BMDC RECOGNIZED

e-ISSN 2408-8714 (Online)
ISSN 1810-1828 (Print)

MEDICINE today

a professional medical journal

VOL. 33 NO. 1 January 2021

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MEDICINE today

A Professional Medical Journal

Volume 33, January 2021

Production Editing: **Medical Services Department, Biopharma Ltd.**

medicinetoday@biopharmabd.com www.biopharmabd.com

Managing Editor: Dr. Lokiat Ullah

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Carlson BM. Human embryology and developmental biology. 3rd ed. St. Louis: Mosby;2004.

Chapter in a book:

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Harnden P, Joffe JK, Jones WG, editors. Germ cell tumours V. Proceedings of the 5th Germ Cell Tumour Conference; 2001 Sep 13-15; Leeds, UK. New York: Springer; 2002.

Scientific or technical report:

Akutsu T. Total heart replacement device. Bethesda MD: National Institutes of Health, National Heart and Lung Institute; 1974 Apr. Report No.: AFRLSRBLTR0 20123.

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Borkowski MM. Infant sleep and feeding: a telephone survey of Hispanic Americans [thesis/dissertation]. Michigan: Central Michigan University; 2002.

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Subscription information:

Journal of Medicine Today ISSN 1810-1828 published by the Dr. Lokiat Ullah, Executive Director, BIOPHARMA LTD. two times a year in January and July.

Address of correspondence:

Manuscripts and other communication for the editors should be address to Medicine Today, **Medical Services Department.**

Biopharma Limited. Corporate Office: House No: 01, Road No.- 1, Dhaka Housing, Adabar, Dhaka-1207, Bangladesh.

E-mail: medicinetoday@biopharmabd.com

Phone: +880 1714-096 030, +880 1713-188 154

DOI: https://doi.org/10.3329/medtoday.v33i1.52148

ORIGINAL ARTICLE OPEN ACCESS

Impact of Endoscopic Ultrasound in Evaluation of Upper Abdominal Pain

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Abstract

Introduction: *Upper abdominal pain is found to be one of the most common presenting symptoms. Endoscopic ultrasound may be a useful tool to yield a specific diagnosis. Aim of our study was to find the etiology of upper abdominal pain with normal endoscopic findings and compare the findings of endoscopic ultrasound with those of trans-abdominal ultrasound.* ***Materials and Methods:*** *This was a cross sectional study conducted in the department of gastroenterology, Sir Salimullah Medical College from January 2015 to December 2019. Total 238 patients suffering from upper abdominal pain who previously underwent endoscopy with normal results and trans abdominal ultrasound with doubtful findings were enrolled in this study. All patients were evaluated properly with history, clinical examination and relevant blood investigations. Then the patients underwent endoscopic ultrasound with conscious sedation. Computed tomorgraphy, magnetic resonance cholangiopancreatography and endoscopic retrograde cholangiopancreatography were done in cases where needed and correlated with endoscopic ultrasound results.* ***Results:*** *Among the total 238 patients, 137 were male and 101 were female. Most predominant age range was 31-40 years. Pain was moderate in severity in 43.27%, epigastric pain was in 59.66% and pain referred to back was in 37.39% patients. Comparison with trans abdominal ultrasound regarding etiologies of upper abdominal pain was statistically significant (P=0.000). Comparative analysis between the two modalities regarding gall bladder, common bile duct, pancreas were also found significant with P values of 0.040, 0.005, 0.000 respectively. Forty two patients were diagnosed as chronic pancreatitis based on Rosemont criteria by endoscopic ultrasound.* ***Conclusion:*** *Endoscopic ultrasound is a modern diagnostic tool which can detect hepato-pancreato-biliary pathologies and also mucosal irregularities of stomach and esophagus. So, it can be considered as a first line investigation to diagnose the underlying etiology of upper abdominal pain.*

Keywords: *Upper abdominal pain, Endoscopic ultrasound, Endoscopy, Trans abdominal ultrasound.*

Number of Tables: *07;* ***Number of References:*** *43;* ***Number of Correspondence:*** *06.*

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Introduction:

In primary health care settings throughout the world, upper abdominal pain is found to be one of the most common presenting symptoms[1]. In fact, almost one fourth to one third adults seek medical amenities for upper abdominal pain annually. If reflux symptoms are included then it is about 40% of total adult patients[2]. Moreover, the incidence of unexplained abdominal pain is around 2% to 3%[3,4,5]. The differential diagnoses seen starting from functional dyspepsia, peptic ulcer disease and cholelithiasis to more unusual diagnoses such as choledocholithiasis, sphincter oddi dysfunction, chronic pancreatitis and upper gastrointestinal malignancies. But many of these conditions are difficult to exclude without invasive procedures and patients may need to undergo esophagogastroduodenoscopy, ultrasound and computed tomography for confirm diagnosis[6]. With all these efforts, many of these cases may yet not be diagnosed[7]. In this context, Endoscopic ultrasound (EUS) may be a useful tool to yield a specific diagnosis.

Endoscopic ultrasound came into light in the early 1980s[8]. It is a specialized endoscope which combines endoscopy and ultrasound to obtain images and information of the digestive tract and its surrounding organs[6]. In this technology, ultrasound transducer is placed within the body so that the distance between transducer and region of interest is reduced by avoiding air filled or bony structures[9, 10,11,12,13,14]. It can successfully obtain clear images and information

Received: *03 November 2020* ***Accepted revised version:*** *11 February 2021*

regarding the layers of the intestinal wall, lymph nodes, sub mucosal lesions and the blood vessels. Another important aspects of EUS is that it can obtain ultrasound guided tissue samples from suspicious lesions[15].

The established diagnostic indications of endoscopic ultrasound are detection of cholelithiasis, microlithiasis, choledocholithiasis, worm in common bile duct, evaluation of submucosal lesions, pancreatic cysts, diagnosis of acute/chronic pancreatitis, pancreatic calculi, diagnosis and staging of gastrointestinal, pancreaticobiliary and lung cancers[16].

As endoscopic ultrasound has both endoscopy and ultrasound in a single entity, performing this modality in the diagnosis of upper abdominal pain may maximize additional benefits[17]. But there are a very few studies regarding utility of endoscopic ultrasound in detecting etiologies of upper abdominal pain with normal upper GI endoscopic findings. This study was designed to find out the etiology of upper abdominal pain with normal endoscopic findings and compare the results of endoscopic ultrasound (EUS) with trans-abdominal ultrasound (TUS) findings of patients with upper abdominal pain.

Materials and Methods:

This was a cross sectional study conducted in the department of gastroenterology, Sir Salimullah Medical College Mitford hospital, Dhaka from January 2015 to December 2019. Total 238 patients suffering from upper abdominal pain who previously underwent endoscopy with normal findings and trans abdominal ultrasound were enrolled in this study. Inclusion criteria for the patients were: Age over 18 years and upper abdominal pain defined as frequent (>6 episodes in previous 12 months) pain or discomfort in the upper abdomen (above the umbilicus). Exclusion criteria included: dysphagia, oesophageal varices, malignancy, bleeding, patients with comorbidities and previous gastric surgery.

Informed consent was taken from all cases; all patients were evaluated properly with history, clinical examination and relevant blood investigations. All the patients underwent Endoscopic ultrasound with conscious sedation. It was carried out by Fujinon echoendoscope (Model EG-530 UR_2 for radial array and E-530 UT_2 for linear array). The findings of endoscopic ultrasound were recorded and compared with those of trans-abdominal ultrasound of respective patients. Computed tomography scan of abdomen, Magnetic resonance imaging/ cholangiopancreatography and endoscopic retrograde cholangiopancreatography were done in cases where needed and correlated with endoscopic ultrasound results to reach the diagnoses. The statistical analysis was done by SPSS 22.0 software (SPSS, Inc. USA). Statistical significance was calculated by Students't test. Statistical significances of the study was set at <0.05.

Results:

Total 238 patients took part in the study. Of them 137 were male and 101 were females with predominant age range was 31-40 years.

Table I: Demographic characteristics of the 238 patients.

Parameter	Frequency	Percentage
Sex		
Male	137	57.56%
Female	101	42.44%
Age (Years)		
18-30	46	19.33%
31-40	58	24.37%
41-50	54	22.69%
51-60	43	18.07%
61-70	23	9.66%
>70	14	5.88%
Total	238	100%

Clinical characteristics of chronic upper abdominal pain are given in table II. It shows pain was mostly moderate (43.27%), in epigastric region (59.66%) and referred to back (37.39%)

Table II: Clinical Characteristics of pain.

Parameter	Frequency	Percentage
Intensity		
Severe	58	24.37%
Moderate	103	43.27%
Mild	77	32.35%
Location		
Epigastrium	142	59.66%
RUQ	63	26.47%
LUQ	28	11.76%
Central abdomen	05	2.10%
Referred Pain		
Nil	137	57.56%
Back	89	37.39%
Shoulder	12	5.04%

Various etiologies detected by endoscopic ultrasound and along with its comparison with trans abdominal ultrasound is shown in table III which is statistically significant (P=0.000).

Table III: Etiologies of abdominal pain.

Causes	Endoscopic Ultrasound	Trans Abdominal Ultrasound	P Value
Calculous Cholecystitis	48 (20.17%)	45 (18.91%)	0.0000
Microlithiasis with Cholecystitis	10 (4.20%)	02 (0.84%)	
GB sludge	24 (10.08%)	19 (9.24%)	
GB Mass	3 (1.26%)	1 (0.42%)	
Worm in GB	1 (0.42%)	0 (0.00%)	
Acalculous Cholecystitis	04 (1.68%)	09 (3.78%)	
Biliary Ascariasis	06 (2.52%)	02 (0.84%)	
Choledocholithiasis	76 (31.93%)	65 (28.15%)	
Acute Pancreatitis	36 (15.13%)	32 (13.45%)	
Chronic Pancreatitis	42 (17.65%)	14 (5.88%)	
Ca Pancreas	06 (2.52%)	1 (0.42%)	
No cause Found	05 (2.10%)	48 (20.17%)	

Table IV shows the gall bladder findings of endoscopic ultrasound and trans abdominal ultrasound and their comparison which is statistically significant (P=0.04).

Table IV: Findings of Gall bladder at Endoscopic ultrasound and Trans abdominal ultrasound.

Parameter	Endoscopic Ultrasound	Trans Abdominal Ultrasound	P Value
Normal	108 (45.38%)	126 (52.94%)	0.04
Calculous Cholecystitis	48 (20.17%)	46 (19.33%)	
Microlithiasis	10 (4.20%)	2 (0.84%)	
GB sludge	24 (10.08%)	22 (9.24%)	
Acalculous Cholecystitis	4 (1.68%)	8 (3.36%)	
Worm	1 (0.42%)	0 (0.00%)	
GB Mass	3 (1.26%)	1 (0.42%)	
Microlithiasis+GB sludge	7 (2.94%)	0 (0.00%)	
Cholelithiasis+GB sludge	3 (1.26%)	3 (1.26%)	
Absent Gall bladder	30 (12.61%)	30 (12.61%)	
Total	238	238	

Table V shows comparative findings of endoscopic and trans abdominal ultrasound in **case of bile duct lesions with significance of 0.005.**

Table V: Findings of Bile ducts at Endoscopic ultrasound and Trans abdominal ultrasound.

Parameter	Endoscopic Ultrasound	Trans Abdominal Ultrasound	P Value
Normal	65 (27.31%)	98 (41.18%)	0.005
Dilated	54 (22.69%)	38 (15.97%)	
Stone	6 (2.52%)	2 (0.84%)	
Sludge	6 (2.52%)	1 (0.42%)	
SOL suggesting neoplasm	5 (2.10%)	1 (0.42%)	
Worm	6 (2.52%)	2 (0.84%)	
Dilated+Stone	70 (29.41%)	63 (26.47%)	
Dilated+SOL	16 (6.72%)	11 (4.62%)	
Dilated+Sludge	6 (2.52%)	1 (0.42%)	
Dilated+Stricture	4 (1.68%)	2 (0.84%)	
Total	238	238	

Table VI shows comparison of pancreatic findings with endoscopic ultrasound's superiority over abdominal ultrasound with statistical significance **P <0.0001.**

Table VI: Findings of Pancreas at Endoscopic ultrasound and Trans abdominal ultrasound.

Parameter	Endoscopic Ultrasound	Trans Abdominal Ultrasound	P Value
Pancreatic Size			0.000
Normal	194 (81.51%)	203 (85.29%)	
Swollen	36 (15.13%)	32(13.45%)	
Smaller Size	8 (3.36%)	3 (1.26%)	
Total	238	238	
Pancreatic Parenchyma			0.000
Normal	204 (85.71%)	216 (90.76%)	
Hyperechoic foci	12 (4.20%)	08 (3.36%)	
Hyperechoic strand	10 (4.20%)	06 (2.52%)	
Hyperechoic foci+strand	12 (5.04%)	08 (3.36%)	
Total	238	238	
Pancreatic duct			0.000
Normal	202 (84.87%)	205 (86.13%)	
Main duct dilatation	13 (5.46%)	15 (6.30%)	
Main duct irregularity	03 (1.26%)	03 (1.26%)	
Calcification	04 (1.68%)	05 (2.10%)	
MPD dilatation	10 (4.20%)	08 (3.36%)	
MPD irregularity	03 (1.26%)	02 (0.84%)	
Worm in MPD	03 (1.26%)	00 (0.00%)	
Total	238	238	

Table VII shows number of chronic pancreatitis patients diagnosed through Rosemont criteria by endoscopic ultrasound.

Table VII: Diagnosis of Chronic Pancreatitis with Endoscopic ultrasound (Rosemont criteria).

Parameter	Endoscopic Ultrasound	Percentage
Consistent with CP	25	10.50%
Suggestive of CP	17	7.14%
Indeterminate	21	8.82%
Normal	175	73.53%
Total	238	100%

Discussion:

Upper abdominal pain is a very common morbidity in day to day practice. Causes may vary from benign to malignant[6]. Yet many patients have no structural diseases which makes the detection of real diagnosis a difficult job[1,18,19]. For the purpose of yielding definitive diagnosis, patients undergo different invasive and noninvasive procedures like endoscopy,[20] trans abdominal ultrasound[21] and computed tomography[5]. According to American College of Gastroenterology, upper gastrointestinal endoscopy is the first step in the diagnosis of dyspepsia of patients older than 55 years or those having alarm symptoms[22,23]. In a recently conducted study, it was found that among the patients with upper abdominal pain referred for further evaluation 40% had undergone previous upper gastrointestinal endoscopy, 65% had a trans abdominal ultrasound, 70% had a computed tomography and 10% had an magnetic resonance imaging[24]. Endoscopic ultrasound, a specialized instrument which combines both endoscopy and ultrasound may be very effective in diagnosing cases of upper abdominal pain.

Our study was conducted on 238 patients referred to our department for upper abdominal pain. Our demographic data showed, males were 137 (57.56%) and females were 101 (42.44%) in number with slight male predominance. It differs from the studies conducted by Thompson et al[6] and Chang et al[17]. Both the studies showed female predominance with upper abdominal pain symptoms. Possible explanation of this sex difference in our study is that males are more aware of their health problems and also keen to seek physician's advice than women in our country. Most common age groups suffering from upper abdominal pain in our study were 31-40 and 41-50 years group with 58 (24.37%) and 54 (22.69%) in number respectively. This data is almost identical with the data of Chang et al[17] where mean age was 48.6%.

Etiologies of upper abdominal pain was searched and compared with the findings of trans abdominal ultrasound which yielded statistical significance (P= 0.000). Most common etiologies were gall bladder disease (37.81%), choledocholithiasis (34.45%), acute pancreatitis (15.13%) and chronic pancreatitis (17.65%). Chang et al[17] showed gall bladder disease as the most common cause of chronic upper abdominal pain with frequency of 32% which is almost similar to our frequency of gall bladder disease of 37.81%.

Different studies have been conducted describing endoscopic ultrasound as adjunctive to trans abdominal ultrasound for detecting gall bladder lesions[25,26,27]. But our study tried to compare the efficacy of endoscopic ultrasound with trans abdominal ultrasound in detecting gall bladder lesions and we found endoscopic ultrasound to be superior than trans abdominal ultrasound with statistical significance (P=0.04). Sugiyama et al showed the superiority of endoscopic ultrasound over trans abdominal ultrasound for diagnosis of common bile duct pathologies[28]. Our study showed efficiency of endoscopic ultrasound to detect the common bile duct lesions which were missed in trans abdominal ultrasound. This comparison between the two modalities was found to be significant (P=0.005). Endoscopic ultrasound was proved to be excellent in diagnosing gall bladder and common bile duct microlithiasis and sludge in abdominal ultrasound negative patients in a study conducted in Iran[25]. It showed 60% patients had common bile duct stones, sludges and microlithiasis in endoscopic ultrasound who did not have any lesions in trans abdominal ultrasound. In comparison, our study found 52% had pathologies of common bile duct in endoscopic ultrasound who had absolutely normal common bile duct in trans abdominal ultrasound. In fact, in a previous study of our centre, gall bladder and common bile duct microlithiasis and sludge are found to be the main reason behind idiopathic acute pancreatitis[29].

Endoscopic ultrasound is superior to Trans abdominal ultrasound, Computed tomography, Magnetic resonance imaging in detecting pancreatic pathologies specially solid lesions and neuroendocrine tumors[15,30,31,32,33,34]. In our study 36 cases have increased pancreatic size (swollen pancreas) by Endoscopic ultrasound and 32 cases have increased pancreatic size by Trans abdominal ultrasound. As the Endoscopic ultrasound see the pancreas from close proximity, it detects pancreatic change better. In fact, important role of Endoscopic ultrasound in acute pancreatitis is to exclude biliary causes to avoid unnecessary Endoscopic retrograde cholangiopancreatography.

Studies suggested that Endoscopic ultrasound is more sensitive for detecting the parenchymal changes of chronic pancreatitis before the development of ductal lesions visible at Endoscopic retrograde cholangiopancreatography. So, it may serve better to diagnose early chronic pancreatitis[35,36]. Pancreatic parenchymal change detected in our study by endoscopic ultrasound in comparison to trans abdominal ultrasound yielded statistical significance (P= 0.000). In this study main pancreatic duct (MPD) dilatation, duct irregularity and calcification are more detected by Endoscopic ultrasound compared to Trans abdominal ultrasound with statistical significance (P= 0.000). There are different methods for revealing prevalence of chronic pancreatitis in patients with upper abdominal pain. Studies which were based on pancreatic function tests showed prevalence ranging from 22% to 35% in patients with dyspepsia[37,38,39]. Prevalence of chronic pancreatitis in patients of upper abdominal pain based on Endoscopic ultrasound found in various studies varied from 3% to 39%[6,17,18,40,41]. Such dissimilarity may be due to differences in inclusion and exclusion criteria, duration of studies, characteristic of abdominal pain, criteria used for diagnosis and hospital settings. We followed Rosemont criteria for diagnosis of chronic pancreatitis. It includes hyperechoic foci with shadowing, main PD calculi and lobularity with honeycombing have been defined as major criteria while the minor criteria for CP include cysts, dilated duct ≥3.5 mm, irregular PD contour, dilated side branches ≥1 mm, hyperechoic duct wall, hyperechoic strand, non-shadowing hyperechoic foci and lobularity with noncontiguous lobules[42,43]. We diagnosed 42 cases of chronic pancreatitis where 25 cases were consistent with chronic pancreatitis while 17 cases were suggestive. Prevalence was 17.64% which is almost similar to the prevalence of the study of Atsawarungruangkit et al[7] of 19.6% while differs from the prevalence recorded by Sahai et al[18] of 39%.

