameter of the cricoid cartilage was found as 7.40±1.72 mm ranged from 3 to 9 mm in age group A (28 to 40 weeks of gestation), 11.31±1.30 mm in age group B (9 to 16 years) ranged from 9 to 13 mm and 17.10±3.99 mm in age group C (17 to 60 years) and ranged from 10 to 24 mm. The mean transverse diameter of cricoid cartilage was highest in age group C (17.10 mm) and was lowest in age group A (7.40 mm). The difference of transverse diameter of cricoid cartilage between group A & B (P=0.001), A & C and B & C (P=0.000) were statistically significant. The mean±SD anteroposterior diameter of the cricoid cartilage was found as 10.33±1.54 mm ranged from 7 to 12 mm in age group A, 20.56±2.66 mm in age group B ranged from 15 to 25 mm and 26.79±4.37 mm in age group C and ranged from 16 to 38 mm. The mean anteroposterior diameter of cricoid was found the highest in age group C (26.79 mm) and the lowest in age group A (10.33 mm). The difference of anteroposterior diameter of cricoid cartilage between group A & B, A & C and B & C were statistically significant (P=0.000).

Conclusion: Our study revealed that significant difference exists in transverse and anteroposterior diameter of the cricoid cartilage among different age groups and the values were found to increase with age.

Keywords: Larynx, cricoid cartilage, diameter, Bangladeshi people

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INTRODUCTION

The larynx is essentially an organ of respiration and phonation, as set in the respiratory tract between the pharynx and trachea. However, the main function of the larynx is to provide a protective sphincter at the inlet of the air passages to prevent entry of any materials other than air.¹⁻³ The larynx is made up of skeletal framework of cartilages, which are connected by synovial joints, ligaments, and fibrous membranes (cricovocal and quadrate) and are moved by a number of intrinsic muscles. The cavity of the larynx is lined by mucous membrane.²⁻⁴ The larynx is composed of nine cartilages, of which three are unpaired and three are paired. Unpaired cartilages are thyroid, cricoid & epiglottis. Paired cartilages are arytenoids, corniculate & cuneiform. The cricoid cartilage is smaller but thicker and stronger than the thyroid cartilage and forms the lower and posterior parts of the wall of the larynx. It presents a signet-shaped complete ring with a narrow anterior arch and a broad posterior quadrate lamina.^{3,4} The lamina is broad and quadrilateral and measures vertically about 20 or 30 mm. On its posterior surface, in the midline, is a vertical ridge to the lower part of which are attached the longitudinal fibers of the esophagus and on either side of this a broad depression for the posterior cricothyroid muscle.⁴ The arch is narrow and convex and measures vertically from 5 to 7 mm. It affords attachment externally in front and at the sides to the cricothyroid muscle and behind, to part of the constrictor pharyngis inferior. On either side, at the junction of the lamina with the arch, is a small round articular surface for articulation with the inferior cornu of the thyroid cartilage. The lower border of the cricoid cartilage is horizontal and connected to the highest first cartilaginous ring of the trachea by the cricotracheal ligament.^{3,4} The upper border of cricoid cartilage runs obliquely upward and backward, owing to the great depth of the lamina. It gives attachment in front of the middle cricothyroid ligament; at the side to the conus elasticus and the lateral cricoarytenoid muscle; behind, it presents in the middle, a shallow notch and on either side of this is a smooth, oval, convex surface, directed upward and lateral ward for articulation with the base of an arytenoid cartilage. The inner surface of the cricoid cartilage is smooth and lined by mucous membrane.⁴

Detail anatomical knowledge is necessary for the diagnosis of diseases by endoscopic evaluation, laryngoscopy, CT scan and MRI. The MRI measures

8% smaller than the anatomical measures and 12% smaller than data reported in the literature.⁵ Laryngeal surgery demands precise method of investigation to provide accurate anatomical details of the laryngeal abnormalities. Hence, for management purpose specially in surgical procedures as intubation, tracheotomy, medialization, implant, subluxation, thyroplasty, laryngoplasty, laryngotomy, laryngectomy, minute anatomical knowledge of larynx is essential.⁶⁻¹⁰ The cricoid lumen configuration was elliptic, and its mean area was smaller than that of available endotracheal tubes. This lumen area was mostly influenced by weight and height. Detailed morphometric data on the anatomy of the cricoid cartilage and its relationship with growth and body characteristics of fetuses is essential for fetal crico-tracheal manipulation.⁹ Moreover, there is disagreement regarding the anatomy of the pediatric airway, particularly regarding the shape of the cricoid cartilage and the location of the narrowest portion of the larynx.⁹ The present study was designed with a view to contribute to data pool to establish a Bangladeshi standard metrics in the gross anatomy of larynx.

MATERIALS AND METHODS

The present study was performed on 60 postmortem human larynges at the Department of Anatomy of Mymensingh Medical College, Mymensingh, Bangladesh. Specimens containing larynx were collected from unidentified dead bodies under autopsy at Department of Forensic Medicine & Toxicology, and dead babies from the Department of Obstetrics & Gynaecology, Mymensingh Medical College Hospital, Mymensingh, Bangladesh, between October 2008 and March 2009. All the collected specimens of cadavers were from medico-legal cases (unnatural death) and another group from stillborn infants. Only fresh specimens from persons who died within the preceding 12 to 24 hours and stillborn infants just after delivery were chosen. The age range of persons whose larynx was collected varies from 9 years to 60 years for groups after birth and 28 to 40 weeks for intrauterine group.

From each cadaver the larynx and related neighboring structures were collected by "Block Dissection", during routine postmortem examination. Then the tissue block was washed gently with running tap water to remove the blood and blood clots as far as possible. Each specimen was duly tagged by a piece

of waxed cloth, which bore an identifying number representing individual serial number. Then the specimen was fixed and preserved in 10% formal-saline solution. For convenience of differentiating the diameter of cricoid cartilage in relation to age, the collected specimens were divided into three groups: e.g., A (28 to 40 weeks of gestation), B (from 9 to 16 years) and C (from 17 to 60 years). Associated muscles, membrane and ligaments were detached from the cricoid cartilage specially. The transverse diameter of cricoid cartilage was measured at the level of junction between anterior arch and posterior lamina of cricoid cartilage, which corresponds outside with the cricothyroid articulation⁸ (Fig. 1). The anteroposterior diameter was measured from midpoint of the superior border of anterior arch to middle of the superior border of the posterior lamina of cricoid cartilage⁸ (Fig. 1). Both the measurements were done using slide calipers and values were expressed in millimeters.

All the data were compiled, sorted properly, and analyzed statistically using Statistical Package for Social Science (SPSS) version 11.0. One-way ANOVA test was performed to compare between age groups. P value <0.05 was considered as significant. This study was approved by the Ethical Review Committee of Mymensingh Medical College, Mymensingh, Bangladesh.

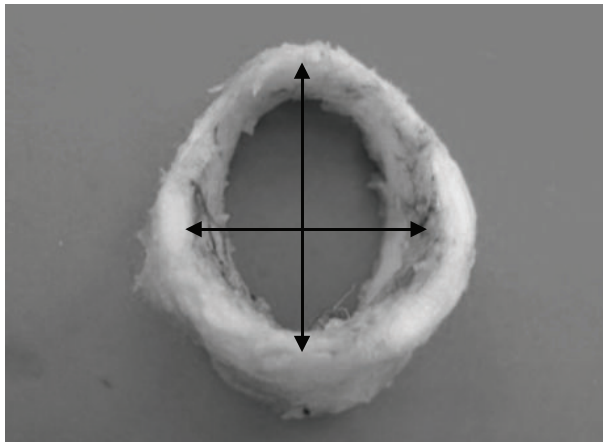


Fig.-1: Photograph of the cricoid cartilage (superior view) shows transverse diameter (horizontal arrow) and anteroposterior diameter (vertical arrow).

RESULTS

The mean transverse diameter of cricoid cartilage was found as 7.40 ± 1.72 mm (ranged between 3 and 9 mm) in age group A, 11.31 ± 1.30 mm in age group B (ranged

between 9 and 13 mm) and 17.10 ± 3.99 mm in age group C (ranged between 10 and 24 mm). The mean transverse diameter of cricoid cartilage was found the highest in age group C (17.10 mm) and the lowest in age group A (7.40 mm). The mean difference of transverse diameter of cricoid cartilage between group A & B ($p=0.001$), A & C and B & C ($p=0.000$) were statistically significant (Table-I). The mean anteroposterior diameter of cricoid cartilage was found as $10.331.54$ mm in age group A (ranging from 7 to 12 mm), 20.56 ± 2.66 mm in age group B (ranging from 15 to 25 mm) and 26.79 ± 4.37 mm in age group C (ranging from 16 to 38 mm). The mean anteroposterior diameter of cricoid was found highest in age group C (26.79 mm) and the lowest in age group A (10.33 mm). The mean difference of anteroposterior diameter of cricoid cartilage between group A & B, A & C and B & C were statistically significant ($p=0.000$) (Table-II).

Table-I: Transverse diameter of cricoid cartilage in different age groups

Age group	Number of specimen	Diameter in mm	P value
A (28 to 40 weeks of gestation)	15	7.40 ± 1.72 (3 - 9)	0.001^S
B (Up to 16 years)	16	11.31 ± 1.30 (9 - 13)	0.000^S
C (17 years and above)	29	17.10 ± 3.99 (10 - 24)	0.000^S

Figures in parentheses indicate range. P value reached from one-way ANOVA test; S=significant.

Table-II: Anteroposterior diameter of cricoid cartilage in different age groups

Age group	Number of specimen	Diameter in mm	P value
A (28 to 40 weeks of gestation)	15	10.33 ± 1.54 (7 - 12)	0.000^S
B (Up to 16 years)	16	20.56 ± 2.66 (15 - 25)	0.000^S
C (17 years and above)	29	26.79 ± 4.37 (16 - 38)	0.000^S

Figures in parentheses indicate range. P value reached from one-way ANOVA test; S=significant.

DISCUSSION

Due to the irregular shape of the larynx, measured values of different parts of the larynx may vary from one study to another.⁶⁻¹⁷ The fact that some of the absolute data differs quite heavily between these studies may be explained by different definitions of measuring points.¹⁰ Moreover, variations exist among different ethnic population in specific geographic area.^{7,10-12} According to Lima et al., the main constriction point of the infants' larynx is the mid-cricoid area.⁹ They studied nineteen larynges from 17 stillborn infants and 2 newborn infants ranging in gestational age from 5 to 9 months (i.e., ~20 to 36 weeks of gestation). The cricoid lumen configuration showed an almost elliptical in shape, which did not change with gestational age. The mean inner subglottic cricoid area was $19.27 \pm 9.62 \text{ mm}^2$ and was related to weight and body surface area. The mean area of cricoid lumen was identified smaller than that of available endotracheal tubes.⁹ Jain & Dhall found the antero-posterior diameter and transverse diameter $28.6 \pm 4.9 \text{ mm}$ $25.7 \pm 3.2 \text{ mm}$ respectively in men, while $23.2 \pm 4.1 \text{ mm}$ and $21.3 \pm 4.7 \text{ mm}$ respectively in women.¹¹ Joshi et al. found that the transverse diameter ranged from 13.88 to 24.05 mm, with an average of $18.33 \pm 2.26 \text{ mm}$, while the antero-posterior diameter ranged from 13.68 to 24.56 mm with an average of $19.29 \pm 2.47 \text{ mm}$ in a western Indian population.¹² Fayoux et al.¹³ also reported that the diameter of the cricoid lumen was significantly less than that of the trachea and glottis lumen. Ajmani et al. found that the transverse diameter of the cricoid cartilage is greater than the anteroposterior diameter in both sexes.⁸ In another similar study done by Ajmani in adult Nigerian population, the mean anteroposterior diameter was found 28.82 mm, while the mean transverse diameter was 29.84 mm in males and the mean antero-posterior diameter is 24.06 mm and the mean transverse diameter as 25.84 mm in females. This study was carried out on 40 specimens (28 males and 12 females) aged between 17 and 50 years.¹⁴ Randestad et al. carried out a study on 34 men and 27 women of Sweden and demonstrated the dimensional differences of the inner cricoid ring. In men, the mean diameter was 15.0 mm (ranged between 11.0 and 21.5 mm), while in women, the mean diameter was 11.6 mm (ranged between 8.9 and 17.0 mm).¹⁵ Kim & Song studied on 48 cadavers (33 males and 15 females) in Korea and found the antero-posterior diameter and transverse diameter

$18.78 \pm 0.47 \text{ mm}$ $17.19 \pm 0.40 \text{ mm}$ respectively in men, while $15.97 \pm 0.54 \text{ mm}$ and $13.36 \pm 0.50 \text{ mm}$ respectively in women.¹⁶ The findings of the present study are more or less similar to those of the previous studies as mentioned above. In contrast, Too-Chung & Green found that in age group from neonatal to 15 years, the coronal diameter of the cricoid cartilage is greater than the sagittal diameter,¹⁷ which is not similar to the observation of the present study. However, they also reported that with age, the sagittal diameter increases faster than that of the coronal one, and both coronal and sagittal diameters bear a linear relationship with height of the individual.¹⁷

CONCLUSION

To summarize, our study revealed significant difference exists in values among different age groups and the values were found to increase with age. The data obtained from this study may contribute to increase understanding in anatomy of laryngeal framework in our population. However, further studies with larger samples and based on different ethnicities in the country are recommended.

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Original Article

Ultrasonography in the Diagnosis of Wilms' Tumor in Children

Mokarabin M¹, Debnath PK², Hasan MM³, Siddiqui MAB⁴, Rahman MS⁵, Mahmud A⁶

ABSTRACT

Background: Ultrasound is a noninvasive imaging modality aids in diagnosis of abdominal complicity without any potentially damage of paediatric patients. Wilms' tumor is the second most common abdominal tumor in childhood and the most common primary pediatric renal malignancy.

Objective: The present study aims to evaluate the effectiveness of abdominal ultrasonography (USG) in the diagnosis of Wilms' tumor and compare the results of USG with those of other methods.

Materials and methods: This descriptive, cross-sectional study was carried out in the Department of Paediatric Surgery of Mymensingh Medical College Hospital, Mymensingh, Bangladesh, from June 2015 to September 2016. A total of thirty patients with palpable abdominal masses in children were selected in this study. Among them, eighteen were male and twelve were female. Age ranged between 6 months and 12 years. Among thirty patients, twenty-five were operated and remaining five were inoperable and underwent enhanced abdominal CT scan.

Results: The results suggested that the predominance of male over female in the ratio of 3:2. This study confirms that Wilms' tumor accounted for 30%. The sensitivity of ultrasonogram is 96.30% and the specificity is 60%. The positive predictive value is 92.86% and negative predictive value is 75% and the overall diagnostic accuracy of this series is 90.62%. In this study false positive rate of ultrasonogram diagnosis is 6.66% and false negative rate of ultrasonogram diagnosis is 3.33%.

Conclusion: Ultrasonography is a non-invasive, safe, inexpensive, and rapid diagnostic tool for determination of Wilms' tumor. It may be the first line of investigation in the evaluation of Wilms' tumor in paediatric surgical practice.

Keywords: Ultrasonography, Wilms' tumor, abdominal mass

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INTRODUCTION

Diagnostic ultrasound is an imaging modality to locate and measure interfaces between different organs and tissues and to cut cross-sectional through different structures. In contrast to image casuistic in different places give direct information, ultrasound enables us to outline the lesion directly and to investigate its relationship with neighboring structures. There is no need for administration of any radiologic contrast possibly harmful to the function of the impaired organ. Ultrasound, both as a screening and diagnostic tool, is a non-invasive and atraumatic procedure, and may be substituted for angiography in many cases. The major feature that is unique to ultrasound is the ability to recognize and verify deep body organs and lesions having similar density on conventional x-ray studies.

Ultrasound is a noninvasive imaging modality that aids in diagnosis without the potentially damaging effects of ionizing radiation, a particularly important consideration in the evaluation of pediatric patients. Ultrasound is widely available, easy to use, and reliable; it is therefore the imaging method of choice in evaluating most known or suspected abdominal masses in neonates or older children. This article focuses on the clinical and sonographic features of selected common abdominal masses in infants and children. The authors highlight the important clinical characteristic of these abdominal masses and specific sonographic imaging features that allow clinicians to differentiate among the common abdominal masses in paediatric patients¹.