There were some limitations of our study. All the patients included in the study were referred to our center. So, there are chances of confounding factors and referral bias. Moreover, cost effectiveness was not addressed in the study.

Conclusion:

Endoscopic ultrasound is an important diagnostic tool. It can detect pathologies in liver, pancreas, gallbladder and biliary tree. It can also find out the mucosal irregularities within the stomach and esophagus. It can certainly be used to diagnose the underlying pathology of upper abdominal pain.

Conflict of Interest: None.

Acknowledgement:

The authors are grateful to the referring physicians and surgeons for their referral and also thankful to study subjects for their active, sincere and voluntary participation.

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DOI: https://doi.org/10.3329/medtoday.v33i1.52150

ORIGINAL ARTICLE OPEN ACCESS

Prevention of Mother to Child Transmission in HIV Antenatal and Postnatal Screening in Khulna Medical College

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Abstract

Introduction: *Prevention of Mother to Child Transmission (PMTCT) program, offers a range of services for women of reproductive age living with or at risk of HIV to maintain health and stop their infants from acquiring HIV. PMTCT services should be commenced before conception and throughout pregnancy, labor and breast feeding. Around 1.4 million HIV infections among children were prevented between 2010 and 2018 by PMTCT program. UNFPO started antenatal screening program in collaboration with AIDS/STD program in Bangladesh from 2013, in 12 centers (BSMMU, 4 Medical College Hospitals, 3 Sadar Hospitals, 3 Health Complexes and Memon Maternity Hospital, Chittagong).* ***Materials and Methods:*** *Observational study of Antenatal and postnatal cases in HIV screening in KMCH during the period of Nov'2017 to March'2020.* ***Results:*** *From November 2017 to March 2020, total 18,911 patients screened, 11 patients were found HIV positive. 2 patients dropped out. Among 9 patients, 6 patients were detected in antenatal and 3 in postnatal period. 6 patients had vaginal delivery, 2 elective caesarean section and 1 patient had abortion. Screening was done by Alere Determine HIV- ½ Ag/Ab Combotest and diagnosis was confirmed by Uni-Gold HIV Rapid Test and First Response HIV 1-2-0 Card test.* ***Conclusion:*** *Following confirmation, ARV started with proper counseling. All babies were breast fed. The neonates were screened by PCR at their age of 45 days and found negative. WHO guideline was strictly maintained during labor conduction and cesarean sections. PMTCT program should be expanded in all institutions to detect cases, reduce transmission, contraception counselling to reduce confirmed cases.*

Keywords: *PMTCT.*

Number of Table: 01; Number of Figures: *03;* ***Number of References:*** *16;* ***Number of Correspondence:*** *04.*

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Introduction:

ON 5 JUNE 1981, A REPORT IN THE MORBIDITY AND MORTALITY WEEKLY REPORT (MMWR), no one who read those reports, certainly not this author, could have imagined that this was the first glimpse of a historic era in the annals of global health[1]. CDC defines a case of AIDS as a disease, at least moderately predictive of a defect in cell mediated immunity, occurring in a person with no known cause for diminished resistance to that disease[2]. Acquired immune deficiency syndrome, a disease in which there is a severe loss of the body's cellular immunity, greatly lowering the resistance to infection and malignancy[3]. The cause is a virus (the human immunodeficiency virus, or HIV) transmitted in blood and in sexual fluids. a disease of the human immune system that is characterized cytologically especially by reduction in the numbers of CD4-bearing helper T cells to 20 percent or less of normal thereby rendering the subject highly vulnerable to life-threatening conditions (as Pneumocystis carinii pneumonia) and to some (as Kaposi's sarcoma) that become life-threatening and that is caused by infection with HIV commonly transmitted in infected blood especially during illicit intravenous drug use and in bodily secretions (as semen) during sexual intercourse. The human immunodeficiency virus (HIV) eats away at the T-cells of the body's immune system, thereby exposing it to infections[4]. HIV is associated with increased rates of preterm delivery, low birth weight and stillbirth. Special intervention to reduce maternal to child transmission (MTCT) includes Anti-retro viral (ARV) treatment and prophylaxis, safer delivery procedures and counseling on safe breast feeding.

High viral load, low CD4 count, advanced HIV disease, presence of sexually transmitted diseases as well as prolonged labor and delivery specially when associated with chorioamnionitis increase transmission of the infection to the baby. The rate of transmission is 17.4%, during pregnancy, 50% during labor and delivery and the remaining 33% during breast feeding[5]. Elective CS is best done at 38 weeks especially when the viral load is greater than 1000 copies/ml[6]. The WHO criteria for initiation of ARV therapy in adults are stage IV, stage Ill with CD4 < 350 cells/mm^3, stage 1 and 2 when CD4 is < 200cells/mm^3.[7] CD4 count typically initially increases by greater than 50cells/mm^3 at four to eight weeks in response to HAART and

Received: *27 September 2020* ***Accepted revised version:*** *03 February 2021*

by an additional 50-to 100 per year thereafter. Family counseling is mandatory when patient is started on ARV treatment[8]. Th is study helps to detect HIV infected patients and initiation of treatment as early as possible with safe delivery and neonatal care, also to emphasize the importance of HIV screening in antenatal period for prevention of maternal to child transmission.

Materials and Methods:

Observational study of Antenatal and postnatal cases in HIV screening in KMCH during the period of Nov'2017 to March'2020. Screening was done by finger prick and taking 50 µliter of blood on "Alere Determine HIV- ½ Ag/Ab Combo test kit and after 20 minutes it shows HIV reactive or non-reactive ('Rapid test') and in positive cases diagnosis was confirmed by, Uni-Gold HIV Rapid Test and First Response HIV 1-2-0 Card test kits by same procedure and if all three tests show reactivity, the women is confirmed as HIV positive.

HIV positive detected cases

Cases newly detected

Case no: 1

Mrs. Nasima Khatun, age 18 years, primi, detected HIV positive on 14/01/2018 at her 16th week of pregnancy during antenatal checkup in outpatient department by routine screening test and Anti-retroviral drug was started accordingly. She was diagnosed as a case of intrauterine death at 28 weeks of pregnancy. Vaginal delivery was conducted under proper protocol at KMCH. She has been continuing her regular follow up and doing well. Her husband was HIV negative.

Case no: 2

Mrs. Khadiza Khatun, age 25 years, G2P1, a case of full-term pregnancy, delivered a healthy baby per vaginally, identified HIV positive on postnatal screening. Her husband was HIV negative and 1st baby was HIV positive. The patient was absconded prior to initiation of treatment.

Case no: 3

Mrs. Razia Khatun age 25 years, primi with 6 months pregnancy, identified as HIV positive in antenatal screening on 15/04/2019, anti-retroviral was started accordingly, her EDD was on 29/05/2019, but she did not report two months following treatment. Her husband was HIV negative.

Case no: 4

Mrs. Tania Khatun, age 21 years, Primi with 1st trimester pregnancy, HIV screening was positive on 28/07/2019 during antenatal checkup, She delivered a healthy baby per vaginally on 25/02/2019, Her husband was HIV positive, On 45th day, PCR test was done for the baby and was negative.

Case no: 5

Mrs. Lima Khanom, age 19 years, delivered a healthy baby per vaginally in KMCH, detected HIV positive on 05/10/2019 during post-natal screening, anti-retroviral was started, Her husband was HIV positive, On 45th day of the baby, PCR test was done and result was negative. The patient is under regular follow-up and she is doing well.

Case no: 6

Mrs. Sonia Akhter age 20 years, a nurse, G2P1, detected HIV positive on 30/11/2019 during antenatal screening, her EDD was 29/07/2020, Anti-retroviral was started accordingly, but after two months of treatment she discontinued medication and follow-up. Her husband was HIV positive a 1st baby was negative.

Case no: 7

Mrs. Farzana Khatun, age 20 years, was detected HIV positive on 09/12/2019 during antenatal screening, next day elective cesarean section was done in KMCH. Anti-retroviral was started accordingly. She did not breast feed her baby. Her husband was HIV negative. On 45th day of the baby, PCR was done and result was negative. She is with regular follow-up and doing well.

Case no: 8

Mrs. Nasima Khanom age 32, detected HIV positive on postnatal screening on 14/03/2020. She delivered a still born baby in KMCH. Anti-retroviral drug was started accordingly.

Known cases

Case 1:

Mrs. Parul Khatun age 19 years, HIV positive 2 years back. P2. Last vaginal delivery in KMCH on 17/03/2018. Husband is HIV positive. PCR test was done in two of her babies, which were negative.

Case 2:

Mrs. Sharmin Akhter age 22 years, HIV positive 5 years back. She had a vaginal delivery on 14/11/2018 in KMCH. Her husband is also HIV positive. On 45th day of her baby PCR test was done and result was negative. Antibody test is due on May'2020.

Case 3:

Mrs. Munni Akhter age 25 years, P2-1 (NND) HIV positive 3 years back. Elective cesarean section on 14/04/2019 in KMCH. Her 1st husband was HIV positive. Present husband is HIV negative. On 45th day of the baby, PCR was done and result was negative.

Results:

During the period of Nov'2017 to March'2020, we had screened for HIV in 18911 patients (ante natal and post-natal) in outpatient department and indoor obstetric ward. Screening was done by 'Rapid test' ("Alere Determine HIV- ½ Ag/Ab Combo). In positive cases, diagnosis was confirmed by, Uni-Gold HIV Rapid Test and First Response HIV 1-2-0 Card test. Total 11 patients were found HIV positive. Among them 3 ante natal patients were known cases with ongoing follow up for Anti-Retroviral (ARV) treatment. Two patients delivered per vaginally spontaneously and one patient underwent elective cesarean section. Remaining new 8 patients were detected HIV positive during ante natal period. Among them 5 patients

delivered per vaginally spontaneously, one patient underwent elective cesarean section, one patient was absconded and one patient is still in ante natal period. Total 10 patients were offered Anti-Retroviral drugs (ARV) following confirmation of the diagnosis. 1st PCR test was done in 9 neonates on 45th day and Rapid test was done on 18th month of their age. They were found HIV -ve. PCR is due for them at their age of one year. Besides KMC, PMTCT activities are also ongoing in BSMMU, 4Medical Colleges, 3 Sadar Hospitals, 3 Upazilla Health Complexes and 1 private institution which is shown in Table No. I.

Table-I: PMTCT activities in different institutions throughout Bangladesh till June'2020.

SL No.	Name of PMCT center	# of women tested at ANC/delivery/PNC (Start–June'2020)	# of women identified as HIV Positive	# of known women received PMTCT services	# of women received PMTCT services (Start - June'2020)	# of women received ART at ANC and PNC for PMTCT	Total # of live births
1	BSMMU & SSMCH	36207	13	85	98	94	78
2	SOMCH & MDH	77375	14	46	60	55	53
3	CMCH, CGH & Memon Hospital	89803	4	14	18	18	19
4	CDSH & UUHC	30493	24	16	40	40	29
5	KMCH & Jashore	23902	8	3	11	10	7

Total screened patients were 257780 and detected HIV positive was 68 (0.026%) which is shown in **Fig No 1.**

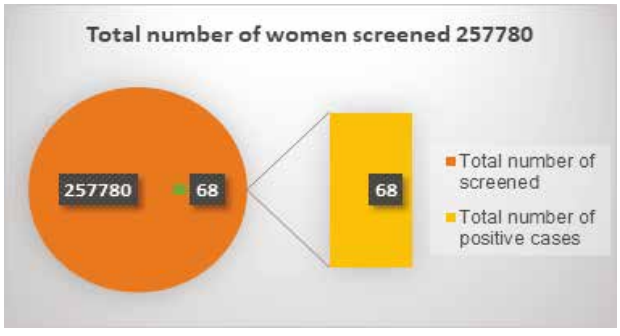

Fig - 1: Showing total number of screened patients and detected cases.

Total number of screened patients in KMCH were 189119 and detected HIV positive was 11 (0.058%) which is shown in Fig No 2, Among 9 HIV positive cases, mode of pregnancy outcome was, NVD 6, elective LUCS 2 and abortion 1, which is shown in **Fig No. 3.**

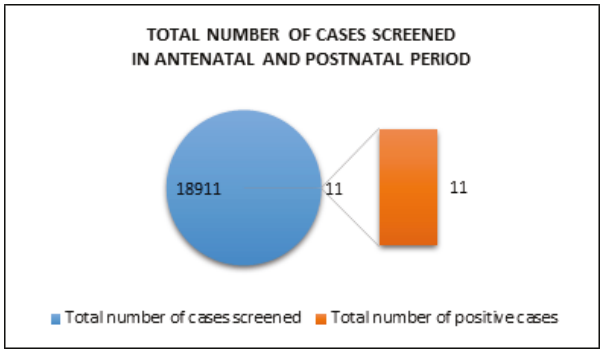

Fig -2: Showing total number of screened patients and detected cases in KMCH.

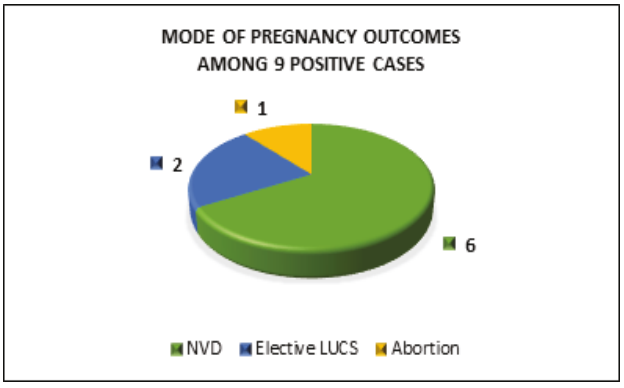

Fig -3: Showing mode of pregnancy outcomes among 9 positive cases.

Discussion:

HIV can be transmitted from an HIV-positive woman to her child during pregnancy, child birth and breast feeding. Mother to child transmission is also known as 'vertical transmission', accounts for the vast majority of infections in children (0–14 years). Without treatment, if a pregnant woman is living with HIV the likelihood of the virus from mother-to-child transmission is 15 –45%. However, antiretroviral treatment (ART) and other interventions can reduce the risk below 5%[9].

World Health Organization (PMTCT) guideline includes:[10]

• preventing new HIV infections among women of reproductive age

• preventing unintended pregnancies among women living with HIV

• preventing HIV transmission from a woman living with HIV to her baby

• providing appropriate treatment, care and support to mothers living with HIV and their children and families.

Guideline for pregnant women living with HIV

In September 2015 WHO released guidelines recommending that all pregnant women living with HIV be immediately provided with lifelong treatment, regardless of CD4 count[11].

Guidelines on infant feeding for mothers living with HIV

WHO bases its recommendations on infant feeding for mothers living with HIV on the comparative risk of infants acquiring HIV through breastfeeding with the increased risk of infants dying from illnesses such as malnutrition, diarrhea and pneumonia, which increases if they are not breastfed.

In 2016, WHO released guidelines recommending that mothers living with HIV who are on treatment and are being fully supported to adhere to it should exclusively breastfeed their infants for the first six months of life, then introduce appropriate complementary foods while continuing to breastfeed for at least 12 months and up to 24 months or longer (similar to the general population)[12].

Currently, most high-income countries recommend women living with HIV do not breastfeed whether they are virally suppressed or not. This is because formula feed and clean, boiled water are widely accessible. So, any risks around dirty water or malnutrition have been eliminated. In low- and middle-income countries this risk is far greater, leading WHO's advice on infant feeding to differ.

Guidelines for HIV-exposed infants

If an HIV-exposed infant is given ART within the first 12 weeks of life, they are 75% less likely to die from an AIDS-related illness[13].

This is one of the reasons WHO recommends that infants born to mothers living with HIV are tested between four and six weeks old. This is often referred to as 'early infant diagnosis'[14].

WHO further recommends that another HIV test is carried out at 18 months and/or when breastfeeding ends to provide the final infant diagnosis[15]. As proportionally more infant infections are now occurring during breastfeeding these tests are becoming increasingly important.

According to WHO guidelines, all infants who test positive for HIV should be immediately initiated on treatment. The treatment should be linked to the mother's course of ARV drugs and would vary according to the infant feeding method as follows:

• breastfeeding: the infant should receive once-daily nevirapine from birth for six weeks

• replacement feeding: the infant should receive once-daily nevirapine (or twice-daily zidovudine) from birth for four to six weeks[15].

Early infant diagnosis

HIV positive infants and children who start treatment late are more likely to experience treatment failure, which underlines the need to diagnose HIV as early as possible[16].

Providing treatment and care for HIV positive infants and children

There is an urgent need to accelerate treatment for children aliving with HIV across the priority countries. Globally in 2017, just over half (52%) of 1.8 million children living with HIV were receivingtreatment.11This is far below the target of 1.6 million children on treatment by the end of 2018, as adopted in the 2016 Political Declaration on Ending AIDS[16].

UNFPA in collaboration with AIDS/STD program started screening test in Bangladesh for 2013 and till now, it's activity is extended in different govt. and non govt institutions including BSMMU, 4 Medical College Hospitals, 3 Sadar Hospitals, 3 Health Complexes and Memon Maternity Hospital, Chittagong. Total 257780 patients were screened and total 64 patients ware confirmed as HIV positive (both in antenatal and postnatal period). In KMCH, total 18911 patients were screened and total 11 cases were confirmed HIV positive, WHO protocol was maintained regarding NVD and elective cesarean section. All patient received ARV as early as the diagnosis was confirmed during antenatal and postnatal period. All mothers offered breast feeding to their babies. All HIV positive patient are from low socioeconomic status and disease was transmitted from their husbands (heterosexual transmission) and by blood transfusion. ARV also offered to all babies and PCR was done on their age of 45th day and all results were negative. So, the vertical transmission was zero.

Pregnancy perse has got no effect on the disease progression in HIV positive women. Increased incidence of abortion, prematurity, preeclampsia, IUGR and perinatal mortality in HIV seropositive mothers still remains inconclusive. Among the HIV positive cases in KMCH, only two abortions occurred, so the overall pregnancy outcome was remarkable.

The initial presentation of an infected patient may be fever, malaise, headache, sore throat, lymphadenopathy and maculopapular rash. Majority of positive cases were asymptomatic, only one case presented with low grade fever, diarrhea and severe weight loss.

All patients are under regular follow-up and ARV was provided, the disease progression and effectivity of ARV are measured by PCR (detects viral load) and CD4 + cell count (detects maternal immune status). High cost of mentioned investigations hinders the patient's acceptance of follow-up procedure.

Conclusion:

Expansion of the PMTCT program is now mandatory, all institutions from primary to tertiary level, both government and non-government should start PMTCT activities, at least screening of all pregnant women (antenatal and post-natal period), starting ARV on the instant of confirmation of diagnosis, following proper protocol during labor management, proper postnatal follow up and ARV treatment outcome. Thus, there will be reduction of transmission of disease, reduction of mortality and morbidity of confirmed cases, reduction of transmission to babies will offer the healthy generations as well as healthy planet.

Conflict of Interest: None.

Acknowledgement:

We are grateful and expressing in-depth thanks to those who are doing their best job in this PMTCT program. Also privileged getting valuable comment and suggestions form the editor.