Wilms' tumor is the second most common abdominal tumor in childhood and the most common primary pediatric renal malignancy. It is an embryonal renal neoplasm, with 450 new cases reported annually in the United States. Presentations include a flank or abdominal mass, left-sided varicocele, hematuria, and hypertension. Such masses can be quite large at diagnosis because they can go unnoticed due to their retroperitoneal location and are usually painless unless hemorrhage or rupture occurs. Wilms' tumor may occur in association with other congenital anomalies or syndromes including sporadic aniridia, isolated hemihypertrophy, cryptorchidism, Beckwith-Wiedemann syndrome, Denys-Drash syndrome, and WAGR complex (Wilms' tumor, Aniridia, Genitourinary malformations, Mental retardation).² In such associations, Wilms' tumor is more likely to be bilateral and may present at a younger age. Approximately 15% of patients will have metastatic disease at diagnosis, most commonly affecting the lungs followed by the liver and regional lymph nodes. Sonography is the best initial imaging technique to confirm the kidney as the organ of origin and to estimate the tumor size. Major blood vessels should be assessed to determine the extent of intravascular tumor thrombi if present. A CT scan with contrast is helpful to determine the degree of kidney invasion and evaluate for metastasis. The contralateral kidney should be assessed carefully for possible involvement. Treatment includes surgery, if possible, radiation, and chemotherapy. Four-year survival rates range from 95% for patients with low stage and favorable histology to less than 25% for advanced initial disease and unfavorable histology. Similar to neuroblastoma, such patients should be cared for in a specialized pediatric center.

The present study aims to evaluate the effectiveness of abdominal USG in the diagnosis of Wilms' tumor in pediatric surgical practice and compare the results of USG with those of other methods.

MATERIALS AND METHODS

This descriptive, cross-sectional study was carried out in the Department of Paediatric Surgery of Mymensingh Medical College Hospital, Mymensingh, Bangladesh, from June 2015 to September 2016.

Inclusion criteria:

- (i) Patients presenting with palpable abdominal mass otherwise healthy child
- (ii) All patients aged 0 to 12 years

Exclusion criteria:

- (i) Patients having congenital abnormalities.
- (ii) Patients having life threatening co-morbidity.
- (iii) Patient above the age of 12 years

Considering all inclusion and exclusion criteria, finally a total of 30 patients having palpable abdominal mass were selected for this study. Among them, 25 children underwent both abdominal ultrasound and laparotomy with tissue diagnosis, while remaining 5 children were inoperable and undergone abdominal ultrasound with enhanced abdominal CT and CT guided FNAC and tissue diagnosis. A purposive sampling technique was adopted.

In each case, data about the patients were obtained by using a questionnaire after obtaining the consent from the parents or guardians of patients verbally. The clinical history was taken in every case with special attention to the duration, sites, and consistency of the palpable abdominal masses and any change since it was noticed. A complete general examination, local examination and relevant systemic examinations were performed in every case and thus clinical diagnosis was made. Abdominal ultrasound was performed in each case. A routine investigation including complete blood count, Bleeding profile, LFT, RFT, Chest x-ray P/A view, imaging studies, especially abdominal ultrasound, enhanced Abdominal CT and CT guided FNAC (where necessary), IVU, Isotope Renogram.

Data were processed and analyses using SPSS (Statistical Package for Social Sciences) software version 20.0 for windows. Analyses were done using

Chi-square test and student's t-test. P value <0.05 was considered as significant. Continuous scale data were presented as mean standard deviation and Categorical data were presented as number percentage. Ethical clearance was obtained from the Ethical Review Committee of Mymensingh Medical College, Mymensingh, Bangladesh.

RESULTS

The highest incidence is 2 to 5 years in age (76.67 %) and 0 to 2 years in age (13.33%) with the second highest incidence (Table-I). Mean age was 3.80 (± 1.36) years and minimum age was 1 year and maximum age was found 10 years. The predominance of male over female was in the ratio of 3:2. Among the 30 case the highest incidence in male is 60% and female is 40% (Table-II). Occurrence of palpable abdominal lump is higher in male child than female.

Table I: Age distribution of the patients

Age in years	Frequency	Percentage
0 to 2	4	13.33
2 to 5	23	76.67
5 to 12	3	10.00
Total	30	100.00

Table II: Sex distribution of the patients

Sex	Frequency	Percentage
Male	18	60
Female	12	40
Total	30	100

The maximum number of patients examined in the present study was Wilms' tumor, as this accounted for 26.66 %. Hydronephrosis was the second highest incidence and was 16.66%, and Lymphoma accounted for 13.32% as the third highest incidence (Table-III). Out of 30 cases, by ultrasound 9 cases were found Wilms' tumor which was 30.00%, where 7 cases of Wilm's tumor clearly delineated by ultrasound and diagnosed both clinically and ultrasonographically another two (2*) 6.66% was not well delineated and inconclusive (Table-V). Among 3 (10.00%) cases of sonographically diagnosed lymphoma 2 (6.66%) cases were well delineated but another 1* (3.33%) was not well delineated and inconclusive. Among 4

(13.32%) cases of sonographically diagnosed ovarian mass 3 (10%) cases were well delineated but another 1* (3.33%) was not well delineated sonographically and was inconclusive. The result suggested that eight (8) cases were clinically suspected Wilm's tumors whereas 9 cases were diagnosed as Wilms' tumour by sonography, among 5 cases of clinically diagnosed hydronephrosis 4 cases were sonographically diagnosed as hydronephrosis, among 4 cases of sonographically diagnosed ovarian mass where 2 cases were clinically diagnosed, among 4 cases of clinically suspected lymphoma 3 were sonographically diagnosed.

Table III: Clinical diagnosis of Wilms' tumor in patient age ranging from 6 months to 12 years

Clinical Diagnosis	Frequency	Percentage
Wilm's tumor	8	26.66
Choledochal cyst	1	3.33
Pancreatic pseudocyst	1	3.33
Neuroblastoma	2	6.66
Dysgerminoma	2	6.66
Retroperitoneal mass	2	6.66
Ovarian mass	2	6.66
Mesenteric cyst	3	10
Lymphoma	4	13.32
Hydronephrosis	5	16.66
Total	30	100.00

Among the Inoperable 2 (40.00%) cases of Wilms' tumor 1 (20.00%) was well delineated by enhanced CT and also proven by tissue diagnosis but another 1 (20.00%) was not well delineated by enhanced CT but proven by tissue diagnosis. Among the inoperable 2 (40.00%) cases of ovarian teratoma (Immature) 1 (20.00%) was well delineated by enhanced CT and also proven by tissue diagnosis but another 1 (20.00%) was not well delineated by enhanced CT but proven by tissue diagnosis. 1 (20.00%) inoperable case of Non-Hodgkin's lymphoma (suggestive in Ultra sonogram) was not well delineated by enhanced CT but proven by tissue diagnosis.

8 (26.64%) cases were clinically suspected Wilms' tumour whereas 9 (30%) cases were diagnosed as Wilm's tumors by sonography but 7 (23.33%) cases of Wilm's tumor were clearly delineated by

Table IV: Pattern of Wilm's tumor in respect of their age (n=30)

Age in years	Pattern of tumor	Percentage
0 to 2	Neuroblastoma (1)	3.33
	Dysgerminoma(1)	3.33
	Hydronephrosis(1)	3.33
	Rhabdomyosarcoma(1)	3.33
2 to 5	Wilm's tumor (9)	30.00
	Ovarian teratoma(4)	13.32
	Hydronephrosis(3)	10.00
	Mesenteric cyst(2)	6.66
	Non Hodgkin's lymphoma(3)	10.00
	Neuroblastoma(1)	3.33
	Retroperitoneal teratoma(1)	3.33
5 to12	Choledochal cyst(1)	3.33
	Pancreatic Pseudocyst(1)	3.33
	Non-Hodgkin's lymphoma(1)	3.33
Total		100.00

ultrasound and another 2 (6.66) cases were not well delineated by ultrasound (Table-IV). Among 3 (12%) cases of sonographically diagnosed Mesenteric cyst, of them 2 (8%) cases were found peroperatively mesenteric cyst but 1 (4%) case was diagnosed as Non-Hodgkin's Lymphoma by peroperative findings with tissue diagnosis. Among 2 (8%) cases of sonographically diagnosed Retroperitoneal mass, of them 1 (4%) was diagnosed as Retroperitoneal teratoma and another 1 (4%) was diagnosed as Rhabdomyosarcoma by peroperative findings with tissue diagnosis (Table-V). All of the cases of Wilms' tumor, hydronephrosis, neuroblastoma, dysgerminoma, ovarian mass, choledochal cyst and pancreatic pseudocyst were same in peroperative findings and tissue diagnosis (where necessary) with sonographic diagnosis. The highest incidence in 2 to 5 years in age was 23 cases (76.67%) and 0 to 2 years in age was 4 cases which was 13.33% with the second highest incidence. Mean age was 3.80 (± 1.36) with a range between 1 and 10 years.

Table V: Enhanced CT scan of abdominal masses with CT guided FNAC with tissue diagnosis of inoperable cases

Diagnosis	Clinical diagnosis Frequency	Ultrasonographic diagnosis Frequency	Operative findings with tissue diagnosis Frequency
Rhabdomyosarcoma	00	00	1(3.33)
Choledochal cyst	1 (3.33)	1(3.33)	1 (3.33)
Pancreatic pseudocyst	1(3.33)	1(3.33)	1(3.33)
Dysgerminoma	2 (6.66)	1(3.33)	1(3.33)
Retroperitoneal mass	2 (6.66)	2 (6.66)	1 (3.33)
Neuroblastoma	2 (6.66)	2 (6.66)	2(6.66)
Ovarian mass	2 (6.66)	4* (13.32)	4(13.32)
Lymphoma	3 (13.32)	3 (10.00%)	4(13.32)
Mesenteric cyst	4 (13.32)	3* (10.00)	2(6.66)
Hydronephrosis	5(16.65)	4 (13.32)	4(13.32)
Wilm's tumor	8 (26.64)	9* (30.00)	9(30.00)
Total	30 (100.00)	30 (100.00)	30(100.00)

*Figure with parenthesis indicate percentage.

DISCUSSION

In present study, the highest incidence in 2 to 5 years in age (76.67%) and 0 to 2 yrs in age (13.33 %) with the second highest incidence. Similar results were found by Athameeneh et al.³ as their study showed age ranged from 0 to 14 years with a median age of 5 years. In current study, the predominance of male over female with the ratio of 3:2 was observed. Similar observation was reported by Athameeneh et al.³ with 42 male (66.00%) and 22 female (34.00%).

This study showed maximum number of patients examined is Wilms' tumor which accounted for 30% cases. Sonographically 9 cases were found with Wilms' tumor. Hydronephrosis is most common with other etiologies including polycystic kidney disease, mesoblastic nephroma, nephroblastomatosis – Wilms' tumor spectrum, renal vein thrombosis, and ectopic kidney. GI tract masses account for about 15% of abnormalities. Common causes include duplication cysts and mesenteric or omental cysts, as well as meconium pseudocysts. Pelvic masses extending into the abdomen make up another 15% and include ovarian cyst, hematocolpos, and sacrococcygeal teratoma. Non-renal flank masses make up 10% of cases and include adrenal hemorrhage, neuroblastoma, and teratoma. Annuar et al.⁴ showed the majority (71%) were retroperitoneal masses where two-thirds were of renal origin Eighty-six percent of Wilms' tumours, 80% of neuroblastomas, 50% of hepatoblastomas, 50% of choledochal cysts and 50% of ovarian cysts were correctly diagnosed. Wilms' tumours are echogenic renal masses whereas neuroblastomas appear as echogenic extra renal masses. The presence of calcific foci was observed in one-third of neuroblastomas.

In this study that sensitivity was found 96.30%, specificity was 60%, PPV 92.86%, NPV, 75% and efficiency of the test was found 90.63%. Athameeneh et al.³ described the ability of ultrasound to determine the presence of absence of a lesion responsible for the mass in the whole group. In the 44 patients with a definitely palpable mass, a lesion was present in 36, and there was one false negative. In the 20 patients with possible mass, a lesion was present in 6 and there was one false positive ultrasound diagnosis. The high positive predictive value was (97%) and negative predictive value was (95%) for the presence or absence of a lesion in study indicates that ultrasound is a credible test of exclusion for palpable

abdominal mass. The use of gray-scale ultrasound morphology to characterize a pelvic mass may also be called pattern recognition⁵. Subjective evaluation of ovarian masses based on pattern recognition can achieve sensitivity of 88.00 to 100.00% and specifically of 62 to 96%.

Research revealed that both ultrasound and CT scans are excellent modalities for affirming or excluding a palpable abdominal mass⁶⁻¹⁰, with sensitivity and specificity values >95%.^{7,10} Both US and CT usually demonstrate the organ from which a mass arises. The accuracy of US in determining the organ of origin has been 88%–91%,^{6,7} whereas CT has fared slightly better at 93%⁹. US is limited by bowel gas in cases of dilated bowel or by body habitus. US is also partly operator-dependent, however likely to a lesser extent with directly palpable abnormalities. As expected, attempts to predict the pathologic diagnosis of masses based on imaging findings are less successful. In several studies US findings correctly suggested the pathologic diagnosis in 77–81% of cases^{4,11}, whereas CT findings correctly suggested the diagnosis in 88% of cases⁹. US still remains more appropriate as the first-line imaging in the pediatric population because of its high sensitivity (90–99%), specificity (97–100%), and lack of ionizing radiation.

CONCLUSION

Abdominal masses are not uncommon surgical condition encountered in infant and children. A definitive diagnosis is very crucial for the management of patient. Many diagnostic modalities are now available for the evaluation of abdominal masses in infants and children. Ultrasound has which characteristic which makes it very suitable, safe and informative in infancy and children. The present study suggested that might be used for diagnosis of abdominal masses in infants and children and shows the potentially of ultrasonographic evaluation of diagnosis of abdominal masses in infants and children. Children with an abdominal mass demand for rapid clinical evaluation. Imaging studies particularly sonography, may provide a specific diagnosis. So, ultrasonographic evaluation of Wilm's tumor is justified as a preliminary tool. Ultrasonography immense help in planning radiotherapy and in following the growth or regression of a mass after treatment are suggested for further study.

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Original Article

Health Related Quality of Life in Patients Receiving Continuous Ambulatory Peritoneal Dialysis

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ABSTRACT

Background: Health related quality of life (HRQoL) covers the impact of the disease or medical actions on the physical symptoms, functional status, and mental and social functioning. The KDQOL is a kidney disease-specific HRQoL instrument used in research.

Objective: To observe the quality of life parameters in patients on continuous ambulatory peritoneal dialysis (CAPD).

Methods: This cross-sectional study was carried out in three tertiary renal care hospital. Total 40 CAPD patient were selected as cases and 40 healthy individuals were included as controls. A semi-structured questionnaire was developed in English and translated to Bangla. The questionnaire contained questions related to: 1) KDQoL-36 developed by RAND; 2) Clinical and 3) laboratory parameters. Different clinical and laboratory parameters were evaluated. Quality of life (QOL) parameters were assessed by KDQOL-SF-36(V-1.3) questionnaire. The scoring procedure for the KDQOL-SF-36 first transforms the raw precoded numeric values of items to a 0-100 possible range. Higher transformed scores better quality of life.

Results: Mean age of the study subjects was 55±11 and control 56±11 years ($p=0.664$). They were also matched for sex and BMI. The main primary disease responsible for ESRD was diabetic nephropathy (57.5%), followed by glomerulonephritis and hypertensive nephropathy. Mean haemoglobin of the study subjects was 8.1±1.4 g/dl, albumin 3.1±1.4 g/dl and Kt/V 1.8±0.3. Mean physical composite score (PCS) calculated by KDQOL-SF-36 in CAPD and control group were 44±15 and 79±12 ($p<0.001$) and mean mental composite score (MCS) were 45±17 and 80±10 ($p<0.001$). When QOL parameters were compared between two groups according to Kt/V $d^1.7$ and >1.7 showed most of the scores were higher in Kt/V >1.7 .

Conclusion: Quality of life parameters among patients on CAPD were good; hence, it can be a viable option for ESRD patients in Bangladesh.

Keywords: Mental composite score, physical composite score, quality of life, continuous ambulatory peritoneal dialysis, end stage renal disease

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INTRODUCTION

Chronic kidney disease (CKD) is a common deadly disease contributing to significant morbidity and mortality. Chronic dialysis imposes a considerable burden on patients and families. While previous interest focused mostly on medical and technical aspects of dialysis care, psychosocial aspects are now increasingly explored, among them quality of life (QoL).¹

Quality of life is a multidimensional concept. The WHO defines it as: "the perception that individual makes about his position in life, within its cultural context and value system, and related to its goals and vital objectives."² Perhaps the clear definitions referred to QoL is "the measure resulted from the physical, mental, and social well-being, such as is perceived by each individual."³ CKD is inversely associated with HRQoL. There is a correlation between the magnitude of the effect on HRQoL and glomerular filtration rate.