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DOI: https://doi.org/10.3329/medtoday.v33i1.52151

ORIGINAL ARTICLE OPEN ACCESS

Clinico-Haematological Study of Pancytopenia

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Abstract

Introduction: *Pancytopenia is a clinical condition, which refers to a combination of anaemia, leucopenia and thrombocytopenia. It often poses diagnostic challenge to physician and the knowledge of accurate etiologies of this condition is crucial in the management of the patient.* ***Materials and Methods:*** *The study was a prospective study done over a period of October 2011 to December 2011 and 50 patients were evaluated clinically along with haematological parameters, bone marrow aspiration and wherever required, a trephine biopsy was performed in Haematology department of Armed forces institute of pathology (AFIP), Dhaka cantonment, Dhaka. In all patients, a detailed relevant history along with a physical examination was done and data was collected using pre designed proforma.* ***Results:*** *Among the 50 cases studied, age of the patients ranged from 3 to 80 yrs with a mean age of 37.5 yrs and male predominance. Fever and generalized weakness were the most common symptoms. The commonest physical findings were pallor followed by splenomegaly and hepatomegaly. Anisopoikilocytosis and relative lymphocytosis was the most prominent peripheral blood findings in patients. The commonest cause of pancytopenia was Aplastic anaemia (36%), followed by Myelodysplastic syndrome (18%), visceral leishmaniasis (12%), Megaloblastic anaemia (8%), Acute leukaemia (6%), Myelofibrosis (4%), Multiple myeloma (4%), Hypersplenism (4%), Malaria (2%).* ***Conclusion:*** *As a large number of pancytopenic patients have a reversible aetiology, early & proper diagnosis may be life saving. Maximum diagnostic yield can be achieved by correlation with clinical findings & laboratory parameters.*

Keywords: *Pancytopenia, Bone marrow examination, Aplastic anaemia.*

Number of Tables: *05;* ***Number of Figures:*** *02;* ***Number of References:*** *44;* ***Number of Correspondence:*** *03.*

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Introduction:

Pancytopenia is an important clinico-haematological entity encountered in our day to day clinical practice. There are varying trends in its clinical pattern, treatment modalities and outcome[1].

The incidence of pancytopenia around the world is not mentioned in the textbook. Different studies done at different places showed variable frequency of pancytopenia. The study conducted by Shazia Memon et al[2] in Hyderabad within three years periods showed, 3.57%, while Habibur Rehman et al[3] , Kanchanalak et al[4] and Adil et al[5] reported 0.8%, 1.2% and 12.6% respectively. The aetiology of pancytopenia varies in different populations depending on the differences in age patterns, nutritional status, climate and the prevalence of infections[6].

It is always present in some stages in the course of aplastic anaemia, very common in subleukaemic leukaemia, relatively uncommon in lymphoma and rare in metastatic carcinoma involving the bone marrow. The prognosis depends on the severity of pancytopenia and on the nature of underlying pathology[7].

Pancytopenia is not a disease entity but a triad of findings that may result from various disease processs, which can be defined by reduction in all three formed elements of blood below the normal reference range(Haemoglobin< 13.5gm/dl in males or 11.5 gm/dl in females, Leucocyte count< $4X10^9$ /L and Platelet count< $150X10^9$ /L)[8].

The presenting clinical symptoms are usually due to anaemia, leucopenia and thrombocytopenia. Fatigue and weakness due to anaemia, increased susceptibility to infections because of leucopenia

Received: 01 December 2020 *Accepted revised version:* 11 February 2021

and bleeding tendency due to thrombocytopenia are the usual presenting symptoms[9].

Red blood cell indices help us to classify anaemias as microcytic, normocytic, and macrocytic depending on low, normal or high MCV. Most of the causes of pancytopenia present with normal RBC indices, but causes like megaloblastic anaemia, aplastic anaemia, myelodysplastic syndrome and paroxysmal nocturnal hemoglobinuria presents with high MCV[10].

Bone marrow examinations, such as bone marrow aspiration and biopsy, are extremely helpful in the evaluation of pancytopenia[11]. The bone marrow picture may vary depending on the etiology, from normocellular with non-specific changes to hypocellular, hypercellular or being replaced completely by malignant cells. According to aetiology, degree and duration of the bone marrow impairment, clinically these can lead to fever, pallor, infection or serious illness and death. Knowing the exact etiology is important for specific treatment and prognostication[12].

Few clear recommendations can be found as to the optimal investigative approach to pancytopenia. Some experts suggest that marrow examination is essential to the diagnosis, but it has not been established whether the procedure is necessary in all pancytopenic patients. Bone marrow aspiration is one of the most frequent and relatively safe, invasive procedure done routinely to evaluate the cause. Though an invasive procedure, it can be easily performed even in the presence of severe thrombocytopenia with little or no risk of bleeding. This study was carried out with the aim to obtain detailed information of a common disorder in our set-up regarding its causes and diagnostic approaches and there by automatically enhance the management process.

Early diagnosis of various causes of pancytopenia are very crucial and require prompt clinical examination and investigations like complete blood count, peripheral blood flim study and bone marrow examination. In Bangladesh the causes of pancytopenia are not well defined, for this purpose, this study will be helpful to findout the underlying etiopathology of pancytopenia.

Materials and Methods:

This study was a prospective study conducted at Armed Forces Institute of Pathology (AFIP), Dhaka cantonment, Dhaka from October to December 2011. Total 50 patients presenting with pancytopenia were found out by using a preformed questionnaires and blood counts obtained prior to transfusion done on an automated haematology analyzer. In all patients, a detailed relevant history including the treatment history, history of drug intake, radiation exposure, along with a physical examination of pallor, jaundice, hepatomegaly, splenomegaly and lymphadenopathy, were taken. Peripheral blood film study was done by staining the blood smears with leishman stains.

Peripheral Smear Preparation and Staining

Peripheral smear was prepared and stained according to the guidelines in Practical Hematology, Dacie and Lewis, 10th Edition[13].

Bone Marrow aspiration[14]

Under aseptic measures aspiration was done through posterior iliac crest. The patient was placed in a prone position, a pillow under their head. Lidocaine was used as the anaesthetic, providing the patient has no history of an allergic reaction to this medication. During this process, local anaesthetic is first infiltrated into the skin and subcutaneous tissue to anaesthetize an area approximately 1 cm. in diameter. After the skin is numb, lidocaine is infiltrated directly over the periosteum to numb an area approximately 2-3 cm in diameter. Salah needle is advanced with steady pressure and a slight twisting motion to the center of the posterior iliac prominence. The needle was rotated back and forth (90^{o}-180^{o}) and careful pressure was applied to advance the needle through the cortical bone. A decreased resistance indicated penetration of cortex and entry into the marrow cavity. Needle was advanced about 1 cm into the marrow cavity. The obturator was unlocked and slowly removed 0.3 ml of marrow fluid was aspirated into a 10 ml syringe and specimen slides were prepared. A folded piece of gauze was placed over the site with a pressure bandage. The patient was asked to lie supine for at least 30 minutes.

Steps of preparing aspirated smear and staining methods[13]

Prepared slides were examined under scanner and low power to assessed cellularity, megakaryocytes and metastatic carcinoma cells. The area where cells were very well spread out was selected and under oil immersion at least 500 marrow cells were counted.

Bone Marrow Biopsy[15-17]

The bone marrow biopsy was obtained through the same skin incision site used for the marrow aspiration. Jamshidi needle was used for this procedure. Once the needle fixed in the bone, the stylet was removed. Using firm pressure, slowly rotate the needle in an alternating clockwise-counterclockwise motion and advance it into the bone marrow cavity to obtain an adequate bone marrow specimen measuring approximately 1.5-2 cm in length. Needle was rotated along its axis to help cut the specimen. Following this procedure slowly pulled the needle out rotating in an alternating clockwise and counterclockwise motion. Then, removed the specimen from the needle with the probe through the distal cutting end. If the aspiration was a dry tap, the core biopsy may be used to make touch preparations prior to placing the specimen in fixative. Obtained material kept in 10% formalin. After the procedure, pressure was applied for a 2 minutes and an elastoplast was applied after placing the gauze on the top of the site. The patient was instructed to check the site frequently, to report any bleeding, and to keep it dry. The dressing was removed after 48 hours only. Biopsy

specimen stained with haematoxylin and eosin (H&E). Prepared slides were examined under microscope.

Ethical Consideration

Ethical clearance was obtained from the Research Committee of DGMS office. Permission to use the records was obtained from the Haematology department of AFIP, Dhaka. Written informed consent was taken from the patient's or legal guardian for the use of any photographs. Patient confidentiality was strictly maintained. No names, addresses or contact details of the patients were divulged.

Method of data processing & statistical analysis

Data were analyzed by using Microsoft excel & statistical analysis was done by using descriptive statistics.

Results:

Among all study patient 80% patients are male and 20% are female. Male to female ratio was 4:1. The most common causes (figure 1) of pancytopenia was aplastic anaemia (36%), followed by MDS (18%), and visceral leishmaniasis (12%). Other less common causes of pancytopenia include acute leukaemia (12%), megaloblastic anaemia (8%), myelofibrosis, Hypersplenism, multiple myeloma (each one constitute 4%). Uncommon causes in this study was malaria (2%). Maximum number of patients was found in the age group (Table I) of 11-20 years and incidence of aplastic anaemia, ALL was more in 11-20 yrs of age. Similarly MDS was more in 61-70 yrs of age and AML & megaloblastic anaemia was more in 51-60 yrs.

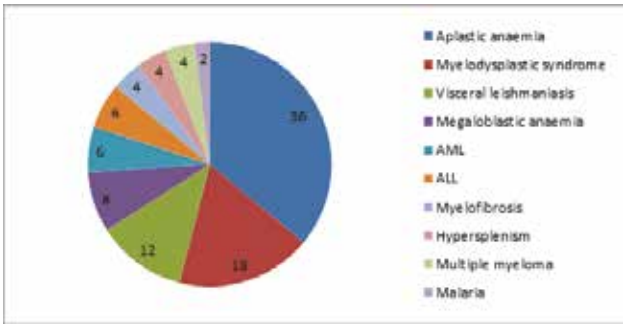

Figure 1: Different causes of pancytopenia.

Table I: Age and etiology wise distribution.

Age in yrs	Aplastic anaemia	MDS	Viscearal leishmaniasis	AML	ALL	Megaloblastic anaemia	Multiple myeloma	Misc.
0-10	3	0	1	0	1	0	0	0
11-20	4	0	2	0	2	0	0	1
21-30	3	1	2	0	0	0	0	1
31-40	3	0	1	1	0	1	1	0
41-50	1	0	0	0	0	1	1	1
51-60	2	1	0	2	0	2	0	1
61-70	2	4	0	0	0	0	1	1
71-80	0	3	0	0	0	0	0	0

MDS-Myelodysplastic syndrome, AML- Acute myeloblastic leukaemia, ALL- Acute lymphoblastic leukaemia, Misc.- Myelofibrosis, Malaria, Hypersplenism

The bone marrow study showed that (Table II) 36%of the patients had hypocellular marrow, 60% had cellular marrow including normocellular marrow (6%) and hypercellular marrow (54%) and 4% had blood tap. Increased erythropoiesis seen (Table II) in 44% cases. Decreased erythropoiesis seen in 38% cases and normal erythropoiesis seen in 14% cases, 32% cases was showed dyserythropoiesis. Granulopoiesis decrease in most cases of (32%) aplasic anaemia. Whereas increases granulopoiesis seen in 28% cases (MDS 12%, megaloblastic anaemia 8%, acute leukaemia 6%, visceral leishmaniasis 2%). Twenty study (40%) cases also showed normal granulopoiesis. Dysgranulopoiesis was seen, only in cases of MDS (10%). Decreased megkaryopoiesis (Table II) seen in 48% cases. Increased megkaryopoiesis seen in 12%cases and normal megakaryopoiesis seen in 32% cases. Dysmegkaryopoiesis was seen in patients having MDS (14%) and megaloblastic anaemia (4%). Overlap of common haematological parameters in major causes of pancytopenia without any clue to diagnosis. However, more severe anaemia, leucopenia and thrombocytopenia were found in cases of visceral leishmaniasis (Table III).

Table II: Cellularity, Erythropoiesis, Granulopoiesis & Megakaryopoiesis in different causes of pancytopenia.

Condition	Hypocellular	Normocellular	Hypercellular	Blood tap
Cellularity	18(36%)	3(6%)	27(54%)	2(4%)
Condition	**Normal**	**Increased**	**Decreased**	**Dyerythropoiesis**
Erythropoiesis	7(14%)	22(44%)	19(38%)	16(32%)
Granulopoiesis	20(40%)	14(28%)	18(26%)	5(10%)
Megakaryopoiesis	16(32%)	6(12%)	24(48%)	9(18%)

Table III: Mean hematological parameters in five common cause of pancytopenia.

Disease	Hb g/dl	Total Count(x10^9/L)	Platelets Count(x10^9/L)	ESR mm	MCV fl	MCH pg	MCHC
Aplastic anaemia	7.93	2.49	34.97	88.6	83.5	28.54	33.77
MDS	8.03	3.01	62.55	80.22	82.8	28.28	34.13
Visceral leishmaniasis	6.02	2.83	43.66	100.8	70.71	25	31
Acute leukaemia	7.62	2.41	62.16	109	85	29	33.33
Megaloblastic anaemia	8.31	2.25	85.25	83.5	90.8	29	35.12

The most common clinical complaint in this study was fever 30 (60%), followed by general weakness (figure 2). Fever affects all patients of visceral leishmaniasis & generalized weakness was more common in cases of aplastic anaemia. Pallor as a clinical sign was universal (70%), followed by splenomegaly (30%) which was more often seen in all patients of visceral leishmaniasis (figure 2). Table IV shows comparison of peripheral blood film findings of different diseases of present study with other studies done by Gayathri and Rao et al[1] and Tilak V et al[18]. Table V shows comparison of first and second causes of pancytopenia in different studies with present study.

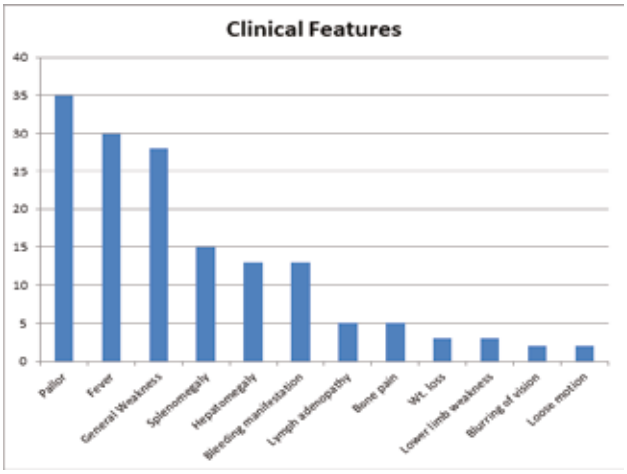

Figure 2: Clinical features according to causes of pancytopeni

Table IV: Comparison of peripheral blood findings with those in other studies.

Diagnosis	Total no of cases			Anisopoikilocytosis			NRBC			Hypersegmented neutrophils			Immature WBC			Relative lymphocytosis		
	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
Aplastic anaemia	18	19	6	1	17	2	-	-	-	-	5	-	-	-	-	12	10	3
MDC	9	-	-	7	-	-	4	-	-	-	-	-	5	-	-	1	-	-
Visceral leishmaniasis	6	-	-	2	-	-	-	-	-	-	-	-	-	-	-	1	-	-
Acute leukaemia	6	4	1	-	1	1	1	1	1	-	-	-	6	2	1	-	-	-
Megaloblastic anaemia	4	77	53	2	68	51	1	-	13	2	38	45	-	20	-	-	-	-
Multiple myeloma	1	1	1	-	1	1	1	-	-	-	-	-	-	-	-	-	-	-
Malaria	1	2	3	1	2	1	-	-	-	-	-	-	-	-	-	-	-	-

A- Present study
B- Study done by Gayathri and Rao et al[1]
C- Study done by Tilak V et al[19].

Table V: A comparison of the first and second most common causes of pancytopenia.

Study	Country	Year	No of cases	Commonest causes	Second most common cause
Keisu & Ost[20]	Israel & Europe	1990	100	Neoplastic disease, radiation (32%)	Aplastic anaemia (19%)
Hossain et al[18]	Bangladesh	1992	50	Aplastic anaemia	Cr. Malaria & Cr. Kalazar
Verma & Das[11]	India	1992	202	Aplastic anaemia (40.6%)	Megaloblastic anaemia (23.26%)
Tilak & Jain[19]	India	1999	77	Megaloblastic anaemia (68%)	Aplastic anaemia (7.7%)
Kumar et al[21]	India	1999	166	Aplastic anaemia (29.51%)	Megaloblastic anaemia (22.3%)
Khodke et al[22]	India	2000	50	Megaloblastic anaemia (44%)	Aplastic anaemia (14%)
International arganulocytosis and aplastic anemia study group[23]	Israel & Europe	1987	319	Aplastic anaemia (52.7%)	Myelodysplastic syndrome (4.5%)
Present study	Bangladesh	2011	50	Aplastic anaemia (36%)	Myelodysplastic syndrome (18%)

Discussion:

Pancytopenia is not an uncommon hematological problem encountered in our clinical practice and should be suspected on clinical grounds when a patient presents with unexplained anaemia, prolonged fever and tendency to bleed[24]. There are varying reports on the underlying aetiology of pancytopenia from various parts of the world[25].

In present study among 50 patients with pancytopenia 40 were males and 10 were females, with male: female ratio of 4:1. It was 2.6:1 in the study done by Lakhey et al, [26] and 2:1 in the study by Mussarrat Niaze and Fazil-i-Raziq[27]. In this study of pancytopenic patients the highest incidence was in the age group of 11-20 years,followed by 41-60 yrs of age. Mussarrat Niaze and Fazil-i-Raziq in their study also found most common age group of pancytopenia in the range from 12-30 years[27]. The mean age was 37.5 years with a range of 3-80 years. Osama Ishtiaq et al[24] and Gayathri B N et al[1]. in their studies found mean ages to be 36.7 years and 41 years respectively. Lakhey et al[26] also found the mean age was 40 years in their study.

The commonest cause of pancytopenia in present study was Aplastic anaemia (36%). Table V shows comparison of 1st and 2nd most common causes common causes of pancytopenia in different studies conducted in different countries[11,19,23]. Hypoplastic anaemia was commonest cause of pancytopenia. However, in some studies hypoplastic anaemia was next to megaloblastic anaemia and latter was the commonest cause of pancytopenia[19,22]. But in a study done by Keisu et al[20] neoplastic disease was the commonest cause of pancytopenia, unlike present study in which it was third in the list. The high frequency of malaria and kalazar in their study may be due to study done in an endemic area. In our study 6 cases of pancytopenia showed leishmaniasis and malaria was detected in 1 case. Only a single study showed MDS as the second commonest cause of pancytopenia[23] like present study. The incidence of aplastic anaemia quoted from west is 10–25%[28]. In present study Aplastic anaemia was the predominant causes of pancytopenia (36%), similar to study conducted by Deepak B Kumar et al[28] (33.33%), Jha et al,[29] (29.5%). Aplastic anaemia was the commonest causes of pancytopenia in some studies ranging from 24%-49% and the second cause in other studies. High incidence of aplastic anaemia was reported in Philippine (54%)[30] and Nepal (30%)[31]. In those two studies, males were affected with aplastic anaemia much more than females which might be a result of a higher incidence of occupational exposure to chemicals and pesticides[32]; the reverse is seen in Iraqi rural community as females use these substances more than males[28].

Over 60% of patients are over the age of 70 at diagnosis, with males more likely to be diagnosed with MDS than females by a ratio of 1.4 : 1.[33] Similarly in present study all the cases of MDS was found within the age group of 61-70 yrs, with male, female ratio was 2:1. The incidence of MDS as a cause of pancytopenia was 8.33% in a study conducted by Deepak B kumar et al[28]. while in present

study MDS was the 2nd most common causes of pancytopenia (18%).