Among the studies, the NECOSAD Study Group,⁴ as they analyzed the effect of starting dialysis with haemodialysis or peritoneal dialysis modalities on survival adjusted for quality of life, the meta-analysis of Cameron et al.⁵ which studied HRQoL of patients undergoing different types of renal replacement therapy and the report of Diaz-Buxo et al.⁶ that analyzed quality of life in hemodialysis and peritoneal dialysis patients.

The application of quality-of-life score is useful to predict the risk of death. For example, Mapes et al.⁷ found that patients who had dropped 10 points in the Physical Composite Score (PCS) in the short form (KDQOL-SF) were associated with a 25% increased risk of death.

The KDQOL is a kidney disease-specific HRQoL instrument. At present, the KDQOL-SF v.1.3 has been developed known as the KDQOL-36 questionnaire. The KDQOL-36 consists of the SF-12, which measures physical and mental functioning, Burden of Kidney Disease subscale, Symptoms and Problems subscale, and Effects of Kidney Disease on Daily Life subscale. The scores of the KDQOL-36 questionnaire are transformed into 0 to 100, with higher scores reflecting better quality of life. Scale scores are computed with the KDQOL-36TM scoring Program.⁸ The present

study aims to observe the quality of life parameters in patients on continuous ambulatory peritoneal dialysis (CAPD) by using KDQOL SF-36 questionnaire.

MATERIALS AND METHODS

This observational study was conducted in the Department of Nephrology, Sir Salimullah Medical College & Mitford Hospital, National Institute of Kidney Diseases and Urology (NIKDU) and Bangladesh Institute of Research and Rehabilitation in Diabetes, Endocrine and Metabolic Disorder (BIRDEM) from January to December of 2015. Diagnosed case of end stage renal disease (ESRD) receiving continuous ambulatory peritoneal dialysis (CAPD) for at least 3 months as study group and healthy individual: Individual with no diabetes mellitus, hypertension, CKD, ischaemic heart disease and any other chronic disease as control were enrolled. Each group had 40 subjects.

A semi-structured questionnaire had been developed in English and translated to Bangla. The questionnaire contained questions related to: 1) KDQoL-36 developed by RAND, 2) clinical, and 3) laboratory parameters. The KDQOL is a kidney disease-specific health related quality of life instrument. The KDQOL-SF v.1.3, which contains the SF-36 with 36 items and 43 kidney disease-specific items. The scoring procedure for the KDQOL-SF-36 first transforms the raw precoded numeric values of items to a 0-100 possible range. Higher transformed scores better quality of life.⁸

Blood pressure, height, weight, presence or absence of anaemia are recorded as clinical parameters.

Complete blood count, Serum urea, serum creatinine, serum albumin, serum total protein, serum potassium, serum glucose, serum calcium, serum phosphate, dialysate urea and creatinine were measured as laboratory parameters. Statistical analyses were done using SPSS version 16.0 for windows. Student's t-test, z-test and Chi-square test were done wherever applicable. Before the commencement of the study, the protocol of the study was approved by Ethical Review Committee of respective institutions.

RESULTS

A total of 40 persons on CAPD for at least 3 months were enrolled as cases, while 40 healthy individuals were included as controls. Most of the patients (57.5%) had diabetic nephropathy followed by glomerulonephritis (22.5%), hypertensive nephropathy (12.5%), obstructive nephropathy (5.0%) and others (2.5%) (Fig. 1).

Table I: Descriptive Statistics of clinical, laboratory parameters of CAPD patient (n=40).

Variables	Mean±SD
Demographic data	
Age (years)	55 ± 11
CKD duration(years)	4.4 ± 2.2
Systolic BP (mmHg)	142 ± 25
Diastolic BP (mmHg)	77 ± 9
Duration of CAPD (months)	17.8 ± 9.2
EPO n (%)	12 (30.0)
Laboratory parameters:	
Haemoglobin (g/dl)	8.1 ± 1.4
Creatinine (mg/dl)	7.7 ± 1.8
Kt/V	1.8 ± 0.3
S. Albumin (g/dl)	3.1± 0.4
S. K ⁺ (mmol/l)	3.4 ± 0.4
S. Ca ⁺² (mmol/l)	6.8 ± 0.8
S. PO ₄ ⁻³ (mmol/l)	5.7 ± 0.6

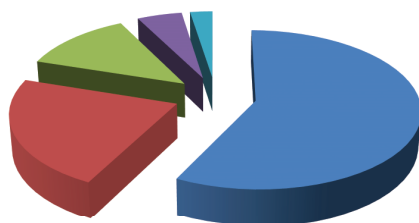


Figure 1: Distribution of patients according to primary disease

Table-II: Comparison of clinical, biochemical and quality of life scores of CAPD patient with control group (n=40).

Variables	Case	Control	p-value
Demographic data			
Age (years)	55 ± 11	56 ± 11	0.664
Gender			
Male	24 (60%)	19 (47%)	0.262
Female	16 (40%)	21 (53%)	
BMI (kg/m ²)	25 ± 3.5	25 ± 2.5	0.536
Systolic BP (mmHg)	142 ± 25	127 ± 13	0.002
Diastolic BP (mmHg)	77 ± 9	78 ± 8	0.704
Haemoglobin (g/dl)	8.1 ± 1.4	12.25 ± 1.87	<0.001
Creatinine (mg/dl)	7.7 ± 1.8	0.98 ± 0.23	<0.001
Quality of life score			
Physical functioning	52 ± 17	80 ± 12	<0.001
Role-physical	34 ± 17	85 ± 20	<0.001
Pain	51 ± 16	75 ± 13	<0.001
General health	49 ± 15	75 ± 13	<0.001
Emotional well-being	52 ± 15	81 ± 10	<0.001
Role - emotion	46 ± 20	90 ± 15	<0.001
Social function	52 ± 21	73 ± 12	<0.001
Energy/fatigue	49 ± 17	76 ± 10	<0.001
PCS	44 ± 15	79 ± 12	<0.001
MCS	45 ± 17	80 ± 10	<0.001

Table-III: Comparison of quality of life scores of CAPD patient in DM and non DM:

Variables	Group		P value
	DM (n=23)	Non DM (n=17)	
	Mean±SD	Mean±SD	
ESRD Targeted areas			
Symptom/problem list	63 ± 11	66 ± 12	0.421
Effects of kidney disease	52 ± 11	57 ± 19	0.268
Burden of kidney disease	25 ± 16	26 ± 17	0.887
Work status	100 ± 0	100 ± 0	
Cognitive function	57 ± 21	65 ± 16	0.184
Quality of social interaction	61 ± 19	68 ± 16	0.244
Sexual function	72 ± 12	54 ± 20	0.160
Sleep	59 ± 10	64 ± 16	0.217
Social support	64 ± 27	54 ± 26	0.253
Dialysis staff encouragement	65 ± 17	70 ± 15	0.330
Patient satisfaction	50 ± 10	50 ± 13	0.965
36-item health survey (SF-36)			
Physical functioning	50 ± 18	53 ± 16	0.618
Role-physical	33 ± 12	35 ± 22	0.696
Pain	51 ± 19	51 ± 14	0.991
General health	50 ± 17	49 ± 14	0.771
Emotional well-being	51 ± 15	54 ± 16	0.494
Role - emotion	44 ± 17	48 ± 23	0.617
Social function	54 ± 21	50 ± 23	0.574
Energy/fatigue	46 ± 15	54 ± 18	0.134

In ESRD targeted area and in SF-36 there was no significant difference in quality of life in any domain between two groups

DISCUSSION

In the present study, health-related quality of life of CAPD patients were evaluated by using KDQOL-SF-36 questionnaire. In this study, most of the patients were above 50 years (Mean age 55±11 years), which were similar to CAPD population in Asian community.^{9,10} A study done by Ross et al. found mean age of the CAPD patients was 77 years that indicates Asian CKD patients progress to ESRD early.¹¹ Most common primary disease leading to ESRD in the present study was diabetic nephropathy which is consistent with another study previously done in our country.¹²

In the presenting study, most of our CAPD patients achieved target Kt/V of at least 1.7 (KDIGO). This

Table-IV: Comparison of quality of life parameters in relation to Kt/V (≤ 1.7 and > 1.7) (Mean ± SD):

Variables	Kt/V		p value
	≤ 1.7 (n=14)	> 1.7 (n=26)	
	[1.42±0.07]	[2.11±0.24]	
ESRD Targeted areas			
Symptom/problem list	60 ± 9	66 ± 12	0.094
Effects of kidney disease	47 ± 15	58 ± 14	0.026
Burden of kidney disease	17 ± 12	31 ± 16	0.014
Work status	100 ± 0	100 ± 0	
Cognitive function	52 ± 14	64 ± 20	0.048
Quality of social interaction	54 ± 20	70 ± 15	0.008
Sexual function	54 ± 31	64 ± 13	0.463
Sleep	54 ± 9	65 ± 13	0.005
Social support	49 ± 25	65 ± 26	0.062
Dialysis staff encouragement	64 ± 14	68 ± 18	0.470
Patient satisfaction	43 ± 10	53 ± 10	0.006
36-item health survey (SF-36)			
Physical functioning	44 ± 13	56 ± 18	0.036
Role-physical	25 ± 00	38 ± 19	0.109
Pain	41 ± 14	56 ± 16	0.005
General health	43 ± 12	53 ± 16	0.049
Emotional well-being	46 ± 12	56 ± 16	0.041
Role - emotion	33 ± 0	50 ± 21	0.060
Social function	39 ± 19	58 ± 20	0.009
Energy/fatigue	40 ± 16	54 ± 16	0.011
PCS	35 ± 9	48 ± 16	0.007
MCS	34 ± 13	51 ± 17	0.002

Physical composite scores (PCS) and Mental composite scores (MCS) were significantly higher in higher (> 1.7) Kt/V group ($p=0.007$) and ($p=0.002$) respectively.

finding is consistent with the study done previously in Bangladesh.¹² The mean physical composite score (PCS) in present study was low (44±15). A study done by de Wit et al. found lower score specially in PCS (38±11).¹³ Lower PCS also found in some other study on PD patients like Ross et al.¹¹ and Kim et al.¹⁴ where the PCS were observed 35 and 39 respectively. Our study was also nearly to the scores of a meta-analysis conducted by Liem et al.¹⁵, where the scores of different domains of SF-36 were around 50.

The Dialysis Outcomes and Practice Pattern Study (DOPPS) on HD patients showed that QoL score was around 60 for Japan, USA and Europe.¹⁶ In Bangladesh, another report on HD patients showed mean QoL score was less than 50;¹⁷ our mean QoL in

PD is comparable to that of haemodialysis subjects of Bangladesh in that previous study. Physical composite score (PCS) of control group was near eighty in this study. A previous study by de Wit et al. found PCS of 50 ± 10 in healthy subjects,¹³ that was much lower and not consistent with our study. Among the QOL scores there were no significant difference between diabetic and non-diabetic group in our study.

Chen et al. showed in their study that more components of the SF-36 were influenced by Kt/V values with higher scores found in higher Kt/V.¹⁸ Similarly in the present study when the two-group divided by total Kt/V ($d > 1.7$ and > 1.7) had significant difference with higher values in higher Kt/V group in almost all domains of QOL parameters ($p < 0.001-0.049$). Therefore, our study is consistent with the above-mentioned study in this regard.

CONCLUSION

Quality of life parameters among patients on CAPD were good. Although the scores were lower than healthy individual, it can be a viable option for ESRD patients in Bangladesh.

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Hepatoprotective Effect of Ethanolic Extract of *Capsicum Annuum L.* (Red Variety) on Paracetamol Induced Hepatotoxicity in Long Evans Rats

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ABSTRACT

Background: Paracetamol induced hepatotoxicity is a critical problem. Plant products like *Capsicum annuum*, are known as an excellent source of flavonoids and phenolics, which are important antioxidant components that reduce the risk of such condition and ensures hepatoprotection.

Objectives: To evaluate the hepatoprotective effect of ethanolic extract of *Capsicum annuum L.* (red variety) and to compare its hepatoprotective activity with Silymarin.

Methods: This experimental study was performed on 35 rats which were taken for the study and divided in 7 groups, each group containing 7 rats. Hepatotoxicity was introduced by Paracetamol at a dose of 750 mg/kg every 72 hourly, and it was given to all except control group. Silymarin was given as standard. G-I rats served as control, G-II served as hepatotoxic control and given Paracetamol. G-III rats were given Silymarin at the dose of 50 mg/kg/day. G-IV and G-V rats were given extract of capsicum at a dose of 250 mg/kg and 500mg/kg daily. After completion of 21 days experiment, all the rats were sacrificed under chloroform anesthesia and blood and liver samples were collected. Biochemical parameters e.g., serum bilirubin, ALT and AST were estimated and histopathological examination of the liver of the rats was also done.

Results: Mean serum bilirubin, ALT and AST levels of paracetamol treated group increased significantly which were highest among all groups. All the parameters were improved with treatment of capsicum and the best result was observed with high dose of extract of capsicum which was similar to silymarin. Microscopic examination of liver tissues showed centrilobular necrosis, periportal fibrosis and loss of cellular architecture in G-II. Bridging fibrosis with improvement of necrosis were found in G-III and G-V.

Conclusion: Pretreated ethanolic extract of *Capsicum annuum L.* (red variety) has hepatoprotective activity, which is almost similar to Silymarin.

Keywords: Hepatotoxicity, capsicum, silymarin, paracetamol

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INTRODUCTION

The liver is a major organ of human body which actively participates in different metabolic functions including metabolism of toxins, various synthetic products and medicines¹. Hepatotoxicity may develop as a result of injury to the liver that is associated with impairment of liver function due to exposure to a drug or other substances and is the leading cause of withdrawal of a drug. Drug induced hepatotoxicity is one of the most common causative factors for both acute and chronic liver failure. Approximately 10% of acute liver failure and about

40-50% of all cases of liver injury are caused by different medicinal agents².

Paracetamol is a very popular and effective NSAID, safe in normal therapeutic doses, used for the treatment of mild to moderate pain and for relieving fever. Near the end of 20th century, paracetamol took the place of aspirin which was a widely used over the counter (OTC) analgesic. It is now used for treating cancer pain as the first step of the World Health Organization (WHO) analgesic ladder³. Among the offending drugs, that causes hepatotoxicity, Paracetamol is most common which is responsible for predictable hepatic injury and the injury is manifested by elevation of serum amino transferases, serum bilirubin with the features of hepatic necrosis in histopathology and reduced glutathione level⁴.

The easy accessibility without the need of laborious pharmaceutical synthesis increased the recognition toward the plant derived herbal medicines. Drugs derived from plants, play a vital role in the management of liver diseases all over the world. A large number of plants and herbal extracts shows hepatoprotective effects. As a result, phytomedicines are now traditionally used in the liver disorders and are included in the complementary and alternative medicines⁵.

Silymarin is obtained from a natural compound derived from the species *Silbyum marianum*, which is called Milk thistle. Silymarin has been used worldwide from long ago as an alternative medicine because of its beneficial role in the treatment of liver diseases as it possesses hepatoprotective and regenerative actions⁶. Capsicum is a member of the Solanaceae family and *Capsicum annuum* is mainly used commercially. Various types of capsicums are widely grown for the fruits that is eaten fresh and also processed to use in different preparations. They are excellent sources of antioxidants, folic acid, dietary fibres and energy and the red pepper possesses the highest content among all⁷. Recently herbal drugs have gained importance and popularity because of their safety, efficacy and cost effectiveness. Therefore, importance has been given around the world to develop plant based hepatoprotective drugs effective against a wide range of liver diseases⁸.

The study was structured to compare the hepatoprotective potential of the Ethanolic extract of *Capsicum annuum* L. red variety in two different doses with Silymarin in paracetamol induced hepatotoxicity in long Evans rats.

METHODS

This experimental study was carried out in the Department of Pharmacology, Sir Salimullah Medical College, Dhaka, Bangladesh, on long Evans rats with ethanolic extract of *Capsicum annuum* (capsicum) for 21 days.

The fresh fruits of *Capsicum annuum* red variety were purchased from local market and extract was prepared in the laboratory of Institute of Nutrition and Food Science, University of Dhaka. Tablet Paracetamol was obtained from Beximco Pharmaceuticals (BD) Ltd. and Capsule Silymarin was obtained from Square Pharmaceuticals (BD), Ltd.

A total number of 35 healthy adult Long Evans rats of both sexes, 8- 12 weeks of age, weighing approximately 100 to 125 grams, purchased from the animal house of the Department of Pharmacology, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh, were taken for this study. The rats were divided into 5 groups. Each group comprised of 7 rats and all the members were given standard lab diet. Group I was served as the normal control, Group II was the hepatotoxic control and treated by paracetamol 750mg/kg at every 72 hours interval. Group III was treated with Silymarin 50mg/kg daily with simultaneous administration of paracetamol 750mg/kg every 72 hourly. Group IV was treated with Ethanolic extract of *C. annuum* 250mg/kg daily simultaneously with paracetamol 750mg/ kg every 72 hourly and Group V was treated with Ethanolic extract of *C. annuum* 500 mg/kg daily simultaneously with paracetamol 750mg/ kg every 72 hourly. All the groups were treated for 21 days.

On 22nd day, animals were sacrificed under chloroform anesthesia and blood was collected by cardiac puncture. The blood samples were taken to the Department of Biochemistry of the same institution to analyze the biochemical parameters (e.g., serum

bilirubin, ALT, AST) by semi-autoanalyzer. After collection of blood, the livers were excised and about two third portions of livers were placed in 10% formalin containing separately labeled containers and taken to the Pathology department of the same institution for histological examination.

Data was collected in data collection form. The results were expressed as mean \pm SD (standard deviation). Statistical significance of differences between groups was determined by one way ANOVA test and Bonferroni test. The calculations were performed by using SPSS version 17.0 for windows. Results of intervention groups were compared with that of control group. The results were expressed as mean \pm standard deviation. P values <0.5 were considered statistically significant. The study was approved by the Ethical Review Committee of Sir Salimullah Medical College, Dhaka, Bangladesh.

RESULTS

There was significant increase in serum bilirubin level in the paracetamol treated group (Group II). Groups treated with silymarin (Group III) and extracts of capsicum (Group IV and Group V) showed significantly lower serum bilirubin level compared to Paracetamol treated group and the level of high dose of capsicum treated group (Group V) is almost similar to silymarin. The induction of paracetamol significantly increased ($P < 0.001$) the levels of serum enzymes ALT and AST. The levels of both enzymes were highest in Group II, the paracetamol treated group. The high dose of ethanolic extract of capsicum treated group (Group V) significantly ($P < 0.001$) reduced the activities of the enzymes and the levels of the enzymes were nearly similar to the silymarin treated group (Group III).

Table I: Serum bilirubin, ALT and AST levels in different groups of rats after completion of 21 days experiment (n=35)

Groups	S. bilirubin (mg/dl)	ALT (IU/L)	AST (IU/L)
Group I (n=7)	0.86 \pm 0.14	36.29 \pm 3.15	37.71 \pm 2.43
Group II (n=7)	6.60 \pm 0.21	80.00 \pm 2.90	88.50 \pm 4.37
Group III (n=7)	2.12 \pm 0.19	40.86 \pm 3.02	51.86 \pm 3.02
Group IV (n=7)	3.87 \pm 0.15	59.00 \pm 2.45	71.71 \pm 3.90
Group V (n=7)	2.28 \pm 0.20	41.00 \pm 2.94	40.91 \pm 4.07
p-value	<0.001	<0.001	<0.001

Table II: Grading of hepatic necrosis by Histopathological changes in the livers in different groups of experimental rats. (N= 7)

Group	Treatment	Grade of hepatic necrosis					
		0	1	2	3	4	5
I (n=7)	Control	7					
II (n=7)	Paracetamol	0	2	3	2		
III (n=7)	Paracetamol+ Silymarin	3	4				
IV (n=7)	Paracetamol+Capsicum(250mg/kg)	2	3	2			
V (n=7)	Paracetamol+ Capsicum(500mg/kg)	4	3				

Grading of hepatic necrosis by Histopathological changes in the livers in different groups of experimental rats was done by the arbitrary scale of Walker⁹. According to the scale, Grade 0 indicates no evidence of necrosis, Grade 1 reveals scattered small foci of centrilobular necrosis, Grade 2, most centrilobular areas show foci of necrosis, Grade 3, more severe necrosis affecting almost all centrilobular areas, Grade 4, confluent centrilobular and midzonal necrosis and Grade 5 stands for massive necrosis with only a narrow zone of surviving hepatocytes. The hepatic architecture in the paracetamol treated group (Group II) showed massive necrosis involving centrilobular and mid zone with a narrow periportal zone of surviving hepatocytes. The high dose capsicum treated group showed repopulation of the hepatocytes with minimum or no evidence of necrosis which was indistinguishable from silymarin treated group.

DISCUSSION

The present study was carried out to evaluate the hepatoprotective effect of *Capsicum annuum L.* red variety. The hepatoprotective effects were tested on Long Evan Norwegian rats. Hepatotoxicity was induced by oral administration of paracetamol at the dose of 750mg/kg body weight in the study.

The fruit of capsicum is proved to possess antiulcer, anticancer, antioxidant, radical scavenging and hepatoprotective properties. The ripe fruits of red capsicum are good sources of antioxidants. Earlier studies by Priya and Anitha suggests the potent antioxidant properties of red capsicum¹⁰. So, the hepatoprotective effect rendered by Ethanolic extract of *Capsicum annuum* could be attributed to the presence of flavonoids and phenolic compounds. In the present study Ethanolic extract of capsicum was given to the group IV and group V of experimental animals at the dose of 250mg/kg and 500mg/kg body weight respectively.

Serum bilirubin is one of the most sensitive tests employed in the diagnosis of hepatic disease. The result of the present study showed significant increase of serum bilirubin level in paracetamol treated rats which indicates hepatocellular damage. Incorporation of capsicum in diet and treatment with silymarin significantly decreased the level of serum bilirubin indicates their role against paracetamol induced hyper bilirubinaemia. These findings are in well agreement with Priya & Anitha¹⁰ and Erhirhie & Ekene¹¹.

Assessment of liver function was made by estimating the activities of serum ALT and AST activity, which are enzymes originally present in higher concentration in cytoplasm. These enzymes leak into the systemic circulation during necrotic cell damage. The elevation of these enzymes occurred in paracetamol treated group and the levels are significantly lower in capsicum and silymarin treated groups. This indicates stabilization of plasma membrane and repair of liver tissue. Similar decrease in ALT and AST levels were reported by Gyawali et al.¹² and Radhika et al.¹³.

Histologic analysis of rat liver treated with paracetamol showed significant hepatotoxicity, characterized by inflammatory hepatic tissues, including the presence of moderate infiltration of neutrophils. There was extensive necrosis in most of the centrilobular areas, in all rats, after hepatotoxicity induced by paracetamol. These histologic alterations in structure of the livers were improved by treatment with silymarin and the extract of capsicum in high dose. These observations of the present study coincide with previous similar studies done by Yeasmin et al.¹ and Masoud¹⁴.

Comparing the general features as well as the biochemical and histological findings in different groups of experimental animals, it is obvious that toxic effects in the liver produced by paracetamol can be prevented by pretreatment with ethanolic extract of *Capsicum annuum L.* red variety in high doses. Prevention of liver damage evidenced by decreased enzyme levels with higher dose of *Capsicum annuum L.* red variety which was almost same observed with Silymarin, which was used as a reference standard.

LIMITATIONS

Molecular components of the active ingredients of *Capsicum annuum* were not identified. Only Ethanolic extract of *Capsicum annuum* was used. Different types of extract would reveal more information; but due to time and resource constrain more elaborate study could not be done.

CONCLUSION

The result of the present study provides a basis for the use of *Capsicum annuum* in the development of new herbal medicine suggesting its use as a potent hepatoprotective agent. Future works could be better directed towards obtaining the specific ingredient and the specific mechanism.

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Original Article

Association of Meniscal Injury in Anterior Cruciate Ligament Deficit Knee and Outcome After Surgery

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ABSTRACT

Background: In young active adult population, the anterior cruciate ligament rupture and meniscus tear are common injuries which reduce the activity level and lead to economic burden.

Objective: To evaluate the association of meniscal injury in anterior cruciate ligament deficit knee by diagnostic arthroscopy and assess the clinical outcome after surgery (arthroscopic anterior cruciate ligament reconstruction by ipsilateral quadruple Semitendinosus and Gracilis tendon auto graft and partial menisectomy).

Methods: This prospective type of longitudinal study was carried out at the National Institute of Traumatology and Orthopaedic Rehabilitation (NITOR), Dhaka, Bangladesh, from January 2014 to December 2015. Purposive sampling was done to include the patients presented with unilateral knee complaints clinically diagnosed as anterior cruciate ligament deficit with or without meniscus injury. The total number of subjects included was 20. Data collection was carried out with pretested questionnaire. After preoperative evaluation and surgery, accelerated rehabilitation protocol was followed. Follow up had been continued up to six months. In Lysholm Knee scoring scale preoperative and postoperative scores were calculated and comparison of mean value was done.

Results: The mean age of respondents was 28.2±9.87 years. Among the respondents, male was found 95%. Regarding the occupation, 60% were sportsmen and 25% were students. The causes of injury were sports (75%), accidental fall (15%) and road traffic accident (10%). Medial and lateral meniscus injury was found in 40% and 45% respondents respectively. The rest were found with anterior cruciate ligament injury alone. The mean postoperative hospital stay was 7.18±4.36 days. According to Lysholm Knee Score, the outcome of surgery was excellent in 60%, good in 35% and fair in 5% respondents. The mean preoperative and postoperative Lysholm Knee Score was 54.64±4.365 and 91±8.768 respectively which reflects significant postoperative improvement ($p<0.05$).

Conclusion: Anterior cruciate ligament injury associated with meniscus injury frequently occurs in young population. Reconstruction of the anterior cruciate ligament and partial menisectomy will help people return to their original activity.

Keywords: Knee joint, Anterior cruciate ligament, meniscus, arthroscopy, gracilis tendon, meniscus, semitendinosus tendon

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INTRODUCTION

The knee joint, the largest and complex hinge joint, is one of the most frequently injured joints of the body because of its anatomical position, structure, exposure to external forces and the functional demands placed on it¹. This is commonly injured in athletic activities and motor vehicle accidents.

Anterior cruciate ligament is an intra-articular, extra synovial structure present in the central complex of knee joint. It functions in concern with all other anatomical structures to control and limit motion and maintain both static and dynamic equilibrium. The ligament provides both anteroposterior and rotatory stability and also helps resisting excessive valgus and varus angulations.

The Anterior Cruciate Ligament is the most frequently injured ligament of the knee joint. The estimated incidence of ACL injury is one in 3000 in general population. On the other hand, incidence of this ligament injury is one in 1750 in people aged between 16 to 45 years².

ACL injury varies in severity from a simple sprain to complete rupture. Rupture of the ACL affects knee stability, resulting in giving way symptoms in daily and sports activities. It increases risk of meniscal injuries and early degeneration of the injured knee³.

Meniscal function is essential to the normal function of the knee joint through providing great elasticity and ability to withstand compression. The meniscus functions as a load-bearing structure^{4,5,6}. They have been assumed to have shock or energy absorbing functions. The meniscus contributes more to stability of the knee joint in the absence of a functioning ACL⁷.

The most common location for injury is the posterior horn of the meniscus and longitudinal tears are the most common type of injury. The other types are transverse and oblique tears, a combination of longitudinal and transverse tears, tears associated with cystic menisci, tears associated with discoid menisci etc.¹.

A meniscal tear requires primary treatment to restore adequate knee function⁸. After nonsurgical treatment of ACL injury, there is often a progressive deterioration of function of the knee joint in athletically active people which leads to repeated instability, meniscal tears, ultimately, degenerative change^{9,10}.

ACL rupture is a threat to the homeostasis of the knee. The goals of ACL reconstruction are to abolish the symptoms of instability in the knee joint and to reduce the risk of secondary meniscal tears and chondral damage. Again, most medial meniscal tears usually require meniscectomy or repair⁷.

Reconstructions of the anterior cruciate ligament (ACL) are frequently performed procedures in knee surgery now a day. In the United States 50,000 anterior cruciate ligament reconstructions are done annually¹¹.

In case of meniscal injury secondary restraints or collateral ligaments are often damaged which give rise to joint line tenderness. It has focused the light on considering the utility of arthroscopic examination in all ACL injuries. In case of knee injury diagnostic arthroscopy is a useful tool and is most accessible¹².

Arthroscopy should be considered as a diagnostic aid used in conjunction with a good history, complete physical examination and appropriate radiographs¹³.

The main aim of arthroscopic partial meniscectomy is to remove all ruptured and offending tissue and to save as much as functional tissue with a peripheral tissue and relieving pain and improving function of the joint.

Of the injuries attended in the orthopedic hospitals, knee injury is a common one. A good history with particular reference to the nature of injury and a well performed clinical examination will, in most situations, indicate the underlying problems. On clinical ground this approach has been improved by experienced arthroscopy. Arthroscopy has revolutionized the diagnosis as well as management of its intra articular pathology.

The combined ACL rupture and meniscus tear is a common injury in young active adult population which reduces activity level and leads to economic burden¹⁴.

Considering these contexts, this study has been carried out on patients with knee injury with two objectives: firstly, to evaluate the association of meniscal injury in anterior cruciate ligament deficit knee by diagnostic arthroscopy and secondly, to assess the clinical outcome after surgery (arthroscopic anterior cruciate ligament reconstruction by ipsilateral quadruple Semitendinosus and Gracilis tendon auto graft and partial meniscectomy).

METHODS

This prospective type of longitudinal study was carried out at the National Institute of Traumatology and Orthopaedic Rehabilitation (NITOR), the largest institution of Bangladesh for managing orthopaedic and traumatized patients, situated in Dhaka metropolitan city. The duration of the study was two years extending from January 2014 to December 2015. Purposive sampling was done. All patients attending outpatient department between 18 to 45 years with Anterior Cruciate Ligament injury were included in the study where the gap between injury and surgery was not more than two years. The exclusion criteria were previously operated patient with any form of knee injury, osteoarthritis of knee, isolated meniscus injury, any injury associated with intra articular fracture of any articular component of knee joint and bilateral Anterior Cruciate Ligament deficiency. The total number of subjects included was 20.

The data collection was carried out with pretested questionnaire. After taking informed written consent, data were collected by face-to-face interview, observation and clinical examination. Clinical diagnosis was confirmed by MRI. After preoperative evaluation and surgery (arthroscopic anterior cruciate ligament reconstruction by ipsilateral quadruple Semitendinosus and Gracilis tendon auto graft and partial meniscectomy), accelerated rehabilitation protocol was followed. The phases of follow up included in the protocol are:

1. Immediate phase (0-2 weeks following surgery) – Short period but regular exercise like calf exercise, isometric quadriceps exercise and straight leg raise, passive/active/assisted active knee flexion up to 90-degree, use of pillow under heel, brace for first 2 weeks and partial weight bearing with crutches.
2. Early phase or Maximal Protective phase (2-4 weeks after surgery) – Ambulation with normal gait without crutches and full extension at heel strike, full passive knee extension, gradual increase of knee flexion (0-125 degree), straight leg raise, calf stretch and Hamstring stretch.
3. Middle phase (5-12 weeks after surgery) – Full active range of motion, start of athletic activity (swimming, cycling), Hamstring built exercise.

4. Late phase (3-4 months) – Continued Quadriceps and Hamstring built exercise.
5. Up to six months after surgery – Return to sports. If motion is >30-degree, Hamstring strength is >95%, Quadriceps strength is >85%, sports specific training and maintenance of exercise 2-3 times weekly.

According to Lysholm Knee scoring scale preoperative and postoperative (in final follow up at 24 weeks) score was calculated¹⁵.

Comparison of mean preoperative and postoperative value was done to determine whether significant improvement was achievement or not after surgery. On the basis of individual postoperative value, final outcome categorization was done. The study was approved by the Ethical Review Committee of National Institute of Traumatology & Orthopaedic Rehabilitation (NITOR), Dhaka, Bangladesh.

RESULTS

The mean age of respondents was 28.2±9.87 years. Most of the respondents were found in 26-30 years age group which was 40% of the study population (Fig. 1). Male was found 95% and female was 5%. Regarding the occupation, 60% respondents were sportsmen and 25% were students. Service holder, businessman and housewife was found to be 5% each. Right knee was found injured in 55% respondents and rest was found in case of left knee representing none with injury of both knee joints. Sports were the causes of injury in 75% respondents. The rest causes were accidental fall (15%) and road traffic accident (10%) (Fig. 2). Medial and lateral meniscus injury was found in 40% and 45% respondents respectively. The rest were found with anterior cruciate ligament injury alone (Fig. 3). Most of the respondents (70%) had to stay in the hospital for 5-10 days during post operative period (Table-I). According to Lysholm Knee Score, the outcome of surgery was excellent in 60%, good in 35% and fair in 5% respondents (Table-II). The mean preoperative Lysholm Knee Score was 54.64±4.365 and postoperative score was 91±8.768. Preoperative versus postoperative Lysholm Knee Scores showed significant improvement ($p<0.05$) (Table-III).