Visceral leishmaniasis was the third most common causes of pancytopenia in present study as found in 12% cases. Similar findings was reported by Najlaa Badir Al-Awadi et al[34]. All the cases of visceral leishmaniasis were from Gajipur, Dhaka, near the endemic zone of this disease, in Bangladesh. Sud A et al.[35] and Sever-Prebilic M et al.[36] have reported the presence of visceral leishmaniasis in non -endemic areas. So, if there is pancytopenia with history of splenomegaly and fever one should think of visceral leishmaniasis even if patient is not from endemic area or not exposed to such area. Visceral leishmaniasis is one of the common cause of pancytopenia and frequency is very high in some studies done in India and Pakistan[37].

The incidence of megaloblastic anaemia in other studies varied from 0.8% to 68%[28]. This wide variation of incidence of megaloblastic anaemia depends on the status of the nutritional anaemia in that particular region of the study. The incidence was 8% in present study, most of the cases was found between the age group of 51-60 yrs and all the cases were male. Out of 4 patients 1 had evidence of malabsorption syndrome, and the remaining 3 cases the underlying disorder could not be established and evaluation of serum folate or vit B-12 was not available in this study.

Pancytopenia can be seen in 30% cases of acute leukaemia at the time of presentation[22]. Acute leukaemia constituted 12% of total cases of pancytopenia in present study which is low as compared to study of Jha et al[29]. in which it constituted 19.59% of total cases of pancytopenia. However, in study of Deepak B Kumar et al[28] no cases of acute leukaemia was detected and in study of Tilak et al[19] only 1 case of acute leukaemia was detected as a cause pancytopenia. On the other hand in the study of Bashwari et al[38] the main indication of bone marrow examination (BME) in case of pancytopenia was investigation of acute leukaemia. Acute leukaemia constituted third most common cause of pancytopenia in the study of Savage et al[39] and similar finding was seen in study of Varma and Dash[11]. In the study of Aziz et al[40] acute leukaemia constituted almost 10% of cases of pancytopenia and was third most common cause of pancytopenia.

In France, Imbert et al[41] founded myelofibrosis on bone marrow biopsy of adult patients with pancytopenia in 31% of them; while in present study, only 4% cases of myelofibrosis was found and all the cases were was diagnosed by bone marrow trephine biopsy.

Erythroid hyperplasia was present 4% cases of the present study and Splenomegaly was seen in both the cases of erythroid hyperplasia in present study. Some of these cases may represent one phase in the evolution of hypoplasia, while some may be cases of refractory anemia. The criteria for differentiation of these groups remain unsatisfactory and these patients should be kept under follow-up. Hypercellular or normocellular marrow in cases of pancytopenia can also be seen in cases with ineffective hematopoiesis with cell death within the marrow. Similarly, hypercellular marrow in the presence of peripheral pancytopenia can be a manifestation of myelodysplastic syndrome[29]. Focal hyperplasia of erythroid or granulocytic cells at a similar stage of maturation may be observed in hot spot. A correlation with BME, clinical parameters and other laboratory parameters are required to trace the cause of pancytopenia in these cases. A possible hypersplenism needs to be ruled out in addition to different haemolytic anaemias in cases of marrow showing erythroid hyperplasia[42].

The annual incidence of Multiple myeloma is 4 per 1,00,000. It represents approximately 1% of all malignant diseases and 15% of all haematological malignancies. The incidence of MM is lower in Asian populations and in blacks is twice that in whites; MM is slightly more frequent in men than in women. The median age at diagnosis is 65 – 70 years. Only 15% and 2% of the patients are younger than 50 and 40 years, respectively[43]. In present study of the remaining causes multiple myeloma accounted for 2 cases (4%).The age of the patients with multiple myeloma were 45 and 65 yrs and both were male. A single case was diagnosed as a cause of pancytopenia in the study done by Pathak et al[42] and Jha et al[29] which shows similarity to this study.

Pancytopenia, a decrease in all the three types of cells in the peripheral blood, commonly presents with symptoms of anaemia or thrombocytopenia. Leucopenia is an uncommon cause of the initial presentation of the patient, but can become fatal during the subsequent course of the disorder. Sometimes pancytopenia is detected as an incidental feature of a disorder that is capable of depressing the levels of all cellular elements in the blood[28]. Figure 2 shows that fever affects all patients of visceral leishmaniasis, while generalized weakness was most often seen in aplastic anaemia. Pallor as a clinical sign was universal in all case of aplastic anaemia, followed by splenomegaly which was found in all cases of visceral leishmaniasis. In another study by Niazi and Raziq weakness (68.2%) was the commonest symptom, followed by fever (47.7%) and bleeding manifestations (33.7%)[27]. With reference to the commonest clinical sign that we came across, pallor was the most common sign, followed by pallor with splenomegaly and pallor with hepatosplenomegaly. In studies conducted by Khodke et al[22], Deepak B Kumar et al[28] and Niazi and Raziq[27], pallor and hepatosplenomegaly were the commonest sign, as in the present study.

We found that the routine hematological parameters were non-specific and showed a significant overlap among the major causes of pancytopenias. Table III shows comparison of common haematological parameters in five major causes of pancytopenia. However, the peripheral

blood films were valuable in pointing toward the cause in patients with megaloblastic anaemia and leukaemia. Bone marrow aspirate was found to be sufficient for diagnosis in most cases of leukaemia and megaloblastic anaemia. Peripheral blood flim findings of present study were comparable with those in other studies shown in Table IV hypersegmented neutrophils were noted in 50% cases of megaloblastic anaemia in present study, compared to 49.35% in Gayathri and Rao[1] study and 84.9% in Tilak V et al[19] study, but Khunger et al[44] in their study demonstrated no hypersegmented neutrophils in megaloblastic anaemia. Also relative lymphocytosis in aplastic anaemia was noted in 66.66% caes in present study compared to 52.63% study done by Gayathri and Rao et a[10] and 50% in study done by Tilak V et al[19].

Conclusion:

The various causes of pancytopenia can be attributed to the geographic area, genetic differences, stringency of diagnostic criteria, and differences in methodology used. Aplastic anaemia is the most common cause of pancytopenia in this study. Severe pancytopenia has significant correlation with poor disease outcome and can be used as a prognostic indicator. There are varying trends in its clinical pattern, treatment modalities, and outcome depending on the different causes of pancytopenia which should kept in mind while managing it. Causes such as megaloblastic anaemia, and infections such as visceral leishmaniasis and malaria are reversible. As a large proportion of pancytopenia is of reversible etiology, early an accurate diagnosis may be life-saving.

Conflict of Interest: None

Acknowledgement:

The faculties of Haematology department of Armed forces institute of pathology (AFIP), Dhaka cantonment, Dhaka.

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ORIGINAL ARTICLE OPEN ACCESS

Comparative Study between Laparoscopic and Open Cholecystectomy: Complications and Management

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Abstract

Introduction: *Laparoscopic cholecystectomy (LC) is currently the most widely used surgical procedure for the treatment of gallstones. The aim of the study was to analyze and compare the postoperative results of patients undergoing laparoscopic cholecystectomy or open cholecystectomy (OC) with regard to complications, recovery time and hospital stays.* ***Materials and Methods:*** *This is a retrospective study which was conducted at the General Hospital Khulna and some of the private Hospital in Khulna City from January 2015 to December 2019. This study which analyzed among 950 patients, 20-65 years old, diagnosed with gallstones undergoing LC or OC. We evaluated postoperative respiratory complications, surgical site infection, deep vein thrombosis, time to oral feeding and ambulation, use of antibiotics and duration of the postoperative period.* ***Results:*** *We analyzed 570(60%) patients undergoing LC and 380 (40%) OC. Most patients were female (55%). Patients' comorbidities were hypertension (12.8%), diabetes mellitus (4.5%) and asthma (1.00%). LC resulted in lower prevalence of postoperative complications (2.8%) than OC (3.4%). Postoperative hospitalization for 2-3 days was found in LC patients and 5-7 days in OC.* ***Conclusion:*** *Laparoscopic cholecystectomy showed higher benefits for patients with lower prevalence of postoperative complications, feeding earlier and shorter mean hospital stay compared with open cholecystectomy.*

Keywords: *Cholecystectomy, Laparotomy, Laparoscopy, Postoperative complications.*

Number of Tables: *06;* ***Number of References:*** *15;* ***Number of Correspondence:*** *03.*

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Introduction:

Laparoscopic cholecystectomy has become the treatment of choice for chronic cholecystitis around the world. Laparoscopic cholecystectomy is still reported as having a higher complication rate for acute cholecystitis than for chronic cholecystitis, with a currently reported postoperative complication rate of about 9% to 17% in some published series[1]. The broad range of the complication and conversion rates should be kept in mind because they depend on variables such as patient age, emergency intervention, ASA classification, and the presence of acute inflammation (gangrene, empyema, or perforation) of the gallbladder[2]. In the early stage of laparoscopic cholecystectomy, it was considered unsafe or technically difficult to perform laparoscopic cholecystectomy for acute cholecystitis[3,4]. With increasing experience in laparoscopic surgery, many surgical services have reported on the use of laparoscopic cholecystectomy for acute cholecystitis, suggesting that it is technically feasible but at the expense of a high conversion rate[5,6]. and common bile duct lesions[7]. Routine use of the open procedure might enable more patients to have the operations during the acute phase because most surgeons are practiced in this approach. The impact of hospital stay and morbidity must also be taken into account. There is the expectation that open operation is associated with more pain and longer hospital stay[8,9]. In some trials successful laparoscopic cholecystectomy is associated with an earlier recovery and shorter hospital stay when compared with open cholecystectomy[10]. The aim of this study was to analyze and compare the perioperative results of patients undergoing laparoscopic and open cholecystectomy concerning to complications, hospital stay and cost.

Materials and Methods:

All patients having cholecystectomy at the General Hospital Khulna and some of the private Hospital in Khulna City from January 2015 to December 2019 were retrospectively registered in the study. Most of the operations were performed by consultants of surgery, but residents participated in surgery under supervision. Patients were eligible to participate in the trial comparing conventional open cholecystectomy and laparoscopic cholecystectomy according to exclusion and inclusion criteria.

We analyzed 950 patients, aged 20-65 years, diagnosed with gallstone

Received: 14 June 2020 *Accepted revised version:* 28 December 2020

disease randomly assigned to laparoscopic cholecystectomy or open cholecystectomy. Excluded were those with confirmed choledocholithiasis and underwent concomitant surgeries, pregnant women and patients with liver cirrhosis or malignant tumors. Demographic data such as age, sex, emergency or elective procedure, surgical risk (ASA score), duration of surgery, use of prophylactic heparin, Intercurrent diseases and use of prophylactic antibiotics were computed. Respiratory complications (pneumonia, bronchopneumonia, pleural effusion, pulmonary embolism), surgical site infections urinary infections, deep vein thrombosis and other complications were recorded from the immediate postoperative period until the time of hospital discharge. We evaluated the time to oral feeding and ambulation, length of postoperative hospital stay and the clinical conditions at the time of discharge.

Results:

Of the 950 patients, 570 (60%) underwent laparoscopic surgery and 380 (40%), open cholecystectomy, distributed by gender and age as shown in Table I. We found a relationship of man to women.

Table-I: Prevalence of age and sex.

Type of cholecystectomy	Age	Male	Female	M:F Ratio	Total
Laparoscopic	45±11	250	320	1:1.28	570
Open	47±10	175	205	1:1.17	380
Total	46±10.5	425	525	1:1.22	950

Most of the patients had co-morbidities such as hypertension, asthma and diabetes mellitus (Table II).

Table-II:Intercurrent illness (co-morbidities).

Diseases	Laparoscopic Cholecystectomy	Open Cholecystectomy	Total
Hypertension	67	55	122 (12.8%)
Diabetes	25	18	43 (4.5%)
Asthma	6	4	10 (01%)
Nontoxic goiter	1	o	1
Lung complications	4	2	6

There was no difference in median time to onset of postoperative oral feeding. It was earlier in laparoscopic cholecystectomy, where 540 (94.7%) patients received oral diet introduced in the first 12 hours, while in open surgery, the oral intake was introduced in 319 (84%) patients after 24 hours (Table III).

Table-III:Time for the beginning of postoperative oral feeding.

Surgery	5-6 h	12h	24h	48h	72h
Laparoscopic Cholecystectomy	20	540	6	4	0
Open Cholecystectomy	0	32	319	25	4

Mean operative time in laparoscopic surgery was 30 to 60 minutes in most 310 patients (54.3%). Open surgery lasting 30 to 60 minutes were performed in 140 patients (36.8%), significantly less when compared with laparoscopic surgery. We performed 252 (44.2%) laparoscopic cholecystectomy in the time interval 61-120 minutes, significantly less than 220 (57%) open cholecystectomy in the same time interval (61-180 minutes) (Table IV).

Table-IV: Operative times (minutes).

Operations	60 – 90	91 - 120	121 - 180	>181	Total
Laparoscopic Cholecystectomy	310	252	6	2	570
Open Cholecystectomy	140	220	14	6	380

Most of the patients with Laparoscopic Cholecystectomy leave hospital within 2-3 days. Patients with open Cholecystectomy leave hospital on 5- 7 days.

Table-V: Hospital stay (days).

Operations	1 – 2	2-3	3 - 4	5 - 6	6 - 7
Laparoscopic Cholecystectomy	5	503	40	22	0
Open Cholecystectomy	0	0	4	326	50

Operative complications resulting from laparoscopic procedure occurred in 16 (2.8%) patients, 6 patients with wound infection. The remaining 10 patients who had complications were affected by bile duct injury, bile peritoneum, port site haemorrhage, deep vein thrombosis, subcutaneous emphysema. Operative complications resulting from open procedure occurred in 13 (3.4%) patients. The surgical site infection was the most frequent complication, diagnosed in 8 patients, followed by urinary tract infection in 2 patients.

Table-VI: Post operative complications observed in patients undergoing laparoscopic and open cholecystectomy.

Complications	Laparoscopic Cholecystectomy	Open Cholecystectomy
Wound infection	6	8
Urinary infection	1	2
Bile duct injury	2	0
Internal haemorrhage	1	0
Port site haemorrhage	2	0
Deep vein thrombosis	1	1
Respiratory infection	2	2
Subcutaneous emphysema	1	0
Total	**16 (2.8%)**	**13 (3.4%)**

Discussion:

Laparoscopic cholecystectomy has largely supplanted the open technique. This is because of the benefits of LC in respect of duration of postoperative hospital stay, shorter time of operative procedure, early recovery, less complications etc. In the present study, the duration of postoperative hospital stay for laparoscopic surgery was from 2 to 3 days in 503 patients (88.25%), and in open cholecystectomy was 5 – 6 days in 326 patients (85.58%). The hospital stay in OC is much more than LC. Other studies showed the mean postoperative stay for an open cholecystectomy has been 8 days compared with the 3 days recorded for laparoscopy[11]. The mean operating time for an open cholecystectomy has been given as 90 minutes, as opposed to 95 minutes for the laparoscopic procedure[12]. These data contrast with our results of 90 minutes and 75 minutes, respectively. Both perioperative and postoperative complications are thoroughly dealt with in most studies that have compared open and laparoscopic cholecystectomy[12,13]. Usually, complications are classified as bile duct injury, vascular, bowel injury, residual stones, wound or urinary tract

infections, urinary retention, and ileus[14]. Bile duct injuries has been more common after laparoscopic than open cholecystectomy[15]. In the present study we had two cases of bile duct injury. The patients were reoperated and the injury was successfully treated.

Conclusion:

Laparoscopic cholecystectomy offers the greatest benefits to patients; it was associated with a lower rate of postoperative complications, feeding earlier and shorter average hospital stay than open cholecystectomy. The operative procedures performed in government hospital were free of cost. The cost of laparoscopic cholecystectomy was about the same as those of the open conventional procedure in private hospital. The difference in cost was attributable to the considerably shorter postoperative stay after the laparoscopic procedure.

Conflict of Interest: None.

Acknowledgement:

The authors gratefully acknowledge Dr. Gazi Shafiqur Rahman MBBS for helping with valuable suggestions and documentation.

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ORIGINAL ARTICLE OPEN ACCESS

The Frequency of Port-Site Infection in Laparoscopic Cholecystectomies

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Abstract

Introduction: *Laparoscopic surgery was a revolution in the field of surgery. Despite many benefits, the technique is associated with certain complications including PSI. PSI, although less common is annoying both for the surgeon and the patient, and cripple the benefits of MSI. PSI not only increases the economic burden, pain and Hospital stay of patient but also harm the reputation of the attending Surgeon and hospital.* ***Materials and Methods:*** *This observational study carried out by the Department of general surgery at Medical College for Women & Hospital (MCWH), Uttara, Dhaka over a period of one year (July 2017 to June 2018). The study was carried out in 108 patients who underwent LC. AIM was to study the frequency of port site infection.* ***Results:*** *In the current study, 108 patients including 92 females and 16 males were operated. A total of 12 patients had PSI. Infection was seen in one male patients and 11 female patients. Age range was 20-75 years. Port –site involved was epigastric, which developed infection in 7 patients, followed by umbilical port which got infected in 5 patients. Gall bladder was extracted through epigastric port site in 29 patients and through umbilical port site in 79 patients. 7 cases are superficial infection with foreign body reaction, 2 cases are deep infection and 3 cases are mycobacterial tuberculous infection.* ***Conclusion:*** *LC is associated with a low risk of port site infection which in most cases is only superficial and responds to local measures. Infection is most commonly seen at port site through which gall bladder was extracted.*

Keywords: *Laparoscopic cholecystectomy (LC), Port-site infection (PSI), Minimal invasive surgery (MSI).*

Number of Tables: *02;* ***Number of Figures:*** *02;* ***Number of References:*** *25;* ***Number of Correspondence:*** *05.*

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Introduction:

Laparoscopic surgery also known as minimal invasive surgery (MIS) is a technique, in which operations can be performed using small incisions away from the site of pathology. It revolutionized the surgical world when first introduced in the beginning of nineteenth century. Cholecystectomy is the most common operation of the biliary tract and the second most common operative procedure performed nowadays[1].

Laparoscopic cholecystectomy is now considered the gold standard procedure for management of cholelithiasis[2]. Despite many benefits such as decrease post operative pain, early mobility, early return to work and small scars,[3] the technique carries certain complications including PSI.

PSI not only increases the pain and hospital stay of the patient but also increases work load on hospital staff, thus decreasing the cost effectiveness of a minimally invasive procedure.

The Centers for Disease Control and Prevention classification (CDC) categorized surgical site infection into incision-site infection and organ-space infection. The incision-site infection is further subdivided into "superficial" in which only skin and subcutaneous tissue is infected and "deep" where fascia and muscles are infected[4].

In our study of PSI in LC, only the incisional category is applicable and has been used.

In this study we analyzed our experience of port site infection in LC.

Gallstone disease is the most common pathology of the biliary tract. It is a major health problem not only in Bangladesh but also worldwide

Received: 11 September 2020 *Accepted revised version:* 19 January 2021

in the adult population. Open cholecystectomy remained the procedure of choice for about 100 years till 1987 when Philip Mouret performed first LC in France[5].

The main objective of LC is to minimize the traumatic insult to the patients without compromising the safety and efficacy of treatment compared with traditional open cholecystectomy[6]. At some centers LC is performed as day case surgery. All patients with symptomatic gall stones disease and even acute cholecystitis are the candidates for the LC. Obesity, old age, previous abdominal surgical intervention and liver cirrhosis are no longer contraindications[7]. Early LC for acute cholecystitis is still performed by only a minority of surgeons because early laparoscopic cholecystectomy for the management of acute cholecystitis is considered to be associated with more complications[8]. Previous attacks of cholecystitis are associated with adhesion formations thus making cholecystectomy more difficult and most common cause of conversion rate from LC to open cholecystectomy[9]. The overall frequency of major complications is less than 5% in laparoscopic cholecystectomy.