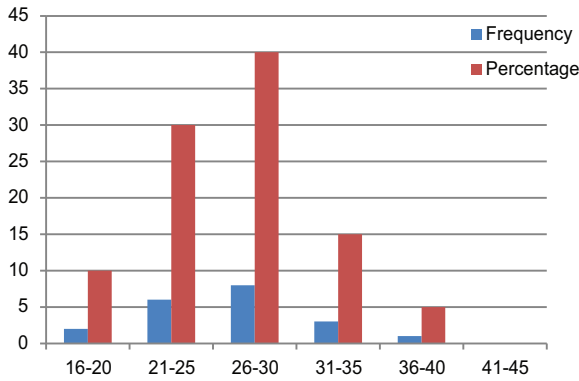


Fig. 1: Distribution of respondents by age (n=20)

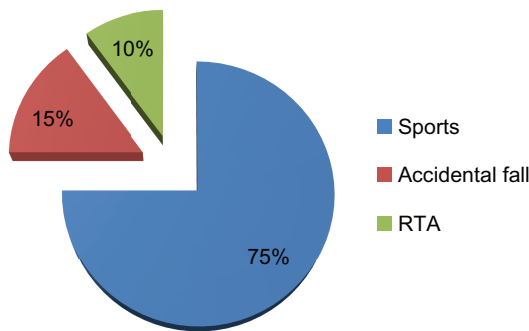


Fig. 2: Distribution of respondents by cause of injury (n=20)

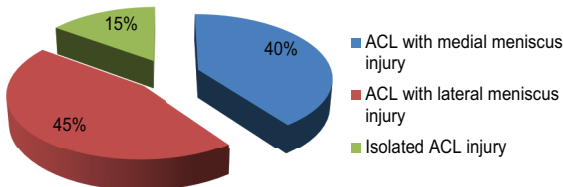


Fig. 3: Distribution of respondents by associated injury of the knee joint (n=20)

Table-I: Distribution of respondents by postoperative hospital stay (n=20)

Hospital Stay (days)	Frequency	Percentage	Mean±SD
<5	4	20	7.18±4.36
5-10	14	70	
10-15	1	5	
15-20	1	5	
>20	0	0	

Table-II: Distribution of respondents by Functional Score and outcome according to Lysholm Knee Score scale (n=20)

Score Range	Outcome	Frequency	Percentage
>94	Excellent	12	60
>84-93	Good	7	35
>64-83	Fair	1	5
<64	Poor	0	0

Table-III: Comparison of Preoperative and Post operative Lysholm Knee Score

Period	Mean±SD	p value
Preoperative	54.64±4.365	<0.05
Postoperative	91±8.768	

DISCUSSION

This study evaluated the association of meniscus injury in ACL deficit patients and the result of arthroscopic ACL reconstruction by Quadruple autograft of Semitendinosus and Gracilis and partial meniscectomy. The respondents were divided into six age groups. The mean age was found as 28.2±9.87 years. Regarding the sex distribution, male was found 19 which comprised of 95% of study patients. Regarding the occupational distribution, sportsmen were found to be 60% (12) of study population. Among the rest respondents, 25% (05) were students. Right knee was found to be involved in 11 patients which comprised of 55% of the respondents and left knee involvement was found in 09 patients (45%). 15% respondents had ACL injury alone. Study done by Razi et al. on 161 athletes observed that about 16.7% of the study population had ACL tear alone¹⁶. Regarding the cause of injury, sports injury was found in 15 (75%) of study patients. Next was accidental fall which was found 3 (15%) of the study patients. While distributing the patients according to associated injury, 9 (45%) were found with lateral meniscus injury. Associated medial meniscus injury was found in 08 (40%) respondents and only 3 patients were found with ACL injury alone which was 15% of the study patients. Another study done by Jae-Jeong L. et al. revealed that the incidence of medial meniscal tears was 44% (77/174) and that of lateral meniscal tears was 35% (61/174)¹⁷. Postoperative hospital stay was mostly 7-10 days in

70% (14/20) of the study patients. Mean hospital stay was 7.18 ± 4.36 days in this study. Uneventful post operative period was found in 85% (17/20) patients. On the other hand, 01 patient each was found with knee pain, superficial infection and knee stiffness which was 5% each.

According to Lysholm knee scoring system, the functional outcome was excellent in 60% (12/20) respondents, good in 35% (07/20) respondents and fair in 05% (01/20) respondents. Preoperative Lysholm knee score was 54.64 ± 4.365 and post operative score was 91 ± 8.768 . Preoperative versus postoperative Lysholm knee scores showed significant improvement ($p < 0.05$).

Due to time constrain, the study had been carried out with small sample size. Whether the meniscal injury was primary or secondary was not evaluated. Further long-term studies are needed to evaluate the effectiveness of the study.

CONCLUSION

Anterior cruciate ligament injury associated with meniscus injury frequently occurs in young population. Arthroscopic reconstruction of anterior cruciate ligament and partial meniscectomy will help them make fit and return to their original activity.

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Original Article

Thyroid Function Abnormalities Among Pemphigus Vulgaris Patients

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ABSTRACT

Background: It is known that individuals with autoimmune diseases such as pemphigus vulgaris (PV) are at increased risk of developing other autoimmune diseases. However, it is not clearly known whether there is any specific relationship between PV and thyroid autoimmunity.

Objective: The study aims to determine the effects of pemphigus vulgaris on the thyroid glands with analyzing the thyroid function tests.

Methods: This cross-sectional, descriptive study was conducted in the Department of Dermatology & Venereology, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh, between November 2015 and October 2016. A total of 42 patients participated in this study. Pemphigus vulgaris was diagnosed clinically with the help of a panel of experts and confirmed by the investigations e.g., histopathological and DIF examination. Demographic profile, detailed history, and clinical features was recorded in data collection sheet. Then the thyroid function tests – serum TSH, FT₄ and FT₃ were measured by chemiluminescent microparticle immunoassay.

Results: In the present study, the mean age of the patients was 46.7±9.9 years. Male: female ratio was 1.1:1. Hypertension was the most commonly observed comorbidity (16.7%), followed by anaemia (11.9%). Serum TSH was abnormal in 9.5% patients, while abnormal serum FT₄ was observed in 2.4%, and FT₃ in 16.7%. Overall, most of the patients (88.1%) had normal thyroid functions i.e., euthyroid state, 4(9.5%) patients had hypothyroidism and 1(2.4%) had hyperthyroid state.

Conclusion: Among pemphigus vulgaris patients, thyroid function tests revealed that serum FT₃ is the most affected by pemphigus vulgaris; nonetheless, serum TSH and FT₄ are also affected in smaller proportion in comparison to FT₃.

Keywords: Thyroid function test, pemphigus vulgaris, autoimmune disease.

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INTRODUCTION

Pemphigus vulgaris (PV) is a kind of autoimmune bullous illness that has been linked to myasthenia gravis and thymoma in the past.¹ Blisters form on the skin and mucous membranes, and the skin and mucous membranes erode. It nearly always affects persons in their 40s or 50s. Pemphigus vulgaris is characterized by a soft blister filled with clear fluid that develops on healthy or inflamed skin. In many cases, mouth blisters are prevalent, followed by recurrent skin blisters.^{2,3} Because of the blisters in his or her mouth, it may be difficult for the individual to eat. Burst blisters on the skin can be painful and interfere with a person's normal activities. Pemphigus vulgaris is still considered of having unknown aetiology. It is thought to be activated when a person with a genetic predisposition to the disease comes into touch with an environmental trigger, such as a chemical or a medicine. Blisters form as a consequence of an accumulation of fluid between the skin cells. Individuals with autoimmune disorders like pemphigus vulgaris are known to be at a higher risk of getting additional autoimmune diseases.³ However, whether there is a link between thyroid autoimmunity and PV has yet to be determined.² Thyroid diseases are common in medical practice and are linked to a variety of skin problems.^{3,4} Thyroid illnesses have been linked to skin conditions such as melasma, vitiligo, alopecia, Sjogren's syndrome, connective tissue disorders, and bullous diseases.⁵ Thyroid disorders and dermatitis herpetiformis are said to be closely linked.⁶ Pemphigus vulgaris is associated with autoimmune problems, and a recent study found that people with pemphigus vulgaris had a higher risk of developing autoimmune diseases in their families.⁷ The most effective treatment for pemphigus vulgaris is corticosteroid, which is also used to treat people with Hashimoto's thyroiditis.^{4,8} Glucocorticoids may lower antithyroid antibody titers and restore thyroid function in these individuals.⁹ Regardless, the number of research examining thyroid autoimmunity in pemphigus vulgaris patients is still limited;^{4,10-12} in our country, such reports are rare. Hence, we proposed this study to observe the results of different thyroid function tests to determine whether pemphigus vulgaris affects the thyroid functions in diseased individuals.

METHODS

This cross-sectional, descriptive study was conducted at the Department of Dermatology & Venereology, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh, between November 2015 and October 2016. A total of 42 patients were selected for the purpose of this study from patients with PV fulfilling the inclusion and exclusion criteria.

Inclusion criteria:

- 1) Patients with PV diagnosed by history, clinical features, histopathological examination and direct immunofluorescence (DIF) assay;
- 2) Patients of both sexes with any age group; and
- 3) Patients who gave consent to participate in the study.

Exclusion criteria:

- 1) Patients using drugs (Iodine and Iodide containing drugs, Lithium, Interferon- α , Interleukin-2, Dopamine, Levodopa, Amiodarone, Phenytoin, Carbamazepine) that interfere with thyroid functions;
- 2) Unable to answer the criteria question; and
- 3) Exclude those affected with other chronic diseases, like diabetes mellitus, chronic renal failure, chronic thyroiditis, nodular goitre, etc.

Informed written consent was obtained from the participants prior to the commencement of the study. Then the selected patients were biopsied under the supervision and sent to the Department of Pathology of the same institution for histopathological and DIF examination. Pemphigus vulgaris was diagnosed clinically with the help of a panel of experts and confirmed by the investigations. Demographic profile, detailed history, and clinical features was recorded in data collection sheet. Then serum thyroid profiles of the patients were evaluated with analyzing thyroid function tests. Serum thyroid stimulating hormone (TSH), free triiodothyronine (FT₃), free thyroxine (FT₄), were measured by using chemiluminescent microparticle immunoassay in Abbott Alinity i Autoanalyzer (made by Abbott Inc., USA), as performed in the Department of Biochemistry and Molecular Biology of the same institution.

All the relevant data were compiled on a data sheet, then statistical analysis was done using Statistical

Packages for Social Sciences (SPSS) version 22.0 for windows. The results were presented in tables. Quantitative data were expressed as mean and standard deviation and qualitative data were expressed as frequency and percentage.

The present study was approved by the Institutional Review Board (IRB) of Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh.

RESULTS

In the present study, 22(52.4%) patients belong to the age range 19-49 years followed by 18(42.9%) patients were in 50-70 years and 2(4.8%) patients within 5-18 years. The age range of the patients was 12 to 62 years. The mean age of the patients was 46.7±9.9 years (Table-I). 52.4% of patients were male and 47.6% were female. Male: Female ratio was 1.1:1. (Table-II). 11.9% of patients had anaemia, jaundice was present in 2.4%, bradycardia in 2.4%, hypertension in 16.7%, and fever in 9.5%, lymphadenopathy in 2.4% and oedema in 7.1% (Table-III). Thyroid function tests of the patients revealed that 4(9.5%) patients had abnormal serum TSH level, while 7(16.7%) patients had abnormal serum FT₃ and 1(2.4%) patient had abnormal serum FT₄ level (Table-IV). Regarding thyroid status, most of the patients (88.1%) had normal thyroid functions i.e., euthyroid state, 4(9.5%) patients had hypothyroidism and 1(2.4%) had hyperthyroid state (Table-V).

Table I: Distribution of the study patients by age (n=42)

Age in years	Number of patients	Percentage
5-18	2	4.8
19-49	22	52.4
50-70	18	42.9
Mean±SD	46.7±9.9 years	
Range	(12 - 62) years	

Table II: Distribution of the study patients by sex (n=42)

Gender	Number of patients	Percentage
Male	22	52.4
Female	20	47.6

Table III: Distribution of the study subjects based on clinical features (n=42)

Clinical features	Frequency	Percentage
Anaemia	5	11.9
Jaundice	1	2.4
Bradycardia	1	2.4
Hypertension	7	16.7
Fever	4	9.5
Lymphadenopathy	1	2.4
Oedema		

Table IV: Distribution of the study subjects by thyroid function test (n=42)

Thyroid function tests	Frequency	Percentage
Serum TSH		
Normal (0.47-5.01mIU/L)	38	90.5
Abnormal (<0.47 or >5.01 mIU/L)	4	9.5
Total	42	100.0
Serum FT ₃		
Normal (2.62-5.70 pmol/L)	35	83.3
Abnormal (<2.62 or >5.70 pmol/L)	7	16.7
Total	42	100.0
Serum FT ₄		
Normal (9.14-23.81 pmol/L)	41	97.6
Abnormal (<9.14 or >23.81 pmol/L)	1	2.4
Total	42	100.0

Table V: Distribution of the study subjects by thyroid status (n=42)

Thyroid status	Frequency	Percentage
Hypothyroid	4	9.5
Hyperthyroid	1	2.4
Euthyroid	37	88.1
Total	42	100.0

DISCUSSION

Pemphigus vulgaris, or PV for short, is a rare form of autoimmune disease that causes blisters on the skin and the mucous membranes throughout the body. It is commonly observed in people over the age of 40, but it can occur in people of any age and gender.¹ It is generally understood that pemphigus vulgaris occurs due to a combination of both genetic factor and environmental trigger. It is known that individuals with autoimmune diseases such as pemphigus vulgaris, are at increased risk of developing other autoimmune diseases and vice-versa.¹⁰⁻¹²

The present study was conducted to observe the effects of pemphigus vulgaris on patients' thyroid glands via evaluation of thyroid function. The mean age of the present study participants was 46.7±9.9 years, with majority being from the age group of 19-49 years. The male: female ratio of our study was 1.1:1, with 52.4% male predominance. In contrast, in some other studies, female predominance was observed.^{4,5} Among the participants of the study, 11.9% had anaemia, 16.7% had hypertension, 9.5% had fever and 7.1% had oedema. Some other minor features were also present in the study. These findings were different compared to other studies, where patients had comorbidities like Cushing syndrome, hypothyroidism, and fungal infection in much higher rates compared to other comorbidities.^{13,14} Thyroid functions of the participants were measured via serum TSH, FT₃ and FT₄ levels. Over 90% of the participants had normal serum TSH levels in the present study, while only 9.5% had deviations from the range values. Serum FT₃ test (i.e., free triiodothyronine) amount in the blood, which is a major hormone produced by the thyroid glands. We observed that 16.7% of the participants had abnormal FT₃ levels, while serum FT₄ levels were found abnormal in only 2.4% of the patients.

Pemphigus vulgaris was observed to coexist with many of the autoimmune disorders like myasthenia

gravis, systemic lupus erythematosus (SLE), rheumatoid arthritis (RA), and Graves' disease.^{15,16} Moreover, evidence suggested that autoimmune thyroid diseases have been linked to pemphigus vulgaris.¹⁰⁻¹² In the present study, regarding thyroid status, majority of the patients (88.1%) had euthyroid state, while 4 (9.5%) patients had hypothyroid and only 1 (2.4%) had hyperthyroid states.

There are some limitations of the present study, as it was conducted in a single hospital with small sample size due to time and budget constraints. Hence, the results may not represent the whole community. Moreover, the cross-sectional design hardly establishes any causal relationship.

CONCLUSION

Our data suggest that serum FT₃ is the most affected by pemphigus vulgaris; nonetheless, serum TSH and FT₄ are also affected in smaller proportion in comparison to FT₃ as per thyroid function tests of pemphigus vulgaris patients. We recommend that this study needs to be conducted with a large sample size and with a control group to better understand the effects of pemphigus vulgaris on the thyroid glands of patients.

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Review Article

Newborn Care During COVID-19 Pandemic

Alo D

Abstract

Background: World has changed tremendously with COVID-19. Every aspect of human life is affected by COVID-19. Pregnant mothers and their newborns are also at risk of COVID-19.

Objective: The objectives of this study were to review and discuss on various important issues regarding essential and immediate newborn care & resuscitation of newborn during delivery in the perspective of COVID-19, timing of testing of newborn for Covid-19, if newborn is positive of Covid-19 what measures should be taken and breast feeding the newborn of Covid-19 positive mother etc.

Methods: The study is designed on the basis of secondary information from different recent studies and guideline. For this, the internet has been used as source of information.