PSI due to non-tuberculosis mycobacterium has been a concern for the laparoscopic surgeons of late as it leads to a protracted morbid state. It washes away all the advantages of the laparoscopic surgery and irritates the surgeon as well as the patient equally due to persistent redundant infection.

Material and Methods:

This prospective study was conducted in the department of General Surgery at Medical College for Women and Teaching Hospital, Uttara, Dhaka over a period of one year (July 2017 to June 2018). Approval from the hospital ethical committee was obtained. All the patients with symptomatic gallstones were admitted through outdoor department, their age range was between (20-75 years).

Patients with age < 20 years, acute pancreatitis, choledocholithiasis, skin infections, pregnancy, past history of peritonitis and bleeding disorders were excluded from the study. Procedure was discussed in detail with the patient and written informed consent was obtained.

All the patients were admitted to surgical ward a day before surgery and were given 3 doses of third generation antibiotics (ceftriaxone 1gm). First dose at the time of induction of anesthesia and rest after the surgery. The patients were monitored for port site infection using standard National Nosocomial Infections Surveillance (NNIS) System definitions given by the Centers for Disease Control and Prevention (CDC).

Operative technique:

All the patients were operated under General anesthesia. After painting with Povidone-iodine solution (from the nipple line to the inguinal ligaments and laterally to the anterior superior iliac spine) and draping, a 1.5-cm longitudinal incision was made at the inferior aspect of the umbilicus, and then deepened through the subcutaneous fat to the anterior rectus sheath. A Kocher clamp was used to grasp the reflection of the linea alba onto the umbilicus and elevate it. A 1cm longitudinal incision was made in the linea alba with a No. 15 blade. The peritoneum was elevated between two straight clamps and incised so as to afford safe entry into the abdominal cavity. A 10-mm blunt trocar was placed into the abdominal cavity, and pneumoperitoneum created. Or sometimes introduced verress needle and pneumoperitonium created. Another way 10mm trocher and cannula introduced blindly and pneumoperitonium created.

The laparoscope was white-balanced and advanced into the abdominal cavity. A 1.2-cm incision is made three fingerbreadths below the xiphoid process and deepened into the subcutaneous fat. A 10-mm trocar was advanced into the abdominal cavity under direct vision in the direction of the gallbladder through the abdominal wall, with care to enter just to the right of the falciform ligament. The table was then adjusted to place the patient in a reverse Trendelenburg position with the right side up to allow the small bowel and colon to fall away from the operative field. The optimal position for lateral 5-mm ports were chosen by the surgeon and the lateral skin incisions were made, and two 5-mm trocars were advanced into the peritoneal cavity under direct vision. Calot's triangle was identified and all the areolar tissue was removed identifying cystic duct and artery clearly. Both the structures were clipped and cut separately. Cholecystectomy was completed using L-hook and hemostasis rechecked and secured. Gall bladder was extracted from epigastric or umbilical port site depending upon surgeon's choice. The umbilical port was repaired under direct vision by OS 6 1/0 vicryl. Then removal of gas and trocar respectively. All the skin incision was closed using OS 6 1/0 vicryl.

Occasionally drain was used which was removed 1st/2nd postoperative day. Patients were discharged on 1st/2nd postoperative day. Port sites were evaluated clinically for infection on day 5 after surgery and wound infections were dealt with local washes with Normal Saline and surgical dressings plus empirical antibiotics. Stitches were removed after 7 days of surgery. All patients were followed for a period of one month.

Evaluation was done for postoperative fever, erythema, discharge from the wound. Local cultures were taken from the wound margin, discharge or aspirate of haematoma. Postoperative infection was considered to be present if cultures were positive.

Results:

In our study LC was performed in 108 patients, which included 92 females (85%) and 16 males (15%). Their age range was between 20- 75years (Table I).

Table-I: Age range of the patients.

Age zone	N	% of age
20-30 years	30	28%
30-40 years	36	33%
40-50 years	20	19%
50-60 years	14	14%
60-70 years	07	06%
>70 years	01	01%

Out of these 108 patients 12(11%) of patients developed PSI. The patients who developed wound infections includes 11 females and one males (Table-II). Most common port site involved was epigarstric port, which developed infection in 7 patients (58%), followed by umbilical port which got infected in 5 patient (42%). Gall bladder was extracted through epigastric port site in 29 patients (27%) and through umblical port site in 79 patients (73%).

Out of the 12 patients who developed PSI, gallbladder was perforated while extraction with spillage of bile and stones in 3 cases (25%). Out of these 12 patients who developed wound infection, 2(17%) patients had operative findings of acute cholecystitis (empyema gall bladder) and 3 patients (25%) develop port site tuberculosis. All others 4 (33%) was having chronic cholecystitis with foreign body granuloma.

Table-II: Frequency of wound infection.

Total No. of patients of developed wound infection	12/108 (11%)
Percentage of female with wound infection	11/12=92%
Percentage of male with wound infection	1/12=8%

Figure-1: Superficial port site infection.

Figure-2: Large and deep Port site infection.

Discussion:

The LC was introduced in 1987 since then it is gaining popularity day by day. Open cholecystectomy procedure has been reduced to less than 20% in developed countries[10]. Now it is the treatment of choice and gold standard due to less pain, minimum surgical trauma, short postoperative hospital stay and early return to home[11]. No surgical procedure is without having complications.

Wound infection is the most common complication of almost every open surgery. Same applies to laparoscopic surgery. Although laparoscopic surgeries have less incidence of port site infections, still they can produce undesirable effects and increase morbidity[12]. LC is now performed commonly throughout the world and it has been accepted as safe out-patients procedure[13].

In this study majority patients were females with a female to male ratio of 92:16=5.6:1. Mean age was 37.57 years and this is consistent with most of the international and national literature[14].

The frequency of PSI observed in our study was 11%. Our results are comparable to Shindholimath et al[15] who has reported an incidence of 6.3%, while, Den Hoed et al [16] and Jan et al[17] reported an incidence of 5.3% and 5.07% respectively. In contrary to our results, Zitser et al and Colizza et al reported a significantly decreased incidences i.e., 2.3% and <2%, respectively[18,19].

Twelve patients (11%) had wound infection at the port site through which the gall bladder was extracted. Nine patients were managed by simple dressing and antibiotics according to culture and sensitivity and three patient need incision and drainage. In the international literature port site wound infection was observed in less than 1% however in national studies, it was reported up to 8%[20,21].

The higher incidence of port site wound infection in our studies as compared to international studies was reported because of spillage of bile or gallstones at the wound site at the time of extraction of gallbladder, use of reusable ports after sterilization and diabetes mellitus. The cost of disposable ports for every case is not affordable by the patient nor by the hospital. However the use of collection bag for extraction of gall bladder can significantly reduce the incidence of wound infection.

In our study, most common port site affected by infection was epigastric port site (58%), followed by umbilical port which got infected in 5 patients (42%). Similar predominance of epigastric port site infection was noted by Jan et al[17] and Hamzagaolu et al.[22] But studies conducted by Colizza et al[19] and Tocchi et al[23] have shown that PSI is more common at the umbilical port site. Increased incidence of infection affecting epigastric over umbilical port site was due to repeated extraction of gall bladder through epigastric port site.

While evaluating the reasons for such port site lesions we could ascertain that in most of the cases the sterilization of the laparoscopic instruments was not proper.The laparoscopic instruments are insulated and have multiple joints and crevices which can harbour mycobacterial spores and other organisms which later germinate in the subcutaneous tissue and cause port site tuberculosis or

infection[24]. Hence it is of paramount importance to clean the instruments of the charred tissue and or clotted blood as these act as nidus for the bacteria. A proper cleaning of the instrument is best achieved by ultrasonic technology[24]. Moreover the normal practice of using tap water for washing has to be discarded as it is the principal source of atypical mycobacteria. Most of the studies recommend washing with autoclaved water and or sterile normal saline and immediate drying of the instruments[25].

The most commonly used agent for sterilization of laparoscopic instruments is 2% glutaraldehyde. Instruments (both ports with trocars and hand instruments) need to be immersed in the said solution for at least 10 hours for proper sterilization and a minimum of twenty minutes for disinfection. The solution has to be changed every two weeks or earlier depending upon the surgical burden of cases.

Ethylene oxide gas sterilization is a better option instead, however it is not available at all centers. Although a higher concentration of glutaraldehyde has been advocated but some studies have reported resistance to even higher concentration[24]. Orthophthaldehyde and per acetic acid may be used as a viable option as reported by Prakash K Sasmal et al[24]. We recommend routine autoclaving of the ports along with trocars and or using a higher strength of glutaraldehyde for insulated hand instruments. Time taken for sterilization and disinfection is very important and should be strictly adhered to where ever the menace is prevalent.

Conclusion:

With innovation of minimal invasive surgery (MIS) the risk of wound infection has decreased considerably. All the advantages of the MIS are drained with the PSI. PSI, which not only disturbs the patient, but also agitates the operating surgeons, because it not just increase the duration of recovery but also increase the cost. We feel it can be reduced by adopting strict antiseptic measure, with no compromise on sterilization or by using disposable instruments.

Conflict of Interest: None.

Acknowledgement:

The research team would like to thank, health staff and patients for participating in the clinical trial. Special thanks to Professor Dr. KGM Iqbal and Professor Dr. MA Hashem Bhuiya for their advice and inspired for research article.

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ORIGINAL ARTICLE OPEN ACCESS

A Clinico-pathological Correlation of Carcinoma Stomach and ABO Blood Group

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Abstract

Introduction: *Stomach cancer related to higher rate for blood group A over other ABO types, a prospective assessment of relation between blood group and carcinoma stomach was performed with a view to state the role of ABO blood group in the development of gastric cancer with relationship of clinico-pathological variation. This study sought to investigate the relationship between ABO blood groups and the risk of gastric cancer as well as clinical pathological parameters.* ***Materials and Methods:*** *A Prospective random observational study carried between October 2005 to September 2006 in Dhaka Medical College Hospital, Department of Surgery & Radiotherapy. Maximum patients admitted in the surgery units with diagnosed case of carcinoma stomach were taken as sample or study population & rest attended in radiotherapy department in DMCH.* ***Results:*** *Among the 70 cases the mean age is 44.3(18-65) (M/F=4:1) years. All the information and data taken from Hospital records and patients themselves or first degree relatives. Results Blood group B-42.85%, A-34.28%, O- 15.71% only 11.42% gave positive family history. Histopathological report show's Adenocarcinoma 95% and among them blood group B 40% and A 31.42%. The differentiation of carcinoma stomach are categorized as Grade-I well differentiated, 37.14% cases moderately differentiated 15.71% and poorly differentiated 45.71%. Among them blood group B is more in case of poorly differentiated carcinoma 25.71%, blood group A is more in well differentiated carcinoma 17.14%.* ***Conclusion:*** *Blood group 'A' has an established relationship with carcinoma stomach. In this study it is found that blood group 'B' is more associated with carcinoma stomach and with poorly differentiated adenocarcinoma.*

Keywords: *Carcinoma Stomach, ABO Blood Group.*

Number of Tables: *05;* ***Number of Figure:*** *01;* ***Number of Bibliography:*** *25;* ***Number of Correspondence:*** *05.*

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Introduction:

Among the malignant tumours' that occur in stomach, carcinoma is overwhelmingly the most important. Its incidence varies widely. In order of frequency the incidence of malignant tumours of stomach approximately are as follows:carcinoma-90-95%,lymphoma 4%,Spindle cell Tumours 2%, Carcinoid 3%. Gastric carcinoma is a wide spread disease. It is particularly high in Japan, Chile, Costa Rica, Colombia and considerably lower in USA, UK, Candada, Australia, Greece, New Zealand, Sweden and Holland. Gastric cancer is the second most common cause of cancer death worldwide about one million patients are newly diagnosed with gastric cancer each year, with 700,000 deaths each year[1].

During the past 5 decades, incidence and mortality of gastric carcinoma has been declined. Nevertheless gastric carcinoma remains a formidable challenge since its over all five year survival rate still continued to be dismally poor. It is a leading cause of all cancer related deaths. It is one of the "captains of men of death[2]. In USA the mortality rate from gastric cancer has dropped from about 30 to 6 per 100000 for men and from 21 to 4 per 100000 for women during last 50 years. In Japan the percentage in mortality surpassed that in incidence. It is postulated that the mass-screening program has had some impact. It is known that gastric cancer can be caused by the interaction between environmental factors and genetic variations[3-5].

Although improvements in nutrition, occupations and socio-economic class have been frequently suggested, the reasons for the dramatic decline in the incidence of stomach cancer remain unclear[6].

There are some preexisting conditions that culminate to gastric carcinoma. Statistical evidence suggests that chronic atropic gastritis, pernicious anaemia, adenomatous polyp, hypertrophic gastropathy, achlorhydria and hypochlor hydria as well as preexisting gastric ulcer are the precancerous lesions[1]. Pernicious anaemia: Fisk of gastric carcinoma was first suggested by Zamcheek et al. in 1955. They concluded that approximately 10% of patient develop gastric carcinoma. Presumable the achlorhydria/ hypochlorhydria associated with pernicious anaemia leads to malignant change[7]. Gastric

Received: 16 September 2020 *Accepted revised version:* 26 January 2021

neoplastic polyp: Neoplastic polyp have (40-66%) of undergoing malignant change. Incidence of cancer is increased in polyps larger than 2 cm in diameter. Huppler and associates reviewed the records of 465 patients with gastric polyps seen at Mayo Clinic 300 patients were operated and 20% of polyp of these patients was malignant, 80% of the patients were achiordydric. Age incidence of neoplastic polyp was between fifty and seventy years[8]. Previous gastric operation: Gastric surgery for benign condition increases the risk of gastric cancer by two- to six-folds. Most cases have occurred after Billroth-II anastomosis, 20 years after the original surgical procedure[9].

The discovery of blood groups in human beings by the Austrian scientist Carl Landsteiner in 1900 was a land mark in the history of medicine for which he was given the 1930 Nobel Prize in Medicine/Physiology. In his study involving[10]. individuals of his laboratory, he indicated three blood groups based on the reactions of different combinations of cells and sera. He named these blood groups as A, B, and C (which later became group O). Apparently, none of the staff of Landsteiner's laboratory had the less common blood group AB which was later reported by other Austrian investigators[11].

The first attempt to correlate a polymorphic system with disease susceptibility was made following the discovery of red blood cell groups. On the assumption that such polymorphisms must be maintained by selection, a search for associations between blood groups and specific diseases was initiated. The first such association was found between blood group A and stomach cancer in 1953[12]. There have been many other studies since that time, showing varying levels of risk of stomach cancer for type A. The role of blood groups in predisposition to various diseases has been studied and reported[13]. One study done in China in 1994 on a population group that has very high stomach cancer rates overall, does show a higher rate for blood group A over other ABO types, but also shows an elevated rate for any ABO type if a family member had stomach cancer, in fact, the odds ratio was much higher for having a parent who had stomach cancer than for being the A blood type[14,12] were the first to notice the correlation between gastric cancer and blood group A[15]. Since then, the relationship between ABO blood groups and carcinogenesis or progression of human tumors has been reported by many investigations, including increased breast cancer risk in blood group A[16]. However, the results regarding the relationship between blood group A and gastric cancer were inconsistent[17–19].

Many studies have addressed the correlation between ABO antigen a development of gastric cancer but most of these have indicated correlation between sporadic cases of gastric cancer and blood group A. This association further supports the role of genetic factors in the development of gastric cancer.Gastric carcinoma develop in patients with blood group-A (Japanese however claim blood group-B). Blood type A is more strongly associated with diffuse gastric histopathological type of cancer than intestinal type[20].

Since the association between blood group A and gastric cancer was reported in 1953 and the relationship with blood groups and incidence clinicopathological parameter and prognosis had been studied in many cancer and other disease. However there is no consistent result. Additionally ABO gene are distributed differently among socioeconomic group. We know that socioeconomic status is one of the risk factors for disease. Blood group related antigens A and B in gastric cancer expressed in intestinal and diffuse type of carcinoma differ significantly in patient of blood group A and blood group B.Thus another observation gave only partial support for the hypothesis that the association between ABO blood groups and gastric carcinoma is dependent on the antigenicity of the neoplasm.Thus a perspective assessment of relation between blood group and ° carcinoma stomach was performed with a view to state the role of ABO blood group in the development of gastric cancer with relationship of clinicopathological variation.

Aims And Objectives 1-To study the relationship between ABO Blood Group with Clinico-pathological types of carcinoma stomach. 2-To see the incidence and relation of Blood Group-A or Blood Group B and histopathological types of gastric cancer.

Materials and Methods:

This is a prospective random observational study carried between October 2005 to September 2006 in Dhaka Medical College Hospital, Department of Surgery & Radiotherapy. Maximum patients admitted in the surgery units with diagnosed case of carcinoma stomach were taken as sample or study population & rest attended in radiotherapy department in DMCH.

All patients with gastric carcinoma irrespective of the site and histological variation, in Dhaka Medical College Hospital in Surgery department and radiotherapy department were prospectively assessed for the association with ABO blood group. Data about age sex, ABO blood type, Endoscopic diagnosis, histopathological variation, operability and inoperabiity included. Clinical and histopathological diagnosis are available, differentiation of carcinoma are categorized grade-I (well differentiated) to grade III (Poorly differentiated). All patient's medical record including operation note, histopathological reports were reviewed.

For all 70 cases a standard protocol according to the data sheet were maintained. The collected data were analyzed.

Criteria for selection: 1. All histopathologically diagnosed cases of carcinoma stomach were included in study period. 2. Only the ABO blood group was considered in the study. 3. All operable and inoperable cases were included. Criteria for exclusion: Other malignant tumors of the stomach histopathologically proved.

Results:

Out of 70 cases, 8(11.42%) cases were found in the age group below 40 years, 36(51.42%) cases in the age group of 41-50 years, 23(32.85%) cases in the age group of 51-60 years and only 3(4.28%) cases beyond the age of 60 years. Incidence of gastric carcinoma predominate in male. In this series of 72 cases the male to female ratio 4:1. Out of 70 patients, only 8 (11.42%) patients had positive family history of carcinoma stomach. Here ABO blood distribution. Out of 8 cases, 6 cases had same blood group, group-A and others blood group-O. Six male and two female patients of the present series gave history of peptic ulcer. None could show any evidence of pernicious anemia, atrophic or benign stomach tumour. Two patients gave positive history of gastric surgery.

Table-I: Blood group of patient (n=70)

Blood group	No. of patients	Percentage (%)
B	30	42.85
A	24	34.28
O	11	15.71
AB	5	7.14

Symptom

It is to be mentioned that most of the patients in this series attended in DMCH for surgical treatment in Department of Surgery and for Chemo Radiotherapy treatment in Department of Radiotherapy and all the cases were established cases of carcinoma. The mode of presentation in different patients is shown in Table-II.

Table-II: Leading symptoms observed in patients (n=70).

Symptoms	No. of patients	Percentage (%)
Epigastric discomfort	68	97.14
Epigastric pain not responding to treatment	42	60
Anorexia	65	92.85
Loss of weight	70	100
Loss of appetite	65	92.85
Vomiting	69	98.57
Dysphagia	5	7.14
Lump in epigastric	31	44.28
Haematemesis and meleana	7	10
Fatigue and tiredness	49	70
Acute abdomen with all the features of perforation of hollow viscus	2	2.85
Anaemia	68	97.14
Weight loss	68	97.14
Dehydration	54	77.14
Ascites	6	8.57
Oedema	3	4.15
Jaundice	6	8.57
Virchow's gland	5	7.14
Umbilical nodule	2	2.85
Subcutaneous nodule	1	1.42
Trousseau's sign	1	1.42
Visible peristalsis	21	30.0
Palpable mass	27	38.57
Succussion splash	42	60.0

Table-II shows that anaemia and weight loss were present in all cases (97.14%), Dehydration of some degree was present in 77.14% patients, palpable mass in 58.69%, ascities 8.57% and oedema in 8.57%, jaundice in 4.16%, tenderness in epigastrium in 5%, visible peristalsis in 30%, positive succussion splash in 60%. Trousseau's sign in 1.13%.

All routine investigations were done with special attention to haematological percent, ESR and x-ray chest, urine R/M/E shows Hb%- within 41-50% were 69.44% cases. Below 40% Hb were 13.8%, ESR above 33 (95.55%) cases, no chest involvement urine abnormality.

Endoscopic examination of stomach and duodenum-

Out of 70 cases in the present study, endoscopic examination was done in all cases. 34 cases showed presence of growth at the antrum, 15 cases at the body, 8 cases at the fundus and 6 case at the cardiac end of stomach and 7 cases ulcerative lesion at the antrum and body. Biopsy taken during endoscopic examination was sent for histopathological examination. USG was done to detect intra-abdominal metastasis, hepatic lesion in 08 cases (11.42%). Ascites 6(8.57%) and enlarged regional lymph node 32(45.71%) were found, 21(30%) patients had normal findings on USG. 3 patients had misssed there USG report.

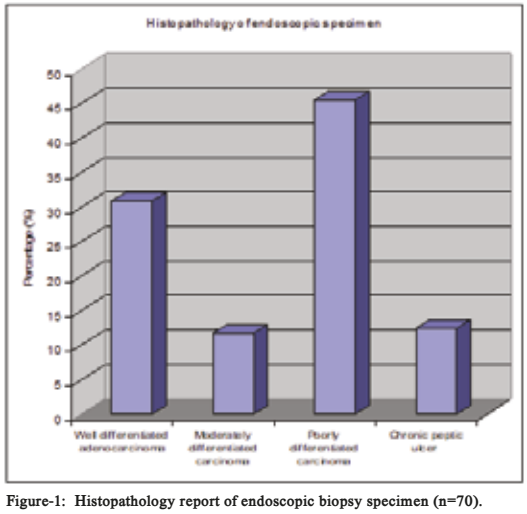

Figure-1: Histopathology report of endoscopic biopsy specimen (n=70).

Here the peroperative findings were shown 60 cases out of 70 cases. 45 cases out of 60 were taken from department of surgery, 15 cases were taken from radiotherapy department. Operative findings of this 15 cases operated outside DMCH were collected from discharge paper.

Table-III: Peroperative findings (n=60)

Laparotomy findings	No. of patients	Percentage (%)
Mobile growth involving the serosa	31	51.66
Fixed growth to the posterior abdominal wall	21	35.00
Ascites	6	10.0
Involvement of regional lymph nodes	57	95.00

Laparotomy findings	No. of patients	Percentage (%)
Involvement of liver	8	13.33
Discrete peritoneal seeding	3	5.0
Involvement of pelvic peritoneum	3	5.0
Location of primary tumour		
Antrum	33	55.0
Body fundus	21	35.0
Cardiac	6	10.0

Table-IV: Histopathology of resected specimen/biopsy (n=60).

Histopathological report	Number of patients	Blood group				Percentage (%)
		A	B	O	AB	
Adenocarcinoma	57	22	28	5	2	95
Squamous cell carcinoma	3	2	1	0	0	5

In this series, out of 70 patients 60 were operated and sent for biopsy, 57 (95%) were adenocarcinoma, 3(5%) squamous cell carcinoma.Out of total number of 70 patients 60 patients were operated, So, in 60(95%) patients histopathologically were found as adenocarcinoma and 5% squamous cell carcinoma. This 5% cases involved cardiac end of the stomach. Possibly this 5% growth develop from lower end of the esophagus-extending and involving the cardiac end of the stomach.

Table-V: Relation of ABO blood group degree of differentiation of adenocarcinoma (n=67).

Blood group	Well differentiated	Moderately differentiated	Poorly differentiated
A	11 (16.41%)	2 (2.98%)	9 (13.43%)
B	9 (13.43%)	2 (2.98%)	18 (26.86%)
O	4 (5.97%)	3 (4.27%)	4 (5.97%)
AB	1 (1.49%)	3 (4.47%)	1 (1.49%)

B group is worse and more in poorly differentiated about 26.86% and A group is more well differentiated 16.41% rest.

This series, surgery was done in 60 out of 70 patients (including laparotomy and biopsy, palliative surgery and curative resection). Among these patients growth was resectable in 43.33% cases and remaining 50% cases growth was unresectable. Among the non-resectable group some form of palliative surgery (by pass) was done in 49% cases, and remaining 6.67% cases no surgical treatment was done. Conservative treatment chemotherapy and radiotherapy were given 14.28%.

Discussion:

From clinical practice it is quite evident that the incidence of this diseases is also significantly high in Bangladesh but no data about the incidence is available. In a country like us, it is very difficult to diagnose gastric cancer at an early stage by implementing mass screening program (Moreover it will not be cost effective in countries where gastric cancer incidence not so high as in Japan). In this study, it was evident that, (In our country) most of the patient coming to the hospital in a very advanced stage, when there is very little to be done for them.

In the present study, 70 cases were studied which were diagnosed as carcinoma of stomach and 45 cases had been admitted into surgical units of Dhaka Medical College Hospital and rest 25 patients from radiotherapy in Dhaka Medical College Hospital. We have tried to detect mode of clinical presentation and preoperative staging by some imaging studies within our limited resources and correlated this with the operative findings and degree of differentiation of the carcinoma stomach and ABO blood group.

Age and sex factors

Age and sex were important factors for incidence and the time of presentation of the disease. It may occur at any age but rare before the age of 30 years. In this study 61 cases (84.72%) were found in between 40 to 60 years of age, 8 cases (11.11%) below 40 years and 3 cases (4.16%) beyond 60 years of age. Only one case was found at the age of 27 years. Most of the cases were between 41-60 years age group[21]. So age is one of the determining factor of presentation as well as planning of treatment. Here this study also correlates with these findings. Overall males are three times more commonly affected than female. In this study it is found. Male: Female: 4:1.

Family history

Genetic make-up passively have some relation with gastric cancer, but it is not well established. In the present series, out of 70 cases only 8(11.42%) had positive family history of gastric carcinoma. Among the 8 cases 6 cases had same blood group 'A' and 2 cases had blood group 'O'.

Blood group

Aird[12] found a higher incidence of gastric carcinoma in people with blood group 'A'. In this series highest incidence of gastric carcinoma was found in blood group 'B' i.e. 30 cases (42.85%) and the next blood group was 'A', 24 cases (34.28%), O 11(15.71%), AB 5(7.14%). Yet not established the ABO blood group A, B is the risk factor for ca-stomach.

Presentation

Carcinoma stomach is a very difficult disease to diagnose early, not only because of the diversity of its presentation, but also because of the time lag between the commencement of the growth and the appearance of symptoms. All patients in this series came with symptoms and were admitted in hospital as suspected case of carcinoma except two patients who were admitted from emergency as acute abdomen due to perforation of hollow viscus.

In the present series, 70 cases were studied. Out of 70 cases, 68 (97.14%) cases complained of epigastric discomfort, 42 (60%) cases noticed epigastric pain, 65 (92.85%) cases anorexia, 65 (92.85%) cases developed loss of appetite, 70 (100%) cases lost their weight,

68 (98.57%) cases developed vomiting, 5 (7.14%) cases complained of dysphagia, 31 (44.28%) cases noticed lump, haematemesis and melaena developed in 7 (10%) cases. Fatigue and tiredness was present in 49 (70%) cases.

Physical findings- Mount ford[22] found approximately 60% of the patients have palpable mass in the upper abdomen indicating advanced growth and 41% patients present with anaemia. In the present series 66% patients showed epigastric tenderness, 58.69% palpable mass, 97.14% patients with anaemia, 8.57% patients with ascites, 8.57% patients with jaundice, 7.54% patients with Virchow's gland, 11.11% with enlarged hard liver. Generally patients of gastric carcinoma presents with anaemia in 97.22% cases, raised ESR in 80% of cases.

Gastroscopic findings

Gastroduodenoscopy is a valuable aid in the diagnosis of early cases of gastric cancer. It is evident that endoscopy with biopsy is much more efficient than roentgenography in detecting minute gastric cancers and is currently to be over 90 percent accurate in diagnosing advanced gastric cancer. Grossen ManMB[23] showed, distribution of the primary site of malignant gastric tumours in 200 surgical specimen about 48.5% in antrum, 18% in body, 12% in fundus, 4.5% in cardia, 8.6% diffuse and 3.5% in multile site. Almost half occur in the distal antral region of the stomach. Now the proximal stomach is the most common site of gastric cancer in the UK, but carcinoma of the distal and body of the stomach is most common in low socioeconomic group.Of the 70 patient in this series, 34 patients showed presence of growth in antrum, 23 body and fundus, 6 cardiac.

Histopathologic result of endoscopic biopsy reveals adenocarcinoma in 63(90%). Among this 31(44.28%) poorly differentiated, 11.42% moderately differentiated and 30% well-differentiated adenocarcinoma were found. 7(10%) cases shows chronic peptic ulcer, this 10% after laparotomy and specimen/biopsy histopathology proved to be adenocarcinoma.So in a significant number of patients endoscopic biopsy and histopathology may not reflect the true disease. Status resulting high percentage of false negative results. So in clinically and endoscopically suspected cases if endoscopic biopsy histopathology report are found in consistent, then re-endoscopy and biopsy should be considered to achieve the correct diagnosis.

Operative staging and surgical treatment

Nodal status in gastric carcinoma is not only related to prognosis but also to the extent of nodal dissection. Nodal status can be diagnosed early by Frozen section, involved lymph nodes often over looked Sentinel lymph node mapping was accurate in predicting nodal status in patients with early stage gastric cancer.Total gastrectomy with D_2 dissection is the standard treatment in Japan for early upper third gastric cancer. But it is shown that proximal gastrectomy for early upper third gastric cancer can be performed safely with an excellent cure rate.In this series, out of 70 patients, 60(85.71%) were underwent surgery. Rest 10(14.27%) were treated conservatively. Among these none in stage I and II, 28 cases (39.31%) in stage III, 14 cases (30%) in stage IV were found peroperatively. Unfortunately, the vast majority of patients seen outside Japan with advanced gastric cancer. In over 50 percent of patients, the tumour is no longer localized when first identified and gastric resection is only moderately beneficial in most of their cases. However, as was true in Billroth's time, surgical resection of the growth with healthy margin is still the method of choice to give benefit to resectable cases. Though majority of our patients of carcinoma stomach present to us at advanced stage exploration was done in all the cases for possible palliation and to do preoperative staging as well.

328 patients were reviewed retrospectively with Histologically confirmed gastric adenocarcinoma diagnosed by Cunningham D, Hde D,[24] between 1974 and 1984. Of these patients, 128 (39%) had a curative resection, 32 (9.8%) had palliative resection, 33 (10%) had a gastrojejunostomy, 26 (79%) had a elestin tube inserted, 38(17.7%) had lapartomy alone, 51 had no surgical proceures. In this series 60 patients out 70 patients underwent operative treatment finding shows-involvement of regional lymph node were in 95% cases, ascites in 10% cases, liver involvement in 13.33% cases, discrete peritoneal seedling in 5% of case and involvement of pelvic peritoneum were in 5% of cases. Location of the primary tumour antrum 55% boody fundus 235% cardiac 10%.

Histopathology

Microscopically, nearly all gastric cancers were of the adenocarcinoma type varying only in the degree of differentation. Pathological staging of carcinoma stomach depends on essential part of the operative strategy and histopathological reports from resected specimen[25] showed 3 cases (3.4%) in stage-I, 23 cases (26.4%) in stage-III, 25 cases (28.7%) in stage-III, 36 cases (41.3%) in stage IV among 87 cases.In this series 95% patients had adenocarcinoma. 5% squamous cell carcinoma, among the adenocarcinoma 57(95%) cases, Poorly differentiated were found in 53.33%, moderately differentiated in 14.92%, and well differentiated 37.31%. It is generally agreed that, the prognosis is worse in the poorly differentiated adenocarcianoma and the relationship of AB0 blood group that well differentiated adenocarcinoma, A (16.42%), B-13.43%, O- 5.97%, poorly differentiated adenocarcinoma, B– 26.86%, A – 13.43%, O- 5.97%, AB-1.49%. Among the squamous cell carcinoma 5% cases shows 2(66.66%) cases were A group and 1(33.33%) were B group. Extent of association & risk factor was not established that AB0 blood group and carcinoma stomach. This series blood group B predominant risk factor of

development of poorly differentiated adenocarcinoma A was the well differentiated carcinoma. May this relationship defends on race and geographic variations and not to correlate with the establish risk factor of A blood group.

Conclusion:

Carcinoma stomach is one of the commonest malignant disease with high mortality. The only treatment modality to cure the disease is a radical resection followed by chemotherapy. So, if the disease can be detected at an early stage, a better result can be obtained. But most of the cases in our country are diagnosed at an advanced stage. So the identification of risk factors is very important. This study was targeted to identify the relationship of ABO blood group with carcinoma stomach and also its relationship with clinical staging. In western countries blood group 'A' has an established relationship with carcinoma stomach. In this study it is found that blood group 'B' is more associated with carcinoma stomach and with poorly differentiated adenocarcinoma. But the relationship is not yet established in our country. So, we suggest a larger study to be performed including all possible cases of carcinoma stomach in all the Medical College Hospitals and Medical Institutes.

Conflict of Interest: None.

Acknowledgement:

I owe my heartfelt gratitude and indebtedness to Prof. Md. Omar Ali, FCPS, Professor of Surgery, Dhaka Medical College Hospital for his valuable guidance, suggestion and supervision in preparing this dissertation work. I am grateful to Dr. Saifullah, Assistant Professor of Surgery, Dhaka Medical College Hospital, for his kind cooperation, constant inspiration and valuable suggestions for this work. I extend my gratitude to R/S. Radiotherapy Department of Radiotherapy for his help. I wish to offer my sincere thanks and gratitude to all the registrars and assistant registrars of surgical unit of DMCH, Dhaka for their active help and cooperation throughout this study. My thanks for staff of surgical ward, operation theatre and relevant department for their sincere cooperation. The library staff of DMCH, and BSMMU, Dhaka, deserves my sincerest thanks for helping me with reference.

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ORIGINAL ARTICLE OPEN ACCESS

Causes of Hoarseness of Voice Based on Fiber Optic Laryngoscopy (FOL): Our Experiences in ENT OPD of a Peripheral Military Hospital

Mohammad Misbah Al Kabir Sumon[*1], Abu Hasanat Md Habibur Rahman[2], Sultana Dil Afsana[3], Md Belal Hossain[4]

Abstract

Introduction: *This study was aimed to determine the common causes of hoarseness of voice in ENT OPD of a military hospital.* ***Materials and Methods:*** *This was an observational study carried out on 93 patients presented with hoarseness of voice in ENT OPD CMH Momenshahi, a peripheral military hospital, for a period of 2 years, from 1st April 2017 to 30th April 2019. Only Fiber Optic Laryngoscopy (FOL) findings were evaluated to diagnose the causes of hoarseness. Data were obtained from FOL findings documentation register. All data were analyzed using IBM SPSS version 25.0. Patients consent was taken.* ***Results:*** *Total 93 cases were studied irrespective of age and sex. Among them 34 (36.60%) were males and 59 (63.40%) were females. Commonly affected age group was 21-30 years. With a mean age of 33.34 years. Majority of the cases were housewife 44 (44.10%). The most common cause of hoarseness was Chronic Laryngitis 25 (26.9%). The other causes were vocal polyp 17 (18.30%), VC nodule 13 (14%), Incomplete Glottal closure 14 (18.30%), leukoplakia of VC 5 (5.40%) and Vocal cord palsy 3 (3.20%). Normal findings were found in 11 (11.80%) cases.* ***Conclusion:*** *Hoarseness is a common symptom of laryngeal dysfunction. Military personnel are frequently affected like general population. Common causes are almost same with a very few variations. FOL should be the basic tool to diagnose the causes of hoarseness.*

Keywords: *Hoarseness, Fiber Optic Laryngoscopy (FOL), Military personnel, Military hospital, Stroboscopy.*

Number of Tables: *05;* ***Number of References:*** *20;* ***Number of Correspondences:*** *03.*

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Introduction:

Hoarseness of voice is the most common symptom of laryngeal disorder. Voice disorders afflict approximately 6% of children under 14 years of age, and 3-9% of the adult population[1]. Fiber Optic Laryngoscopy (FOL) or Videolaryngoscopy, either with a rigid 70 or 90 degree Hopkins telescope allows an excellent view of the larynx through a transoral approach and produces a much higher optical resolution and higher sensitivity for detailed assessment of phonation[2]. Broadly voice disorders are grouped into organic disorders and functional disorders. The commonest of them are organic disorders.

Organic lesions are associated with structural changes of the vocalization system which may be due to malformation, traumatic, inflammatory or infectious, and neoplastic etiologies[3]. In Functional dysphonia (aphonia/psychogenic dysphonia/hyper or hypo functional dysphonia) there is no significant organic changes that affect the vocal structures[4]. Neurologic dysphonia results from lesion in the central or peripheral nervous system that affect innervation and muscular control of the vocalization system[3,4]. A significant number of military personnel and their families present with hoarseness of voice in military hospitals. No single study is available regarding the prevalence of various causes of hoarseness among the military personnel. In this study the FOL findings of vocal cords are used to find the causes of hoarseness of voice among the military personnel and their families in a peripheral military hospital.

Materials and Methods:

This was an observational study carried out on 93 patients presented with hoarseness of voice for more than 06 weeks of time in ENT OPD, Combined Military Hospital (CMH) Momenshahi, from 1st April 2017 to 30th April 2019, for a period of 2 years. CMH Momenshahi is a peripheral military hospital with limited facilities. After taking history and clinical examinations all patient were evaluated by Fiber Optic Laryngoscopy (FOL) and findings were documented in prescribed form. 70 degree Hopkins Rod (CARL STORZ) was used in every cases and all FOL procedure were done by same ENT specialist. In this study we included all the patients of

Received: 20 October 2020 *Accepted revised version:* 16 January 2021

chronic hoarseness (> 06 weeks) irrespective of age and sex. We excluded the acute cases of hoarseness (< 06 weeks) and also the diagnosed cases who reported for review. We considered only the findings of FOL to diagnose the causes of hoarseness. In patient with hoarseness of voice with no visible obvious lesion, Stroboscopy is the best tool to study mucosal wave pattern of vocal cords. But as this facility was not available in our CMH we could not do it. The statistical analysis was done by using IBM SPSS version 25.0. Patients consent were taken. Ethical clearance was also approved.

Results:

Our total cases were 93 irrespective of age and sex. Among them 34 (36.60%) were males and 59 (63.40%) were females with a Male to Female ratio of 1 : 1.73 (Table-I).

Table-I: Sex distribution amongst study patients (n=93).