Results: Results of different recent studies and WHO & national guidelines are that the routine care of newborn is not different from national guideline, additional measures for infection prevention and control should be taken by both health service provider and caregiver or mother. Newborn should be tested for COVID-19 routinely if mother is suspected or confirmed Covid-19 positive. If testing is not available suspected newborn should be managed as Covid-19 positive case. Till date Covid-19 virus is not detected in breast milk or transmitted through breast milk. So, multiple benefits of breast feeding substantially outweigh the potential risks of transmission and illness associated with COVID-19. In the community transmission phase, all newborns coming to SCANU should be considered as COVID-19 suspected neonate and should assess before admission to SCANU. Mother or caregiver should be counseled about post-natal follow up and also for danger signs.

Conclusion: As we are in the intermediate stage of corona virus outbreak the available information be changed according to further studies. The main attempt of this study is to summarize the literature about update care of newborn during COVID-19 pandemic.

Keywords: Newborn care, COVID-19 pandemic

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INTRODUCTION

The outbreak of SARS-CoV-2 is the worst healthcare emergency of world in this century, and its impact on neonates is still largely unknown. Coronavirus disease-2019 (COVID-19), which started in Wuhan, China, in December 2019¹ and was declared a worldwide pandemic on March 11, 2020.² Neonatal COVID-19 accounts for a small percentage of newborns and is often milder than that in adults; however, it can progress to severe disease in some cases of newborns. Newborn infants deserve more concern due to their immature immune system and the possibility of mother to infant transmission, so the neonate could be a vulnerable source of spreading the disease.

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There are some key facts regarding Covid-19 in newborns. These are: till date, there is no evidence of an increased risk of miscarriage or teratogenicity or preterm birth or in-utero (vertical) transmission of the COVID-19 or transmission through breast milk. But babies born to mothers with COVID-19 can potentially become infected through droplet exposure^{3,4}. Hence, infection prevention and control measures should be taken by both mother or care giver and health care provider.

METHODS

The study is designed on the basis of secondary information from different recent studies and guideline. For this, the internet has been used as source of information. An exploratory search is done from the relevant search engine like PubMed, Medline and Google scholar. The search terms were: newborn,

care, Covid-19. Studies were searched by titles and/or abstracts. In addition, lists of references were also scrutinized to find relevant published article. All the results of different recent studies and WHO guideline were compiled.

RESULTS AND DISCUSSION

A. Essential and Immediate newborn care in the context of COVID-19

The existing national guideline should be followed regarding the technical content of essential and immediate care of newborn. Additional measures will be taken in the context of COVID-19. With appropriate IPC measures skin to skin care and Kangaroo Mother Care (where indicated) can be initiated immediately after birth of newborn.^{1,2} Breastfeeding should be initiated within one hour after birth with appropriate IPC measures. Because, currently available data suggest that prolonged skin-to-skin contact and early and exclusive breastfeeding are still the best strategies for reducing morbidity and mortality for both the mother with COVID-19 and her baby, in tandem with rigorous infection prevention and control measures.^{5,6} Application of 7.1% chlorhexidine for umbilical cord care is a must. Bathing is delayed. It should be given 72 hours after birth. If possible BCG immunization is given just after birth. Regular routine cleaning of all surfaces that the mother has had contact should be ensured with appropriate disinfectant.^{7,8}

B. Breast Feeding in the perspective of COVID-19:

At present, data are not sufficient to conclude vertical transmission of COVID-19 through breastfeeding⁹⁻¹¹. In infants, the risk of COVID-19 infection is low, even in the few cases of confirmed COVID-19 infection in young children, most have experienced only mild or asymptomatic illness while the consequences of not breastfeeding and separation between mother and child can be significant. At this point it appears that COVID-19 in infants and children represents a much lower threat to survival and health than other infections, rather breastfeeding is protective against due to its inherent content of Ig A and Lactoferin that protect from many infectious agents^{12,13}.

The benefits of breastfeeding and nurturing mother-infant interaction to prevent infection and promote health and development are especially important when health and other community services are themselves disrupted or limited like in Covid-10 or emergency situation. Adherence to infection

prevention and control measures is essential to prevent contact transmission between COVID-19 suspected or confirmed mothers and their newborns and young infants.

Based on available evidence, WHO recommendations on the initiation and continued breastfeeding of infants and young children also apply to mothers with suspected or confirmed COVID-19. COVID-19 has not been detected in the breast milk of any mother with confirmed/suspected COVID-19 and there is no evidence so far that the virus is transmitted through breastfeeding.^{1,2,10,11}

Breastfeeding and skin-to-skin contact significantly reduce the risk of death in newborns and young infants and provide immediate and lifelong health and developmental advantages. Breastfeeding also reduces the risk of breast and ovarian cancer for the mother. The numerous benefits of breastfeeding substantially outweigh the potential risks of transmission and illness associated with COVID-19.^{10,14}

Breastfeeding – if done within the first hour of life, exclusively for the first 6 months and until age 2 – has the greatest potential impact on child survival of all preventive health interventions. Thankfully, data indicate that COVID-19 is not found in breast milk, and all women are encouraged to breastfeed. However, those with suspected or known COVID-19 infection should do so while taking precautions, such as wearing a mask and washing their hands before and after touching their baby. If a mother isn't well enough to breastfeed,

she should try to express her breast milk in a safe way.

B1. Appropriate IPC (Infection prevention & control) measures taken by COVID-19 positive or suspected mother during breast feeding

Mothers should follow appropriate IPC measure during breast feeding and newborn care.

Mother should wash hands frequently with soap and water or use 70% alcohol-based hand rub before touching the baby. She should wear a face mask while breastfeeding and providing skin to skin care or kangaroo mother care. If a medical mask is unavailable, mother is advised to sneeze or cough into a tissue and immediately dispose of it & wash hands. Chest should be washed if she has been coughing on it. Breast does not need to be washed before every feeding. Mother should regularly clean and disinfect surfaces that she has touched.^{1,2,7,8,10}

Breastfeeding mothers and COVID-19

If you are sick with COVID-19 or think you might have it, follow these steps when breastfeeding:

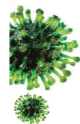
-  Use a medical mask when near your child
-  Wash your hands thoroughly with soap or sanitizer before and after contact with your child
-  Routinely clean and disinfect any surfaces you touch

 World Health Organization
REGIONAL OFFICE FOR THE Eastern Mediterranean

#COVID19
#CORONAVIRUS

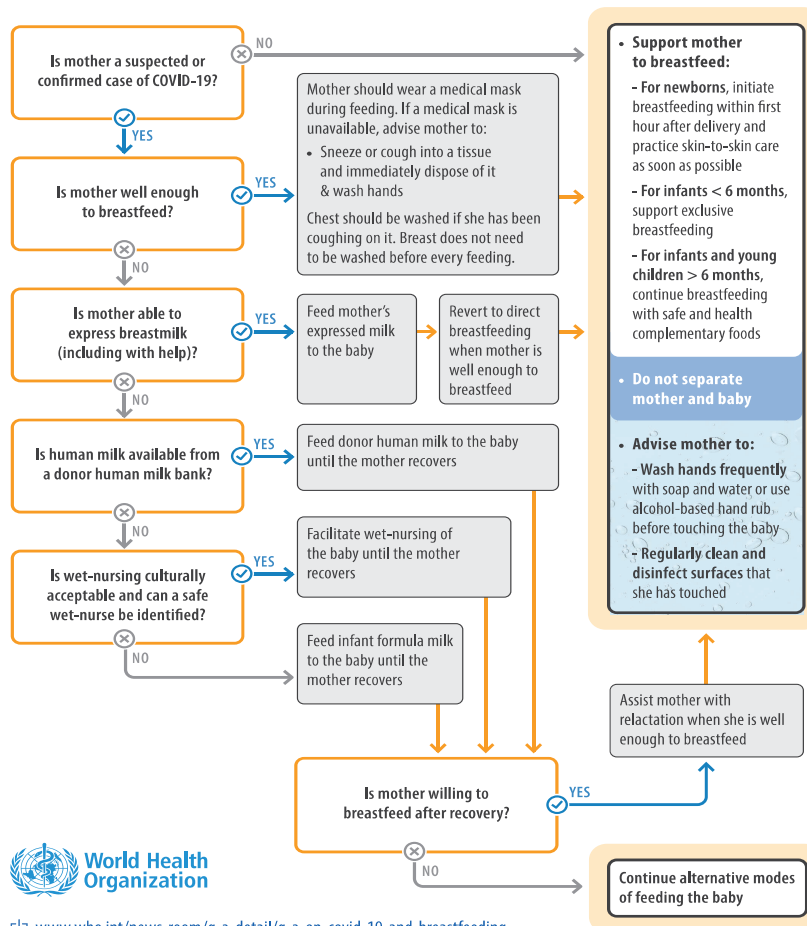
B2. Breastfeeding if the mother is COVID positive and critically ill:

Mother is encouraged and allowed to initiate breastfeeding as soon as she can even if she was unable to initiate during the first hour. The baby is fed with expressed breast milk if the mother-baby are temporarily separated (shifted to SCANU or otherwise indicated to the mother). A non-infected family member can be engaged in expressing breast milk. Appropriate IPC measures should be ensured while expressing breast milk (hand washing with soap and water, or 70% alcohol-based hand sanitizer and wearing a face mask). A non-infected caregiver will feed the breast milk to the baby with proper hand washing and wearing a face mask. Mother may need help with re-lactation when she is well enough to breastfeed.^{1,9}



DECISION TREE

for breastfeeding in context of COVID-19:
Guidance for **health care and community settings**



B3. Breast Feeding of suspected or positive COVID-19 neonate:5-8

1. The COVID 19 positive or suspected neonate should be fed expressed breast milk by the non-infected mother or caregiver
2. Non- infected family member should support to express milk. The caregiver will wash the hand with soap water or 70% alcohol-based hand sanitizer and wear a mask while expressing breast milk.

C. Newborn Resuscitation: Newborn resuscitation/ HBB (Helping babies Breathe) service should continue as per the national SOP¹. But precaution should be taken by Service providers with appropriate IPC measure for airborne, contact and droplet transmission.

IPC FOR SERVICE PROVIDERS

1. All doctors, midwives and nurses managing COVID 19 suspected or positive newborn during bag-mask ventilation, intubation, tracheal suctioning, nasal canula oxygen, continuous positive airway pressure and/or positive pressure ventilation of any type, must wear gown, gloves, N95 respiratory mask with eye protection, or air-purifying respirator (powered air-purifying respiratory (PAPR) or government supplied level-3 PPE.
2. During routine management of newborn and during feeding, the nurse must wear gown, gloves, standard procedural mask and eye protection (either face shield or goggles).

D. Testing of Newborn for COVID-19:

Testing should be done first after 24 -48 hours of age as early test may have negative result. For infants who are positive on their initial testing, follow-up testing of combined throat/nasopharynxial specimen should be done at 48-72-hour intervals until two consecutive negative tests. If testing facility is not available, treat the suspected neonate as COVID-19 positive and manage accordingly.^{1,2}

Positive test results: but infant has no symptoms of COVID-19,

1. Frequent outpatient follow-up (either by phone, telemedicine, or Face to Face) should be planned up to 14 days after birth.
2. Precautions are needed to prevent household spread from infant to caregivers; following use of

standard procedural masks, gloves and hand hygiene in the home environment.

Negative test results:

- Newborn can be discharged to the care of a healthy caregiver.
- The mother or the caregiver with persons under investigation (PUIs) for COVID-19 should maintain a 3-feet distance and use a mask and practice hand hygiene when directly caring for the infant until either
 - a) she has been afebrile for 72 hours without use of antipyretics
 - b) at least 14 days have passed since her symptoms first appeared; or she has negative results from a COVID-19 test from at least two consecutive specimens collected 24 or more hours apart.

If baby cannot be tested:

1. Treat the baby as COVID-19 positive for the 14-day period of observation.
2. Mother should still maintain precautions^{1,2,5,6}.

E. Referral of symptomatic or sick newborn: If isolation intensive care is not available in the facility where symptomatic or sick newborn is born or referred with COVID 19 infections, the newborn should be immediately shifted to the designated closest hospital where such facilities are available. Complete safety and PPE policies and precautions must be followed during transport.^{1,2,6,7,8}

F. Sick Newborn Management in SCANU

In the community transmission phase, all newborns coming to SCANU should be considered as COVID-19 suspected neonate and should assess before admission to SCANU.^{1,2}

F1. Triage for COVID 19 before entering SCANU

Must ASK:

1. Infants born to mothers with suspected or confirmed COVID-19
2. With a known exposure to another suspected or confirmed COVID-19 patient
3. Newborns with symptoms of COVID-19

ASSESS

4. Newborns with signs of COVID-19 infection
- F2. When the newborn is suspected as COVID 19 positive.**

The newborn needs to be admitted to an area separate from unaffected infants. If no separate space, the newborn should be kept at least 6 feet away from other neonates or place them in air temperature controlled isolates until proved COVID negative. Thorough investigations are needed to be done with symptoms of COVID-19 infection for other common diseases that may have similar clinical problems.^{1,15-17}

F3. Visitation of newborn in SCANU

Visitor should be restricted to one visitor. Mothers with COVID-19 should not visit SCANU until all the following are met:

- (1) resolution of fever without the use of antipyretics for at least 72 hours and
- (2) improvement (but not full resolution) in respiratory symptoms, and
- (3) negative results of a SARS-CoV-2 test from at least two consecutive specimens collected e"24 hours apart or at least for 14 days after disappearance of symptom.

Other attendant with person under investigation (PUIs) should not visit infants until they are confirmed to be negative. Other attendant with symptoms of disease and are confirmed to have COVID-19 must also meet the requirements above before visiting infants in the neonatal intensive care unit. Mother or other attendant without COVID or not suspected can visit with proper PPE.^{1,2,16-18.}

F4. Infection Prevention and Control (IPC) in mothers' room

1. All mothers and accompanying attendant should be screened for COVID 19 –
 - a. Flue like symptoms (fever, headache, sore throat) in mother or other family members
 - b. Contact history of mother or family member with COVID patient.
2. If a mother with PUI, and no separate space is available, she should be placed at least 3 feet from other with mask and meticulous hand hygiene.^{1,2.}

F5. IPC in SCANU waiting space

1. Allowing minimum attendant in waiting space
2. Screening all attendant visitors before allowing in the waiting room (contact history with COVID patient, flue like symptoms)

3. Maintaining physical distancing during sitting (3 feet)
4. We must follow sneezing and coughing etiquette and dispose used tissue in a closed bin
5. Washing hand with soap and water for 20-40 seconds or with alcohol based hand sanitiser for 20-30 seconds and wear mask before entering SCANU

G. Counseling to COVID 19 positive mother:

1. Mother should keep distance of 6 feet until fully recovered from COVID 19.
2. All mothers with COVID-19 or who have recovered from COVID-19 should be counseled on safe infant feeding, and appropriate IPC measures to prevent COVID-19 virus transmission.^{1,2}
3. To monitor newborn for COVID-19 symptoms.

If the newborn has one or more of these signs or symptoms, they may have early symptoms of COVID-19 or another illness mother should contact healthcare professional.¹⁵⁻¹⁷

- Fever (a temperature of 100.4 or higher is considered an emergency)
- Lethargy (being overly tired or inactive)
- Runny nose
- Cough
- Vomiting
- Diarrhea
- Poor feeding
- Increased work of breathing or shallow breathing

H. Postnatal follow up

The first face-to-face PNC visit may be on the 6th week. Before this, we have to organize PNC contacts through telemedicine and other measures. The existing national guideline should be followed regarding the technical content of care. We should promote and encourage breastfeeding irrespective of the COVID-19 status of the mother and the newborn. We have to promote immediate long-acting

post-partum contraceptive services (PPIUD, PP Implant) with proper counseling and consent to avoid any unwanted pregnancies.^{15,16,17,18}

IPC measures in Outpatient Department management^{1,2,17,18}

1. Providing PNC services in separate PNC room dedicated for suspected or confirmed COVID-19 newborn

2. Restricting the accompanying person from entering the PNC room/area
3. Maintaining at least three feet of physical distancing
4. Wearing appropriate PPE at all times (face mask, hand gloves, goggles/face shield)
5. Washing hands before and after examining each patient
6. Conducting physical examinations respectfully but quickly to minimize exposure time
7. Cleaning surfaces that are coming in touch with the mother hours and mop the floor with 1% sodium hypochlorite solution in every 3-4 hours
8. Counseling the mother to avoid unnecessary contact with others and babies
9. Counsel about postnatal anxiety and depression
10. Instruct the mother to wash her clothes with detergent or disinfectant in water at 70 degrees for at least 25 minutes.

CONCLUSION

COVID-19 is novel to us. Its many things are still unknown to us. Researches are going on; hence, we should be updated time to time.