Sex	Frequency (n)	Percent
Male	34	36.6
Female	59	63.4
Total	**93**	**100.0**

Most of the patients were in the age group of 21–30 years 32 (34.40%) followed by 19 (20.40%) in 31-40 years age group. only 3 (3.20%) belong to the age group of <10 years. Mean age of the patient was 33.34 years (Table-II). Minimum age affected was 5 years and maximum age was 70 years.

Table-II: Age distribution of the study patients (n=93).

Age interval (years)	Frequency (n)	Percent
<10	3	3.2
11-20	15	16.1
21-30	32	34.4
31-40	19	20.4
41-50	6	6.5
51-60	9	9.7
61-70	8	8.6
>70	0	1.1
Total	**93**	**100.0**

Considering the occupation (Table-III) majority of the patients were housewife 44 (44.10%). 11 (11.80%) were teacher and Military personnel were 14 (15.10%).

Table-III: Distribution of relation between causes of hoarseness and occupation (n=93).

Disease	Occupation of participants					Total
	Military Service	Housewife	Teacher	Student	Others	
Normal	1	9	0	0	1	11
VC Polyp	3	6	3	2	3	17
VC nodule	0	2	7	4	0	13
Chronic Laryngitis	6	11	1	2	5	25
GORD	0	4	0	0	0	4
Leukoplakia VC	2	0	0	0	3	5
Incomplete glottal closure	2	8	0	4	1	15
VC palsy	0	1	0	0	2	3
Total	14	41	11	12	15	93
Percentage	15.10%	44.10%	11.80%	12.90%	16.10%	100%

Table-IV showed the causes of hoarseness as per gender distribution. The most common cause of hoarseness was Chronic Laryngitis 25 (26.9%) with a negligible male dominance (13/12). The second commonest cause was vocal polyp 17 (18.30%) with slight female dominance (9/8). Other causes were VC nodule 13 (14%) with female dominance (12/1), Incomplete Glottal closure 14 (18.30%), leukoplakia of VC 5 (5.40%) and Vocal cord palsy 3 (3.20%). Normal findings were found in 11 (11.80%) cases.

Table-IV: Distribution of causes of hoarseness among patients (n-93).

FOL findings	Male	Female	Frequency	Percent
Normal	2	9	11	11.8
VC Polyp	8	9	17	18.3
VC nodule	1	12	13	14.0
Chronic Laryngitis	13	12	25	26.9
GORD	0	4	4	4.3
Leukoplakia VC	5	0	5	5.4
Incomplete glottal closure	3	12	15	16.1
VC palsy	2	1	3	3.2
Total	34	59	93	100.0

Table-V: Distribution of incomplete glottal closure as a cause of hoarseness among different age groups.

Cause of hoarseness among different age groups						
	Age interval					Total
	<10	11-20	21-30	31-40	41-50	
Male	1	2	0	0	0	3
Female	0	3	5	3	1	12
Total	1	5	5	3	1	15

Discussion:

Hoarseness of voice means a change in the quality voice. Basic mechanism of hoarseness are insufficient glottic closure during phonation, changes in the vocal fold stiffness and imbalance in mechanical properties between the two folds. Fiber Optic Laryngoscopy (FOL) is a very useful tool to detect various causes of hoarseness of voice. In addition Stroboscopy is the best tool to study mucosal wave pattern of vocal cord in patient of hoarseness of voice in whom no obvious lesion is seen. We just considered the FOL findings to find out the common causes of hoarseness of voice among military personnel and their families.

In our study, average age group was 21 –30 years (Table-II) which is similar to studies of Adegbiji W.A et al[5] and Nirupama Moran[6] but in other studies average age group was between 4th and 6th decade[7,8]. This difference may be due to the fact that military personnel are younger people who are physically more active and use their vocal skills more than other age groups. Male to female ratio was 1:1.70 in our study which differs from other studies[5,6,7,8] where there was male dominance. No specific cause was found behind this observation.

High prevalence of hoarseness of voice were observed among housewives 41(41.10%), teachers 11(11.80%) and

also in military personnel 14(15.10%) in our study (Table-III). Hoarseness is known to be due excessive vocal use or abuse which is common with housewives, teachers, etc. This observations in our study are similar to other reports[5,9]. In our study the most common cause of hoarseness was chronic laryngitis 25 (26.90%) which is similar to the study by Nirupama Moran[6] (35.29%) and Baitha S et al[11] (43.63%). Adegbiji W.A et al[5] and Dagli M, et al[10] found acute laryngitis as the most common cause and chronic laryngitis as 2nd most common causes of hoarseness. It differs from our study as we excluded all acute causes of hoarseness.

In our study the second and third commonest causes of hoarseness were vocal cord polyp 17(18.30%) and vocal cord nodule 13(14%) respectively which are almost similar to other documented studies[5-13].

Adegbiji W.A et al[5] documented vocal nodules as the third commonest cause of hoarseness in their study. Munjal M et al[7] found vocal nodule as their most common causes of hoarseness in 20% of cases. In their studies Ramesh kumar E et al[8] and Ghosh et al[13] showed vocal nodules as the most common cause. Banjara et al[12] also mentioned vocal nodule (11.95%) as the 2nd most common etiology. Female in the younger to middle age had maximum number of vocal nodules. Vocal abuse or misuse leading to phonotrauma considered to be the cause of vocal cord nodules. In our study vocal cord nodules (Table-IV) were also predominant in females (12 out of 13 cases) especially in housewives because their vocal abuse or misuse while dealing with their children in house. Sex distribution of vocal cord polyp was almost equal (8/9).

In our study we documented normal findings in 11(11.80%) cases. Munjal M et al.[7] showed normal study in 27% of cases. Banjara et al[12] mentioned functional lesions (16.33%) to be most common etiology in their study. Adegbiji W. A et al[5] in their study, showed all the patients with normal findings as secondary to psychogenic types. In functional dysphonia there is no organic abnormality in the patients. We also found the same in our study but we couldn't levelled those cases with normal finding as functional dysphonia because without stroboscopic findings it not possible for us to consider them as normal/functional dysphonia. Further evaluation is required in those cases.

Munjal M et al.[7] showed 10% vocal cord palsy. Baitha[11] documented 9.09% vocal cord palsy. Banjara et al[12] mentioned vocal palsy (11.16%) but in our study only 3(3.20%) cases showed vocal cord palsy. We didn't find any specific cause behind this but our observation is that number of elderly age group patients, who are frequently develop vocal cord palsy, is less amongst military personnel. Vocal cord carcinoma or growth is also less due to the above reason in our study.

We observed incomplete glottic closure or phonatory gap in 15(16.10%) cases and mostly in female (13/15). Commonly affected age group is between 11-30 years (Table: V).

Glottal closure refers to the extent of vocal fold closure during the closed phase of phonation. Stroboscopic evaluation of the vocal folds is used to assess glottal configuration and closure during phonation. Gender & age, changes in pitch, loudness, vocal register, phonemic variations, and prosodic emphasis have an effect on glottal configuration during phonation[14,15,16]. Most common glottal configuration are complete closure, posterior glottal chink, spindle shape, hourglass configuration, irregular closure, incomplete closure & anterior glottal chink[15,17,18]. Casper et al. caution that in the absence of vocal fold pathologies, the difference between a normal larynx and one that is thought to be the cause of a voice disorder is indeed difficult to assess with use of stroboscopy alone[19]. A comparison of vocal fold closure in Rigid Telescopic and Flexible Fiberoptic Laryngostroboscopy showed that the estimated degree of incomplete closure was significantly higher during rigid telescopy than during flexible fiberscopy and the difference was especially evident in soft phonation. The degree of incomplete closure decreased significantly with increased loudness, regardless of method[20]. Stroboscopic examination, which lacks in our study, is recommended for detail evaluation of glottal closure.

Conclusion:

Hoarseness of voice has a great impact on individual's personal and social life. For armed forces personnel who are always remain active and need special voice demand for their nature of duties, it is very important for them to be diagnosed as early as possible. Fiber Optic Laryngoscopy (FOL) facility should be available in every ENT OPD for early detection of various causes of hoarseness of voice.

Conflict of Interest: None.

Acknowledgement:

We are utmost grateful to all of our fellow colleagues of CMH Momenshahi and all the patients who participated in our study.

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ORIGINAL ARTICLE OPEN ACCESS

Spinal Tumor Surgery- Our Experiences of 35 Cases in a Peripheral Hospital in Bangladesh

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Abstract

Introduction: *Surgical outcome of spinal tumour varies depending on a number of factors such as: site of the tumour, compression within the spinal canal, the histological characteristics of the tumour, the neurological progression and initial response to corticosteroid therapy, patient's age, comorbidity, tumour extension, involvement of neighboring structures and organs etc.* ***Materials & Methods:*** *The 35 patients with spinal tumour underwent surgery by our team in 10 years (January 2009 - December 2018) were reviewed retrospectively.* ***Results:*** *Analysis of the surgical outcome of our spinal tumour patients was done on different variables like age, sex, presenting symptoms, neuroimaging, comorbidities etc. The aim of surgery was decompression of the spinal cord, total removal of the tumour when possible and spinal stabilization when needed. Out of our 35 patients with spinal tumour, extradural tumour comprises 8, intradural extramedullary tumour 25 and intramedullary tumour 2.* ***Conclusion:*** *The aim of this study is to analyze the data to made conclusion for more effective strategy as per site, size, type, resectibility and histological variety to establish and effective treatment protocol and prevention of per-operative and post-operative complications. Intradural extramedullary tumour can be radically resected with no mortality and minimal peri-operative morbidity. But resection of intramedullary spinal tumour is difficult, hazardous and usually incomplete, so needs much more skilled and meticulous surgical hands.*

Keywords: *Spinal tumours, Spinal cord compression, Surgical outcome, Intramedullay, Extramedullary.*

Number of Tables: *08;* ***Number of References:*** *30;* ***Number of Correspondence:*** *03.*

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Introduction:

Surgical outcome of spinal tumours varies depending on a number of factors such as: site of tumour, compression within the spinal canal, the histological characteristics of tumour, the neurological progression and initial response to corticosteroid therapy, patient's age, comorbidity, tumour extension, involvement of neighboring structures and organs etc. Treatment of spine and spinal cord tumour is complex and a multidisciplinary approach is required[1]. Treatment options are surgery, radiation therapy and chemotherapy[2]. This study was conducted to analyze factors with impact on the functional outcome in a series of 35 surgically treated patients with spinal tumour and to point out the characteristics of the different histological entities. The signs and symptoms of intradural extramedullary tumour are not specific to tumours and are similar to those caused by any spinal disorder that produces symptoms of spinal cord or nerve root compression. Because of the slow growth of these tumours, symptoms may be subtle and progress slowly overtime before diagnosis[3]. The benign nature of ordinary spinal schwannomas is well documented[4-7]. Total surgical removal can usually be achieved and shortterm outcome is favorable in those who are not too severely crippled before operation[5,7].

Intradural-extramedullary (ID-EM) tumours are the most commonly observed intradural spinal tumours, comprising over 60% of tumours found within the spinal canal[8]. While consisting of a heterogeneous group of pathological entities, the vast majority of these lesions are one of three types: meningiomas, schwannoma or neurofibroma[9]. Fortunately, the more common tumours are typically benign and surgical excision represents the possibility of a curative result[10]. Surgical outcomes have generally been quite

Received: 14 October 2020 *Accepted revised version:* 09 February 2021

positive, with multiple studies quoting gross total resection rates approaching 100% with minimal morbidity and mortality regardless of histologic subtype[11,12].

Materials & Methods:

A descriptive cross sectional study was conducted from January 2009 to December 2018 where 35 patients with spinal tumour underwent surgery by our team, among those 19 were male and 16 were female in were reviewed retrospectively.

Results:

Table-I: (Distribution of the patients: (According to the site).

Site	No of Patients
Extradural (ED)	08 (22.85%)
Intradural extramedullary (IDEM)	25 (71.42%)
Intramedullary (IM)	02 (5.71%)

Table-II: (Distribution of the patient according to age).

Age	No of Patients
<20	04 (11.43%)
21-40	17 (48.57%)
41-60	10 (28.57%)
61-80	04 (11.43%)

Table-III: (Distribution of the patient according to sex).

Sex	No of Patients
Male	19 (54.28%)
Female	16 (45.72%)

Table –IV: (Distribution of the patient according to the region in the spinal column).

Region in the spinal column	No of Patients
Cervical	09 (25.71%)
Dorsal	18 (51.43%)
Lumbar	07 (20%)
Sacral	02 (5.71%)
Conus	01(2.85%)

Table-V: (Distribution of the patient according to the sypmtoms).

Presenting symptoms	No of Patients
Pain	35 (100%)
Numbness	30 (94.28%)
Paraparesis	18 (51.43%)
Paraplegia	05 (14.28%)
Quadriparesis	09 (25.71%)
Cauda equine syndrome	02 (5.71%)

Neuro-imaging

Plain X-ray 35 (100%)

MRI 35 (100%)

The aim of surgery was decompression of the spinal cord, total removal of the tumour when possible and spinal stabilization when needed. Most of the cases were done by laminectomy or laminoplasty.

Many factors have influenced the outcome of surgical treatment. The most important are the histological characteristics of tumour, spinal segment affected and the degree of decompression.

Table-VI:

Histological characters	No of Patients
Schwannoma	14 (40%)
Meningioma	7 (20%)
Ependymoma	2 (5.71%)
Chordoma	2 (5.71%)
Metastatic (adenocarcinoma)	2 (5.71%)
Ganglioglioma	1 (2.86%)
Hemangioma	1 (2.86%)
Arachnoid cyst	1 (2.86%)
Clear cell tumor	1 (2.86%)
Cavernoma	1(2.86%)
Plasma cell tumor	1(2.86%)
Neurofibroma	2 (5.71%)

Satisfactory postoperative outcome corresponds with the degree of decompression (e.g. total removal of meningioma or neurofibroma leads to full recovery), but decompression in cases of primary intramedullary tumours and metastases were not always satisfactory.

Extent of tumour resection:

Table-A

Surgical resection

Trait	Number (%)
Gross total	22 (62.86%)
Near total	08 (22.86%)
Subtotal	03 (8.57%)
Biopsy only	02 (5.71%)

Table-B

Clinical improvement

Trait	Number (%)
Immediate improvement	07 (20%)
Improvement at discharge (7 days)	12 (34.28%)
Improvement at first month follow-up	10 (28.57%)
No improvement	02 (5.71%)
Deterioration	03 (8.57%)
Death	01 (2.85%)

The most frequent difficulties encountered during surgery was the per operative bleeding, anesthetic hazard in previously pulmonary compromised patient etc.

Fig.-1: Intradural Extramedullary (IDEM) Spinal Tumour

Fig.-2: Per Operative finding of Intradural Extramedullary tuomor

Postoperative complications includes CSF leakage 2 (5.71%), Wound infection 1 (2.85%), Deformity 1(2.85%), Pneumonia 1(2.85%).

Discussion:

The optimal surgical approach provides maximal exposure with the least manipulation of the neural elements. For most intradural extramedullary tumours, resection can be accomplished with a midline approach. As a general rule, lesions dorsal to the spinal cord can be reached easily using a dorsal midline approach, whereas lesions ventral and lateral to the spinal cord may require resection to provide the best trajectory to the tumour[13]. In our study, the most of the patients were male19 (54.28%) and belong to the age group of 21-40 years 17 (48.57%). Similar scenario regarding age and sex was reported in Islam MR et al[2]. Our study presented with variable types of symptoms, among which pain contributes as 100% and numbness as 94.28%. In our study 18 cases were at dorsal spine involvement which was highest in location (51.42%). Regarding nature of tumour the most frequent cases were Schwannoma 14 (40%) followed by meningioma 7 (20%). The extent of tumour resection and decompression correlates directly with a good outcome. The extent of excision either incomplete or biopsy was found to positively correlate with postoperative improvement. In our study 22 cases (62.86%) were underwent operation with gross total removal of tumour, 08 cases (22.86%) were underwent operation with near-total removal of tumour, 03 cases (8.57%) were underwent operation with sub-total resection of tumour and in rest 02 cases (5.71%) only biopsy were taken. In our study 12 patients (34.28%) were discharged at 7th post-operative day with significant improvement. In 07 patients (20%) of our study, immediate postoperative improvement were observed. There was no post-operative improvement in 2 cases (5.71%), deterioration in 03 cases (8.57%) and 01 patients died (2.85%) due to severe cardiac complications. Post-operative complications varies from 10-50%[14-29]. In our study there were different type of post-operative complication like CSF leakage in 2 cases (5.71%), wound infection in 1 case (2.85%), deformity in 1 case (2.85%) and pneumonia in 1 case (2.85%).

Conclusion:

To achieve good surgical outcome, reduce postoperative mortality and peri-operative morbidity in case of spinal tumours, each neurosurgeon has to perform meticulous anatomical dissection mandatorily with modern sophisticated instruments like operating microscope. Besides this, early mobilization & rehabilitation are essential for good clinical outcome[30]. CSF leak and pseudomeningocele formation may be prevented with meticulous dural closure, fat grafting for obliteration of the dead space and 48 hours postoperative bed rest. Patients tend to completely recover their preoperative neurologic deficits even in the case of longstanding preoperative neurological deficit.

Conflict of Interest: None.

Acknowledgement:

Study was performed in the Department of Neurosurgery, Shaheed Sheikh Abu Naser Specialized Hospital, Khulna, Bangladesh.

All the patients were examined and reviewed separately with verbal and written consent.

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Short Term Complications of Acute Myocardial Infarction in a Tertiary Hospital

Md Nazrul Islam[*1], Sabikun Nahar Chowdhury[2], Md Sajjadur Rahman[3], Sk Moazzem Hossain[4]

Abstract

Introduction: *Acute myocardial infarction is very common in Bangladesh. It is one of the most common causes of mortality worldwide. The clinical course is associated with various complications.* ***Materials and Methods:*** *To assess the short-term outcome of acute coronary syndrome we select 100 patients. The study was conducted at the Medicine wards of Khulna Medical College Hospital, Khulna from February'2019 to August'2019. We observed the clinical presentations, ECG findings, echocardiographic findings, short term complications and outcome.* ***Results:*** *We found that most of the patients (61%) were within 45-64 years of age. Chest pain was the most common (85%) presentation. NSTEMI is more common than STEMI. 53% patients developed complications. Acute LVF is the most common (23%) complication. AV block is the most common arrythmia (10%). We found overall mortality 38%.* ***Conclusion:*** *Early detection of complications is essential for reduction of morbidity and mortality. This study will help to evaluate short-term complications and to give appropriate management.*

Keywords: *Infarction, Complications, NSTEMI, STEMI.*

Number of Tables: *05;* ***Number of References:*** *20;* ***Number of Correspondence:*** *05.*

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Introduction:

Coronary artery diseases (CAD) is a common cause of mortality worldwide[1] and within few years it will be first in the leading cause of disability[2]. Acute Myocardial Infarction (AMI) is the most common form of CAD. When there is rupture of an atherosclerotic plaque or there is erosion with superimposed thrombosis then acute occlusion of coronary artery occurs followed by myocardial infarction. Though AMI is very common in Bangladesh but advanced treatment of AMI (eg. thrombolytic therapies and PCI) is not available in every hospital, even in all tertiary level hospitals. As a result, various complications develop in these patients and many patients die. Numerous studies done in our country as well as in abroad shows that various complications may arise after an acute MI such as left ventricular failure, carcinogenic shock, heart block, arrhythmia, cardiac rupture and pericarditis[3-7]. This study was done to see the various complications and outcome of the patients of AMI admitted in a tertiary level hospital in Bangladesh.

Materials and Methods:

It is an Observational study. The study was conducted at the Medicine wards of Khulna Medical College Hospital, Khulna from February'2019 to August'2019. Patients with Acute Myocardial Infarction admitted in the Medicine wards of Khulna Medical College Hospital were taken.