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Review Article

Flipped Classroom Approach in Anatomy Teaching and Learning in Undergraduate Medical Education in Bangladesh

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ABSTRACT

Adoption of the flipped classroom approach in teaching and learning in medical education has been gaining much more popularity gradually in recent years across the globe. In Bangladesh, medical education has very little or no experience of flipped classroom teaching. Since the very beginning, most of our teaching and learning processes have been going through teacher-led didactic approach. In a traditional classroom, students often do not have the opportunity to discuss their ideas and misconceptions and there is very little interaction between students and their peers and teacher/instructor. It is assumed that this deficit is one of the main reasons for attrition in Phase-I courses (1st and 2nd Year MBBS) in anatomy, which later gives rise to failing, or dropping out exams or courses. However, in flipped classroom approach, students have opportunities to participate, self-direct, and engage in their own learning, which supports adult learning theories, and seems beneficial to long-term learning and the development of self-directed learning skills. In this review paper, we have discussed our flipped classroom approach in anatomy teaching and learning as well as its prospects and challenges in the Phase-I of MBBS curriculum in Bangladesh.

Keywords: *Flipped classroom, anatomy teaching and learning, medical education, Bangladesh*

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INTRODUCTION

Adoption of the flipped classroom approach in teaching and learning (sometimes called the 'inverted classroom') in medical education has been gaining much more popularity gradually in recent years.¹⁻³ Flipped classroom is a "pedagogical approach in which direct instruction moves from the group learning space to the individual learning space, and the resulting group space is transformed into a dynamic, interactive learning environment where the educator guides students as they apply concepts and engage creatively in the subject matter".¹ Being popularized in the United States⁴, flipped classroom approach has replaced teacher-led in-class instructions with individual homework or group activities and is being adopted for decades across the globe.^{3,5} In recent years, the flipped classroom approach has made inroads into health professions education, and has even been touted "a new paradigm" in medical education.³ In Bangladesh,

medical education has a little or no experience of flipped classroom teaching. Since the very beginning, most of our teaching and learning processes have been going through teacher-led didactic approach. In traditional pedagogy, a substantial amount of material can be covered in lecture; however, students are often “overwhelmed by the content”.³ They struggle to make connections among the facts and to build upon their previous knowledge. Those classroom lectures can be considered teacher-centered strategies that are conducive to passive learning on behalf of learners.^{3,5-7} Moreover, students often do not have the opportunity to discuss their ideas and misconceptions and there is very little interaction between students and their peers and teacher/instructor.^{3,6-8} It is assumed that this deficit is one of the main reasons for attrition in Phase I courses (1st and 2nd Year MBBS) in anatomy, which later gives rise to failing, or dropping out exams or courses and causes frustrations and despair among students about the Department of Anatomy in general. In contrast, active learning strategies (i.e. opportunities for students to participate, self-direct, and engage in their own learning) are not only supported by adult learning theories but have also been shown to be beneficial to long-term learning and the development of self-directed learning skills.^{2,9} Moreover, accreditation standards now formally demand that medical programs include opportunities for medical students to work in active learning environments, so that they can develop lifelong learning skills (independent identification, appraisal, analysis, and synthesis of knowledge) desirable of modern physicians.^{10,11} Given the pedagogical and accreditation considerations in undergraduate medical education, we have recently started now applying elements of the flipped classroom to our anatomy teaching. In this review, we have discussed our flipped classroom approach in anatomy teaching and learning as well as its prospects and challenges in the Phase-I of MBBS curriculum in Bangladesh.

FLIPPED CLASSROOM APPROACH IN ANATOMY TEACHING AND LEARNING

The Flipped Learning Network (FLN) demonstrates what effective flipped learning looks like. It is a baseline or a roadmap that contains the principles of flipped learning.” FLN’s Four Pillars (**F-L-I-P**) are the following:¹²

Flexible Environment: Educators can create flexible spaces in which students choose when and where they learn. Furthermore, educators who flip their classes are flexible in their expectations of student timelines for learning and in their assessments of student learning.

Learning Culture: The Flipped Learning model deliberately shifts instruction to a learner-centered approach where class time is dedicated to exploring topics in greater depth and creating rich learning opportunities. Students are actively involved in knowledge construction as they participate in and evaluate their learning in a manner that is personally meaningful.

Intentional Content: Educators continually think about how they can use the Flipped Learning model to help students develop conceptual understanding and procedural fluency. Educators use intentional content to maximize class time in order to adopt methods of student-centered, active learning strategies.

Professional Educator: Professional educators continually observe their students, providing them with feedback relevant in the moment and assessing their work. Professional educators are reflective in their practice, connect with each other to improve their instruction, accept constructive criticism and tolerate controlled chaos in their classrooms.

In the Phase-I of MBBS programme, we have started re-designing our courses in human anatomy, e.g., gross anatomy, histology, embryology etc. In the flipped classroom approach, medical students (of 1st and 2nd Year) have been given some course materials like reading texts, recorded lectures, tutorial videos, animations, and podcasts in advance. The teacher/instructor also have used online tools to host a short video and create the comment space with the students. The students need to register and identify themselves on the site that has monitored their activities. After that, during the anatomy class, the students were separated into small groups to answer an online questionnaire having some objective questions on their smartphones with a time limit, followed by discussions of the topic with its clinical relevance. This approach gives more flexibility to the teachers/instructors to devote the scheduled class time to ensure student engagement through active learning activities, problem solving through discussion and collaborative work, and feedback. This

methodology is focused to students' learning needs placing them at the center. During the scheduled class time, they get the opportunity to discuss their ideas, ask questions, and clarify their misconceptions. They became more independent, both online and in-person and in the discussion of the proposed theme. We have taken this strategy instead of traditional didactic lecture based teaching, where students seem to be more passive in learning by absorbing the information transmitted by their teachers/instructors. The inversion of the classroom (i.e., 'flipping the classroom') has changed our teaching practice, allowing the teacher/instructor to assume a much more accessible role in front of the students.

The flipped classroom, a blended model of teaching and learning, might be different in various classrooms in various disciplines in a medical college depending on the teacher, content, the use of digital resources, tools, and technology. It is now a growing pedagogical strategy embraced by many of the disciplines in medical and allied health professions education.¹³⁻²² However, the educators who teach the courses often do not recognize that flipping classrooms means something more than offering only asynchronous video resources or podcasts to the students.^{3,5,23-25} Besides, the computer interaction alone is not sufficient for measuring the effectiveness of the flipped teaching methods.^{3,5,23} Hence, designing the structure of the flipped classroom should focus on improving the student's problem solving, analyzing and evaluating information skills, which are crucial to overall learning environment inside the classroom or laboratory.^{3,8,9,23} Faculty also need to put efforts to improve strategy based on personal experience, evidence and student feedback.^{3,8,23,26} Therefore, faculty as well as institution should further investigate the efficacy of implementing flipped classroom for different courses/training and populations of students (e.g. undergraduate and postgraduate) in medical education.^{9,26,27}

HOW TO FLIP THE CLASS TO TEACH ANATOMY IN MEDICAL COLLEGES

Some Practical Ideas^{3,6,8,17,24}

1. Students may participate in pre-class, in-class and post class activities surrounding the lecture on the anatomical terminology and anatomical planes of human body. They may have some pre-class readings and videos. Then they come to class, discuss, show different anatomical planes

in their own bodies and discuss anatomical terminologies and take a post class quiz to test their knowledge of the information gained during the flipped classroom.

2. An upper limb dissection video may be given in advance instead regular dissection room sessions. The video is again played by an anatomy instructor during class. The instructor provided comments on the videos, guided the students, and answered their questions. The students. Then the students may engage themselves in cadaver dissection and anatomical drawing of the structure of forearm, arm and hand in groups.
3. For human embryology teaching, each of the modules can be designed as having learning objectives, a core lesson, clinical correlations, textbook references, videos, YouTube links, summaries, timelines, and practice and graded quizzes. For each topic, students are assigned a module to review in the days prior to the in-class clinical cases session. Each regular class session may include a review of the key materials from the module, application of basic and clinical content to 2-3 cases with open- and closed-ended students' response questions, while offering time for questions and answers throughout the session. Meanwhile, students may engage themselves in integrating those clinical cases with other disciplines (e.g., pathology, radiology, medicine, surgery, gynaecology etc.) and clarify their misconceptions through peer-learning or help from the instructor.
4. In histology teaching, similar can be done by posting advance videos, reading texts, animations. While being in laboratory, students may come up with questions and discussions among them and engage in drawing what they have seen in the videos previously and under the microscope in the class, compare any discrepancy or disruption, identify the causes and correlate normal histological structures with the abnormal one (histopathology). Later, they may sit for quizzes or short answer questions on that specific topic.

PROSPECTS

Many advantages of the flipped classroom have been covered throughout the recent literature in medical

education and elsewhere. Researchers proposed some radical changes in medical education, e.g., moving away from teaching decontextualized knowledge, integration of active learning in the classroom, improving clinical reasoning skills.^{9,10} New and innovative instructional strategies must be integrated within medical education to achieve these goals.¹⁰ Evidence showed that flipped classroom pedagogy increases students' competence, autonomy, and relatedness which improves intrinsic and extrinsic motivation.^{2,3,6,11,13-29} Besides, it has particular benefit to those students whose personality types and preferred learning styles impair their performance in traditional educational environment. It helps engage with peers and reduce the frustration levels while taking medical courses.^{2,3,6,11,13-25,30} For the teachers/instructors, this approach helps to work closely with the students in the classroom, improve student motivation and attitude, and students' ability to solve open-ended problems, gaining a better understanding of students' difficulties, accommodation of a range of different learning styles during in-class activities, progression of students at different paces and using class time in innovation and critical thinking.^{11,26-30}

CHALLENGES

Of course, as with anything, there are also some challenges to the flipped classroom approach in teaching. Teachers are not all familiar with the methods and technologically challenged to implement flipped learning in their institutions.^{9,10,21,26} Students from resource-strained background may not have the ability to possess the computers/tablets and the internet facilities to avail the materials of teaching that the flipped classroom mostly requires.^{9,10,21,26} While teaching in a large scale, the development of the flipped classroom needs a multi-disciplinary cooperation learning ecology that the flipped classroom method requires additional skills, provided by photographer, videographer, instructional designers and many more, unlike the traditional classroom method. Moreover, the effectiveness of flipped classroom and active learning is not universal among different courses and different populations of students.²⁶ Some disappointing results could be attributed to the diversity of the student population or the instructors' inexperience.²⁶ Last but not the least, the negative attitude of teachers/instructors towards flipped learning is huge challenge, as they are habituated with traditional

teaching method for decades and hardly want to switch.^{8,9}

CONCLUSION

We advocate changes to transform the anatomy classroom from teaching centered to learning centered, which might not come out as great as we imagine in all situations. Still, we would like to argue that the principles and skills we use to guide our work in quest of science in experiments in dissection rooms or histology laboratories are the same ones needed to guide our activities in the classrooms, as described in the book titled 'Scientific Teaching'.^{31,32} Human anatomy is a gateway into any of the healthcare careers in all over the country. It is very important for students to acquire required knowledge, skills and confidence in anatomy so that they can advance in their studies, succeed in the professional examinations, and be well-prepared for their future education and careers. Flipped learning helps them gain better insights into that direction. Moreover, faculty members in Anatomy also need to consider under which condition such flipped classroom approach could be the most effective strategy in teaching and learning.

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CASE REPORT

Rhabdomyolysis with Acute Renal Failure in Falciparum Malaria: A Case Report

Islam KJ¹, Haque MM², Rahman MS³, Islam MK⁴

ABSTRACT

Malaria is transmitted by the Plasmodium parasite, and often reported in Bangladesh in patients with a history recent travel to an endemic zone. Malaria is endemic in 13 of 64 districts in Bangladesh. About 14 million people are at risk. Prompt diagnosis and treatment is essential in preventing mortality. Severe malaria represents a medical emergency because it may rapidly progress to complications and death without prompt and appropriate treatment and almost exclusively caused by Plasmodium falciparum. The incidence of imported malaria is increasing and the case fatality rate remains high despite progress in antimalarial treatment. Clinical deterioration usually appears 3-7 days after onset of fever. Complications involve the nervous, respiratory, renal, and/or hematopoietic systems. Metabolic acidosis due to renal failure is a common systemic complication. We are reporting here a case of severe malaria in a 30-year-old man who presented with fever, myalgia, and reduced urination for two days.

Keywords: Rhabdomyolysis, Acute renal failure, Falciparum malaria, Bangladesh

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INTRODUCTION

Malaria is one of the most burden diseases among all infectious diseases. It is transmitted by the bites of infected female *Anopheles* mosquitoes.¹ In the year 2015, about 212 million cases of malaria occurred worldwide. Most of the cases in 2015 were in the WHO African Region (90%), followed by the WHO South-East Asia Region (7%) and the WHO Eastern Mediterranean Region (2%). Progression to severe and fatal disease is significant but not entirely confined to *Plasmodium falciparum* infections. High mortality is always associated with severe malaria. From a clinical perspective, there is a continuum from asymptomatic malaria to uncomplicated illness

through to severe and lethal malaria.² In severe malaria, the prompt administration of an effective antimalarial drug, preferably by a parenteral route, is essential. Artesunate (i.v. or i.m.) is the treatment of choice, followed by Artemether (i.m.) and Quinine (i.v. or i.m.).²

Acute renal failure is a common complication in severe malarial infection which can be the resulted from multiple mechanisms: hypovolaemia, excessive haemolysis, disseminated intravascular coagulation or impaired microcirculation due to a high level of parasitized erythrocytes.³ Rhabdomyolysis is an uncommon way of inducing renal failure in malaria infection. The diagnosis is based on high serum level of muscular enzymes; Creatine Phosphokinase (CPK) and clinical symptoms like myalgias. To our knowledge, very rarely few cases of rhabdomyolysis complicated by acute renal failure during malaria infection have been described.^{4,5}

CASE REPORT

A 30-year old man was admitted in our hospital with one week history of intermittent high grade fever which appeared every alternate days, yellowish discoloration of his eyes and severe body ache and

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decreased urination for two days. He denied any itching, cough, dysuria, diarrhea, melaena, convulsions, blood transfusion and contact with any sick patient. The patient had no history of chronic diseases, drug, or alcohol abuse, contact with heavy metals, trauma, severe exercise, seizures, and use of medications, snakebite, or other recent infectious diseases. He did not have any travelling history to any endemic zone for malaria in the past one year; however, he had frequent travel history to endemic zones.

On examination, his initial vital signs were pulse 130 bpm, BP: 90/60 mmHg, RR-30 breaths/min, and T-102°F on Day-0. He appeared pale, icteric; there were bleeding spots in his noses and bleeding spots over his chest. His capillary refill time was 3s. He had severe prostration. He would cry out of pain whenever his proximal muscle groups were touched. There was no lymphadenopathy. His systemic examination revealed hepatomegaly and splenomegaly. His chest was clear on examination. His GCS was 12 and he did not have any neck stiffness or any flapping tremors. On admission, his initial WBC count (7000/ul) and haemoglobin (13.1 g/dl) were within normal limits; however, platelet count was low (30,000/ul). A comprehensive metabolic panel revealed, blood glucose 4.6 mmol/l, creatinine of 1.96 mg/dl, serum electrolytes revealed Na⁺ 133mmol/l, K⁺ 4.4 mmol/l, Cl⁻ 99 mmol/l initially. In addition, the hepatic panel showed serum bilirubin of 16.8 mg/dl and ALT-72 U/L. Other investigations revealed: Reticulocyte count: 2%, CRP-48mg/dl, CPK-911u/l, LDH 614 U/l. On Day 1, an initial ICT for Malaria was positive for both P. Vivax and P. Falciparum which was then repeated twice to reconfirm it (Fig. 1). Parasite count and venous lactate was not done. Urinalysis was positive for blood 3+, bilirubin 2+, protein 1+, urobilinogen 1+ and the red blood cell was 49-99/ HPF, WBC 9-19 / HPF. The chest X-ray was normal. On the Day 1, his urine output further declined and became very dark (Fig. 2). The IEDCR was contacted; the patient was supplied with three doses intravenous artesunate to be given at 2.4 mg/kg/dose at 0, 12 and 24 hours. The first dose was given on 1815 hours on Day1, 2nd dose on 0615 hours on Day 2 and 3rd dose on 1815 hours on Day 2 (Fig. 2). After receiving the 2nd dose, the patient's orientation to time place and person deteriorated at 1415 hours on Day 2 with a GCS of 10. On 1900 hours Day 2, his metabolic panel revealed, creatinine: 3.48

mg/dl, an arterial blood gas analysis showed pH 7.3, PO₂ 45 mmHg, PCO₂ 24.1 mmHg, HCO₃⁻ 11.5 mmol/l, BE 14.9 mmol/l. Further blood test revealed: haemoglobin 11.7 g/dl, SO₂ - 77%. Serum electrolytes were Na⁺ 131 mmol/l, K⁺ 6.8 mmol/l, Ca⁺⁺ 0.67 mmol/l, Cl⁻ 106 mmol/l. On Day 2, further hydration and correction of electrolytes was intended and urgent dialysis was being arranged for the patient. The patient was treated with 10% Calcium gluconate IV, nebulized salbutamol for the correction of hyperkalaemia. The patient's blood pressure dropped to 80/50 mm of Hg and he was resuscitated with IV fluids. The urine output decreased to 0.3ml/kg/hour. The urine color appeared dark red as shown in Fig. 3. He was also given IV sodium bicarbonate to correct the acidosis. Despite all efforts the patient died 0845 on Day 3.



Fig. 1: Immunochromatographic tests (ICT) done on the bed side showing ICT positive for both *Plasmodium falciparum* and *Plasmodium vivax*.



Fig. 2: Patient on Day 2 at 14:15 hours.



Fig. 3: Patient's urine on Day2 at 18:15 hours.

DISCUSSION

Malaria is an important public health problem in Bangladesh with significant morbidity and mortality. More than 95% of malaria cases in Bangladesh are reported from 13 highly endemic districts, where 11 million people are at risk.⁶ An early and accurate diagnostic approach is essential for reduction of morbidity and mortality of malaria. Considered as the gold standard, microscopic examination of Giemsa-stain blood films is widely used because of its efficiency and low cost. However, the microscopic technique is time-consuming and requires equipment and trained personnel.⁷ Immunochromatographic tests (ICT) render the non-microscopic methods for malaria diagnosis, thereby saving on training and time. These tests are easy to perform and require little training to interpret results.⁸ Immunochromatographic rapid tests offer the possibility of more rapid non-microscopic method for rapid diagnosis.^{9,10} In diagnosis of Falciparum malaria in Bangladesh, a study done by Ahmed MU et al. have revealed that "ICT Malaria Pf" had sensitivity and specificity of 94.2% and 100% respectively.¹⁰ Both the studies found that Immunochromatographic rapid diagnostic tests were reliable.^{9,10} Reducing the impact of malaria is key to the achievement of the Millennium Development Goals (MDGs), agreed by every United Nations Member States. In achieving the global goal rapid diagnostic test can play its role. Considering the limitations in the rural areas rapid diagnostic tests

(RDTs) are very useful.¹¹ Harani MS et al. evaluated the sensitivity Ischaemic acute tubular necrosis is by far the most common cause of acute renal failure in *P. falciparum* malaria.⁹ It is the result of hypovolemia, peripheral pooling of blood and blockage of microcirculation by parasitized red cells and non-specific effects of infection.

In this case, the patient had rhabdomyolysis that may be the actual reason of this acute renal failure. Many mechanisms may induce these muscle damages.¹² In this case, rhabdomyolysis could not be explained by usual causes (hyperthermia, crush syndrome, metabolic abnormality, drugs, or other infectious diseases). Thereafter, the responsibility of *P. falciparum* as the pathophysiological mechanism of the rhabdomyolysis was supposed. Only a few publications are available about rhabdomyolysis and *P. falciparum* infection.^{4,5} The mechanism postulated to explain rhabdomyolysis is the sequestration of parasitized erythrocytes in striated muscle capillaries, inducing microcirculatory obstruction. *Plasmodium falciparum* may also induce myositis with myoglobinuria.¹³ This mechanism may explain the muscle pain experienced by our patient and the high level of CPK.

We suggest that signs of rhabdomyolysis has to be sought in patients with acute renal failure and *P. falciparum* malaria infection, especially when muscle pain is present. Mild jaundice due to haemolysis in malaria is common. Severe jaundice due to haemolysis, hepatocyte injury, and cholestasis may occur in the setting of *P. falciparum* infection; this manifestation is more common among adults than children. Liver dysfunction together with renal impairment and other organ dysfunction portend a poor prognosis.¹⁴ Our patient most likely developed jaundice because of severe haemolysis. Thrombocytopenia is also a common feature in malaria. Thrombocytopenia induced by malaria is due to shortened life span in the peripheral blood and, third, some interaction is present between platelets and malaria plasmodia or parasitized red cells.¹⁵

The possible cause of death in our patient was due to severe metabolic acidosis and acute renal failure. Acidosis is an important cause of death from severe malaria; it is caused by several factors, including: anaerobic glycolysis in host tissues where sequestered parasites interfere with microcirculatory flow, parasite lactate production, hypovolemia and

insufficient hepatic and renal lactate clearance.¹⁴ The prognosis of severe acidosis is poor in *Falciparum* malaria.

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CASE REPORT

Tuberous Sclerosis: An Incidental Finding in A Woman with Long Standing Abdominal Distension and Heartburn

Sultana F¹, Uddin MM², Ahmed L³, Chatterjee S⁴, Ahmed R⁵, Deepa ZS⁶

ABSTRACT

A 38-year old female patient was admitted into the Department of Medicine of Shaheed Suhrawardy Medical College Hospital, Dhaka, Bangladesh, with the complaints of abdominal distension and retrosternal burning sensation for last eight months. She also gave history of previous hospitalization for the same reason. She also had complaints of an episode of seizure two years back. However, she was treated as a case of peptic ulcer disease in her previous admission in the district hospital. On clinical examination, adenoma sebaceum were observed on her face; hepatomegaly, and bilateral mid- and lower-abdominal masses were also found. She was sent for radiological investigations in the Department of Radiology & Imaging of the same hospital. The ultrasonogram of the abdomen showed multiple echogenic space occupying lesions in the liver along with bilateral echogenic kidneys and mild ascites. CT scan of the abdomen revealed hepatic angiomyolipomas, bilateral grossly enlarged and distorted kidneys having multiple angiomyolipomas, and sclerotic foci in the scanned part of bones. Moreover, CT scan of brain revealed multiple subependymal calcified nodules along with multiple sclerotic foci in the scanned part of bones. Those features were consistent with tuberous sclerosis. The patient was kept admitted and treated accordingly. After obtaining a written informed consent, she was presented as a special case in clinical education.

Keywords: Tuberous sclerosis, radiological investigation

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INTRODUCTION

Tuberous sclerosis (TS), also known as tuberous sclerosis complex (TSC) or Bourneville disease, is a phakomatosis (neurocutaneous disorder) characterized by the development of multiple benign tumours in multiple organs.¹⁻⁴ Tuberous sclerosis has an incidence of 1:6000-12,000, with most being sporadic.^{1,2} Tuberous sclerosis was classically described as presenting in childhood with a pathognomonic triad (Vogt triad) of seizures, intellectual disability and adenoma sebaceum.¹⁻⁴ However, the full triad is only seen in a minority of patients (~30%). Therefore, diagnostic criteria have been developed to aid the diagnosis of definite tuberous sclerosis complex based on either 2 major features or 1 major and 2 or more minor criteria.⁵ Tuberous sclerosis is usually diagnosed in infancy

or early childhood because a child presents with seizures, developmental delay, or hypomelanotic macules. However, the diagnosis of tuberous sclerosis can be made earlier or later on the basis of other features that manifest themselves at other ages. For instance, cortical/subcortical tubers and cardiac rhabdomyomas are detected prenatally and in infancy, while renal, pulmonary, and osseous lesions are identified more commonly in adulthood.^{1,4} Here we have presented an incidental finding of tuberous sclerosis in a woman in her 40s with long standing abdominal distension and heartburn.

CASE SUMMARY

A 38-year old female patient was admitted into the Department of Medicine of Shaheed Suhrawardy Medical College Hospital, Dhaka, Bangladesh, with the complaints of abdominal distension and retrosternal burning sensation for last eight months. She also gave history of previous hospitalization for the same reason. She also had complaints of an episode of seizure two years back. However, she was treated as a case of peptic ulcer disease in her previous admission in the district hospital. On clinical examination, adenoma sebaceum (fibrous papules) were observed on her face (Fig. 1); hepatomegaly, and bilateral mid- and lower-abdominal mass were also found. Then requisition was given for her radiological investigations in the Department of Radiology & Imaging of the same hospital. Ultrasonogram and CT scan of the whole abdomen as well as CT scan of brain were done. The ultrasonogram report showed multiple echogenic space occupying lesions (SOLs) in the liver along with bilateral echogenic kidneys

and mild ascites. CT scan of the abdomen revealed hepatic angiomyolipomas, bilateral grossly enlarged and distorted kidneys having multiple angiomyolipomas, and sclerotic foci in the scanned part of bones (Fig. 2). Moreover, CT scan of brain revealed multiple subependymal calcified nodules along with multiple sclerotic foci in the scanned part of bones (Fig. 3A & 3B). Those features were consistent with tuberous sclerosis. The patient was kept admitted and treated accordingly. After taking her written informed consent, she was presented as a special case in clinical education.



Fig. 1: Adenoma sebaceum as observed on the face of the patient (facial angiofibromas).

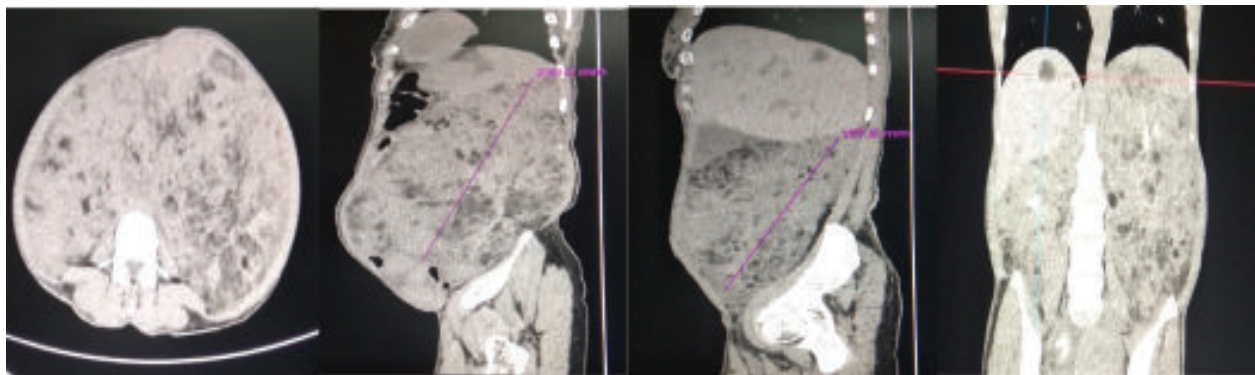


Fig. 2: CT scan of the abdomen showing hepatic angiomyolipomas, bilateral grossly enlarged distorted kidneys having multiple angiomyolipomas, mild ascites, and sclerotic foci in the scanned part of bones.

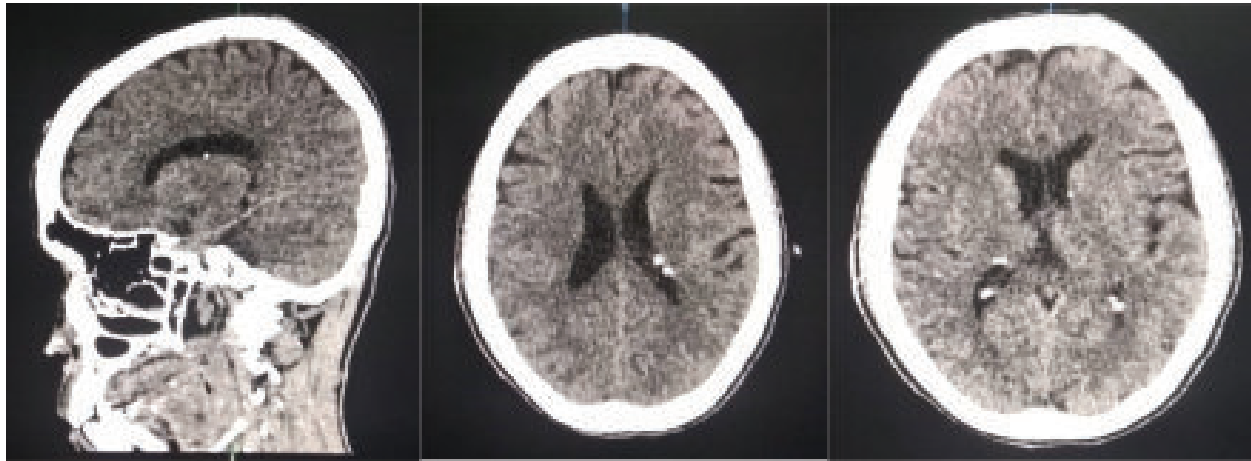


Fig. 3A: CT scan of brain showing multiple subependymal calcified nodules.

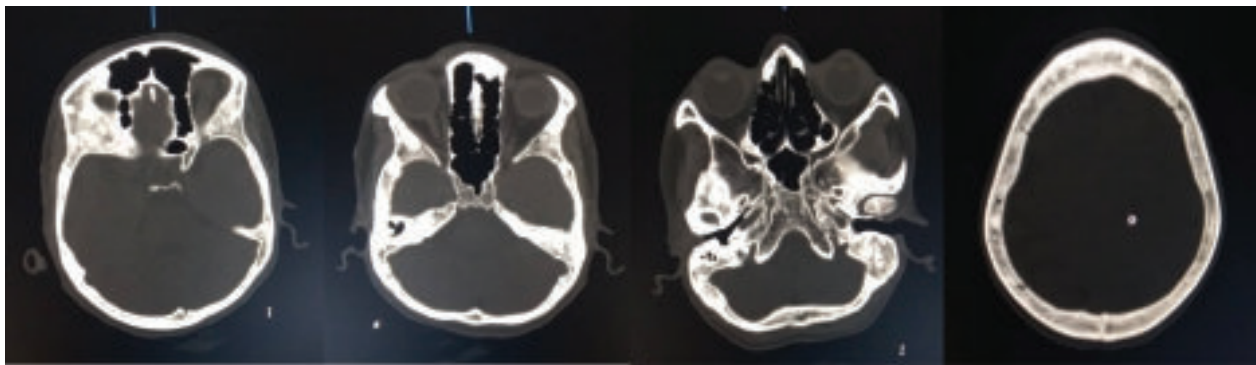


Fig. 3B: CT scan of brain showing multiple sclerotic foci in the scanned parts of bones.

DISCUSSION

Tuberous sclerosis is a rare autosomal dominant neurocutaneous syndrome characterized by the presence of benign congenital tumours in multiple organs.¹⁻⁴ The diagnosis is usually established based diagnostic criteria applied to physical or radiologic findings.^{2,5} Because the classical triad of epilepsy, mental retardation, and adenoma sebaceum is uncommonly found at clinical examination, radiologic examinations usually play an important role in the diagnosis of tuberous sclerosis and in its treatment.^{1,2} In our case, we observed adenoma sebaceum (fibrous papules) on patient's face. Adenoma sebaceum are solitary, dome-shaped, skin-colored to red papules located on the central face, usually around the nose and on the malar eminences. In tuberous sclerosis, angiofibromas typically arise symmetrically on the cheeks, nasolabial folds, nose, and chin. They can start off as erythematous macules that form into the red to red-brown papules that can coalesce into plaques.¹⁻⁴ Hepatic and renal

angiomyolipomas were found in our case. Angiomyolipomas are the most common benign mesenchymal neoplasm and are composed of varying amounts of fat, smooth muscle, and blood vessels. Angiomyolipomas are present in 80% of patients with tuberous sclerosis.^{1,6-8} Our patient also had cortical tubers and subependymal nodules. Cortical/subcortical tubers are one of the most common causes of epilepsy, which is sometimes medically intractable.^{1,3,9,10}

Although there is no cure for tuberous sclerosis, treatment can help manage specific symptoms. For example, anti-seizure medications may be prescribed to control seizures. Other medications may help manage heart arrhythmias (if present), behaviour problems or other signs and symptoms. If a growth affects the ability of a specific organ (e.g., liver, kidney or heart) to function, the growth may be surgically removed. Surgical procedures such as dermabrasion or laser treatment may improve the appearance of

skin growths. A mental health provider can also help address behavioural, social or emotional issues and recommend treatment as well as resources.^{9,10}

CONCLUSION

Tuberous sclerosis has a significant number of manifestations, involving many organ systems. The clinical course of the disease and patient prognosis depend on the sites of manifestations. Familiarity with the diverse clinical and radiological features facilitates diagnosis and helps in treatment planning and monitoring response to treatment of this multisystem disorder. Tuberous sclerosis is a lifelong condition that requires careful monitoring and follow-up because many signs and symptoms may take years to develop. Early identification of problems can help prevent complications.

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INSTRUCTION TO THE AUTHORS

Points to consider before submission

Submissions are accepted on the understanding that they have not been published in their current form or a substantially similar form (in print or electronically, including on a web site), that they have not been accepted for publication elsewhere, and they are not under consideration by another publication.

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Authors must state all possible conflicts of interest, including financial, consultant, institutional and other relationships that might lead to bias or a conflict of interest

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