Sampling method: Purposive sampling.

Inclusion criteria:

- Patients with Acute Myocardial infarction
- Age > 18 years
- Both male and female
- Voluntarily given consent.

Exclusion criteria:

- Not willing to give informed consent
- Patients with AMI having the following associations:
- Rheumatic and congenital heart diseases
- Chronic liver disease
- Chronic kidney disease
- Malignancy

Informed written consent was taken from the patient. All patients were interviewed by using standard questionnaire containing socio-demographic and relevant information about the study topic. General medical condition of the patients was evaluated through complete history, physical examination and help of investigations. Standard treatment of acute MI was given to all patients and they were followed up till discharge. After collection, data editing and clearing was done manually and prepared for data entry and analysis by using SPSS.

Received: 11 September 2020 *Accepted revised version:* 30 January 2021

Results:

Table I shows age distribution of patients with acute myocardial infarction. Out of 100 patients 29(29%) were in the age group of 55-64 years and 32(32%) were in the age group of 45-54 years. The mean age for AMI is 54.2±10.75 years.

Table-I: Age distribution.

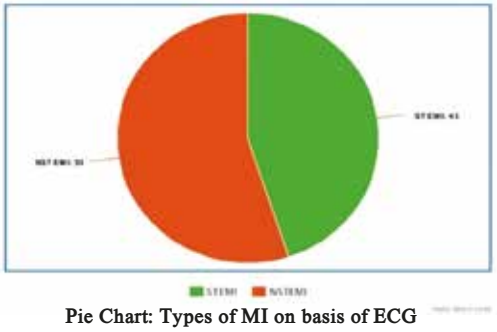
Age group	No (%)	Mean± SD
25-34	4 (4)	
35-44	15 (15)	
45-54	32 (32)	53±10.74
55-64	29 (29)	
65 and above	20 (20)	

Table II shows clinical presentation in AMI patients. Chest pain was the most common (85%) symptom reported. The second and third common symptoms were dyspnea (52%) and sweating (43%) respectively. Among other symptoms, anxiety was also found in significant number of patients.

Table-II: Clinical Presentation.

Manifestations	No	Percentage
Chest pain	85	85%
Dyspnea	52	52%
Sweating	43	43%
Nausea vomiting	38	38%
Anxiety	27	27%
Epigastric pain	12	12%

On the basis of ECG findings MI was divided into STEMI & NSTEMI. NSTEMI (55%) was more common than STEMI (45%).



Pie Chart: Types of MI on basis of ECG

Cardiac function was assessed by echocardiography. Systolic dysfunction was found in 33% cases, diastolic dysfunction in 15% cases and both systolic and diastolic dysfunction in 30% cases.

Table-III: Echocardiographic findings.

Echocardiographic findings	No	Percentage
Systolic dysfunction	33	33%
Diastolic dysfunction	15	15%
Both systolic and diastolic dysfunction	30	30%
Normal	22	22%

In our study 53% patients developed complications. Acute left ventricular failure was the most common complication 23%. Among other complications 17% developed arrythmia and 13% developed cardiogenic shock. Among the arrythmias atrioventricular block (AV block) was most common (10%). Other arrythmias include ventricular tachycardia (4), ventricular fibrillation (3).

Table-IV: Complications.

Complications	No	Percentage
Acute LVF	23	23%
Arrythmia	17	17%
Cardiogenic shock	13	13%
Post MI angina	09	09%
Thrombo-embolic phenomenon/ stroke	02	02%

Table-V: Types of arrythmia.

Types of arrhythmia	No	Percentage
Atrioventricular (AV) block	10	10%
Ventricular tachycardia (VT)	04	04%
Ventricular fibrillation (VF)	03	03%

Mortality is 38%.

Discussion:

This observational study was carried out on 100 cases of Acute Myocardial Infarction (AMI) admitted in the medicine wards of Khulna medical college hospital. Demography, clinical presentations, investigations and outcome were observed.

This study found that, most of the patients were in the age group of 45-54 years (32%). This finding is similar to a study by Islam M et al[8] in 2017 in Bangladesh and in other studies[9-10].

Chest pain was the most common symptom reported. The second and third most common symptoms were dyspnea and sweating respectively. Among other symptoms, anxiety was also found in significant number of patients. These findings correspond to several other studies[11-12].

ECG findings revealed that NSTEMI was more common (55%) than STEMI (45%). Similar finding was found in a study by Kjell Nikus et al[13]. Several studies reveals STEMI more common than NSTEMI[14-15].

Echocardiographic assessment of cardiac function shows Systolic dysfunction (33 %) both systolic and diastolic dysfunction (30%) diastolic dysfunction (15%). These findings are similar to findings in other studies[16-17].

Acute Left ventricular failure was the most common complications (23%), followed by arrythmia (17%) and cardiogenic shock (13%). Study also found that AV block was the most common arrythmia (10%) followed by VT (4%) and VF (3%). These complications correspond with other several studies[18-19].

In our study we found that mortality rate was 34%. This result is very similar to a study by Harvey D White[20].

Conclusion:

In Bangladesh advanced treatment of AMI (different thrombolytic therapies and PCI) is not available in every health care facility, even in all tertiary care hospitals. So due to delay in diagnosis and lack of availability of appropriate treatment various complications may develop and patients may die. Early detection of complications can reduce morbidity and mortality. Thus, this study may help physicians to be aware of short-term complications and taking essential management.

Conflict of Interest: None.

Acknowledgement:

I acknowledge the authors in my references and also my intern doctors helping me in data collection and data analysis.

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ORIGINAL ARTICLE OPEN ACCESS

Outcome of Dynamic Condylar Screw with Plate versus Distal Femoral Lock Compression Plate Fixation in Fracture of Distal Femur

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Abstract

Introduction: *The dynamic compression screw with plate implant used to treat fractures of the distal femur. The distal femoral lock compression plate fixation is designed as an alternative surgical option to treat these fractures. The objective of this study was to assess the comparative endurance of both devices. The objective of the study is to compare the outcome of DF-LCP and DCS fixation in distal femoral fractures.* ***Materials and Methods:*** *This prospective comparative study was conducted in the Department of Orthopaedics, Sylhet MAG Osmani Medical College Hospital, Sylhet between January 2011 and December 2012. Thirty patients with AO type 33-B and 33-C fracture were selected and were divided randomly into group-A and group-B by odd and even number. Dynamic condylar screw (DCS) fixation was used in group-A and distal femoral locking compression plate (DF-LCP) fixation in group-B.* ***Results:*** *DCS group [9 male, 6 female; mean age, 44.9 ± 12.9 years] and DF-LCP group [10 male, 5 female; mean age, 42.6 ± 15.7) years] were similar in age (p=0.660) and sex (p=0.705). The total operation (minutes) [92.3 ± 7.5 versus 90.4 ± 6.9; p=0.484], length of postoperative hospital stay (days) [6.0 ± 0.9 versus 5.9 ± 0.9; p=0.695] and union time (weeks) [20.6 ± 5.0 versus 18.7 ±3.3 weeks; p=0.238] did not differ significantly between two groups. Total complications [6 (40.0%) versus 4 (26.7%); p=0.439] was also similar in both groups. Functional outcome was excellent in 13.3%, good in 33.3%, fair in 33.3% and poor in 20.0% cases in DCS group; while excellent in 53.3%, good in 20.0% fair in 6.7% and poor in 20.0% of cases in DF-LCP group; different was not significant (p=0.080).* ***Conclusion:*** *Dynamic condylar screw with plate and distal femoral locking compression plate fixation are equally effective for achieving satisfactory union and functional outcome in AO type 33-B, 33-C fracture distal femur.*

Keywords: *Dynamic condylar screw, Locking compression plate, Distal femur fracture.*

Number of Tables: *03;* ***Number of References:*** *20;* ***Number of Correspondence:*** *08.*

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Introduction:

Distal femur fractures are typically complex, frequently comminuted and intra-articular, and they often involve osteoporotic bone. Understanding the inherent characteristics of distal femoral fracture as well as the principles and challenges of management is important in optimizing outcomes. Treatment goals are to restore axial alignment, anatomic reduction of the joint surface, minimize joint stiffness by allowing early mobilization, all with minimal soft-tissue disruption and to preserve the function of the extremity[1]. Surgical fixation has consistently demonstrated better outcomes than has nonsurgical management, including improved alignment, union, knee motion, and functional outcome[1,2].

Goals for treatment of distal femoral fractures of AO type 33-B (partial articular) and 33-C (complete articular) are anatomical alignment, stable fixation, rapid mobilization and early functional rehabilitation of the knee. Open reduction and internal fixation of these difficult fractures are justified only if (I) the joint surfaces can be restored anatomically, (II) fixation is sufficiently rigid that external immobilization is not required and (III) rigidity of fixation is sufficient to allow early and active motion of the knee joint[3]. As orthopaedic surgery has evolved, trends in treatment of supracondylar and intercondylar femoral fractures now more commonly involve operative management[4].

Dynamic condylar screw provides freedom in the plane of flexion and extension, hence is technically less demanding than fixed angle

Received: 20 September 2020 *Accepted revised version:* 21 November 2020

device. It provides interfragmentary compression and also gives good purchase in osteoporotic bone[3]. Dynamic condylar screw fixation for distal femoral fractures achieves better functional outcomes and lower complication rates[1,18].

Distal femoral locking compression plate (DF-LCP) allows both locking and compression screw fixation. Locking condylar plate fixation is indicated for intrarticular and extraaricular condylar fractures, buttressing of multi-fragmentary distal femoral fractures, bridging of high comminuted distal femoral fractures and treatment of distal femoral malunion[5,16,17]. Several studies showed a lower revision rate, less deformity and better morbidity in patients with distal femoral fractures treated by DF-LCP[6,7,20].

Though many centres throughout the world are practicing DF-LCP for fixation but less effort is observed in our country to evaluate the outcome of intercondylar fracture of femur fixation with DF-LCP in comparison to fixation by DCS and Plate. The distinction between DCS and DF-LCP fixation in AO type 33-B, 33-C fractures naturally lead to the question of which achieves the best outcome. If the functional outcome of the DF-LCP fixation in spite of some limitations overshadows the outcome of fixation by DCS and Plate in AO-type 33-B, 33-C fractures, and then it will end the therapeutic dilemma in our orthopaedic arena regarding the treatment of displaced, intraarticular distal fractures of femur. This study was designed to compare the outcome of DF-LCP and DCS fixation for AO type 33-B, 33-C fracture of the distal femur[19].

Materials and Methods:

This prospective comparative study was conducted in the Department of Orthopaedics, Sylhet MAG Osmani Medical College Hospital, Sylhet during the period between January 2011 and December 2012. Thirty patients with closed fractures distal femur fracture were included. Inclusion criteria were (1) intercondylar fracture of distal femur (AO type 33-B and 33-C fractures) within 3 weeks of injury, (2) aged between 18 and 90 years irrespective of sex, (3) polytrauma, (4) osteoporotic fractures, (5) ambulant patients (all patients had independent walking capability with or without a walking aid before fracture) and (6) prove consent to enrolled in the study. Exclusion Criteria were (1) other type of intercondylar fractures except AO type 33-B, 33-C, (2) AO type 33-B3 and 33-C3, (3) pathological fracture except osteoporosis and (4) presence of infection. Diagnosis of AO type 33-B and 33-C fractures were confirmed by X-ray of the affected thigh including the knee joint anterio-posteror (A/P) and lateral views and in some cases by CT scan of the knee.

Procedure of data collection

All patients with history of Road Traffic Accident (RTA) or simple fall were evaluated from history clinical examination and radiological investigations. Selection criteria were applied and those who fulfilled the inclusion criteria were included in this study. In this way 30 patients with intercondylar fracture of distal femur (AO type 33-B and 33-C fractures) were selected. They were divided randomly into group-A and group-B each comprised 15 patients. Every odd number of patient was taken as group-A and even number was taken as group-B. DCS fixation was done in patients of group-A and DF-LCP fixation in group-B. All patients were examined and declared fit by the anesthetists for fixation of intercondylar fractures of distal femur. After proper antibiotic prophylaxis (Preoperatively cefuroxime 1.5 gm I/V followed by 750mg I/V 8 hourly for 3 doses and then orally 500mg 12 hourly for 5 days) DCS and DF-LCP fixation was done via lateral parapatellar (Modified Swashbuckler) approach using the recommended surgical technique for each implant. For DCS surgery, at the junction of anterior 1/3rd and posterior 2/3rd of the longest AP dimension, a K-wire was inserted perpendicular to the lateral condyle of the femur. K-wire in the joint and the patellar groove was used as a guide. A lag screw, with the required length was inserted over the guide K-wire. Once in place, a side plate was applied in the distal fragment, with at least 8 holes. In the anatomical reduction, plate was then fitted to the shaft of femur with 4.5 mm cortical screws and a couple of cancellous screws were attached into the intercondylar region. For distal femoral locking compression plate, the mode of approach was a lateral parapatellar with significant intercondylar comminution, coronal plane fractures or both. Temporary fixation was done by 2 mm K-wire. Inter-fragmentary lag in the articular fragments was achieved by 6.5 cm cannulated cancellous screws placed anterior and posterior to the plate, which was then slid to lace and fixed with locking screws to the articular block. Stab incisions at the screw sites were given and the plate was secured to the diaphyseal portion.

Follow up: The patient undergoing DCS or DF-LCP fixation were to be informed about mobilization technique and were allowed to sit on the bed 2nd day. Quadriceps isometric exercises and active assisted passive knee flexion exercises as tolerated on 2nd post operative day. Ambulation with crutches was began when the patient leg is straightened and initiate progressive gait training without bearing weight after 3 months. Every patient was discharged on the 5th post operative day. Post discharge follow-up were done at 3 weeks, 6 weeks, 3 months, 6 months and evaluations to be done on the basis of Knee Society Score[8]. Stitches of all the operative patients were removed on 3rd week during first follow up. Non weight bearing crutch walking was recommended immediately after surgery up to 3 months. The initiation of partial weight bearing was after 3 months and full weight bearing after 6 months. The initiation of full weight bearing was determined by a review of patient symptoms.

Radiographic appearance and healing of associated injuries, time to advance to full weight bearing and final range of motion were documented for all patients. Complications of fixation failure, infection, and secondary surgical interventions were also documented.

Statistical Analysis: Data were processed and analysed with the help of computer program SPSS (Statistical package for social sciences) 16 version. Quantitative data were analyzed by mean and standard deviation; and comparison was done between two groups by unpaired t-test. Qualitative data were analyzed by rate, ratio, and percentage; and comparison was done between two groups by Chi-Square test. A probability (p) value of < 0.05 ($p<0.05$) was considered statistically significant.

Ethical Consideration: An approval of the study protocol was obtained from the Ethical Review Committee of Sylhet M.AG. Osmani Medical College Sylhet before the commencement of the study and informed written consent was obtained from every patient after explaining the options of treatment, ultimate outcome, possible side effects and complications of operative procedures.

Results:

The age of the patients ranged from 22 to 70 years with the mean age of 43.7 ± 14.2 years. The mean age of the patients in both groups was almost identical (t=0.445; p=0.660). Male preponderance with male to female ratio was 1.7:1 [Table-I].

Table-I: Distribution of the patients by baseline characteristics.

Baseline characteristics	Group-A (n=15)	Group-B (n=15)	P value
Age			
21-30 years	3 (20.0)	4 (26.7)	*p=0.799
31-40 years	2 (13.3)	3 (20.0)	
41-50 years	5 (33.3)	4 (26.7)	
51-60 years	3 (20.0)	1 (6.7)	
61-70 years	2 (13.3)	3 (20.0)	
Mean in years	44.9 ± 12.9	42.6 ± 15.7	*p=0.660
Sex			
Male	9 (60.0)	10 (66.7)	*p=0.705
Female	6 (40.0)	5 (33.3)	
Cause of injury			
RTA	10 (66.7)	9 (60.0)	*p=0.591
Trauma	5 (33.3)	5 (33.3)	
Fall from height	0 (0.0)	1 (6.7)	

*Chi-Square test and Unpaired t test were employed to analyze the data. Figure in the parenthesis indicates corresponding percentage. Mean was expressed as mean ± standard deviation.

Regarding cause of injury, road traffic accident (RTA) is the common cause (63.3%), other causes were trauma (33.3%) and fall from height (3.3%). The cause of injury between groups did not differed statistically significant ($\chi^2=1.053$; p=0.591) [Table-I].

The mean operation time was [92.3 ± 7.5 (range, 80-100) minutes versus 90.4 ± 6.9 (range, 80-105) minutes, t=0.710; p=0.484]; length of postoperative hospital stay [6.0 ± 0.9 days versus 5.9 ±0.9 days, t=0.397, p=0.695] and union time [20.6 ± 5.0 (12-26) weeks versus 18.7 ± 3.3 9 (12-28) weeks, t=1.210, p=0.238] did not differ significantly between two groups.

Post operative complications were similar in both groups such as superficial wound infection, postoperative stiffness, varus deformity and Implant failure were similar in both groups (p>0.05) [Table-II].

Functional outcome was excellent in 13.3%, good in 33.3%, fair in 33.3% and poor in 20.0% cases in the group-A. In group-B functional outcome was excellent in 53.3%, good in 20.0% fair in 6.7% and poor in 20.0% of cases. The functional outcome of either method of fixation was almost similar ($\chi2=6.767$; p=0.080) [Table-III].

Table-II: Distribution of patients by post operative complications

Complications	Group-A (n=15)	Group-B (n=15)	P value
Superficial wound infection	3 (20.0)	2 (13.3)	p=0.624
Postoperative stiffness	4 (26.7)	3 (20.0)	p=0.666
Varus deformity	1 (6.7)	2 (13.3)	p=0.543
Implant failure	2 (13.3)	1 (6.7)	p=0.543
Total complications	6 (40.0)	4 (26.7)	p=0.439

*Chi-Square test was employed to analyze the data. Figure in the parenthesis indicates corresponding percentage. Individual complications were more due to multiple complication of occurred in some of the patient.

Table-III: Distribution of respondents by outcome

Functional outcome	Group-A (n=15)	Group-B (n=15)	P value
Excellent	2 (13.3)	8 (53.3)	
Good	5 (33.3)	3 (20.0)	p=0.080
Fair	5 (33.3)	1 (6.7)	
Poor	3 (20.0)	3 (20.0)	
Total	15 (100.0)	15 (100.0)	

*Chi-Square test was applied to analyze the data. Figure in the parenthesis indicates corresponding percentage.

Discussion:

In this study the age of the patients ranged from 22 to 70 years with the mean age of 43.7 ± 14.2 years. The mean age of the patients in DCS group and DF-LCP group was almost identical (p=0.660). This result was supported by Yeap and Deepak,[6] that the age of the patients ranged from 15 to 85 years with a mean age of 44 years. Several other studies supported this result[4,7,9].

In the present study 63.7% patients were male and 36.7% patients were female with male to female ratio of 1.7:1. There was no significant difference of between two groups (p=0.715). This result was correlated with the study of Yeap and Deepak,[6] that 63.6% of patients were male and 36.4% of patients were female in their series. Male preponderance of distal femoral fracture reported in other studies[4,7,9]. Males were more exposed to severe injuries because of their outdoors work, serious traffic conditions and over speeding while females tend to spend more time indoors in a more conservative community.

Regarding cause of injury the current study showed that,

road traffic accident (RTA) is the common cause (63.3%) of distal femoral fracture, other causes were trauma (33.3%) and fall from height (3.3%). The cause of injury between groups did not differed statistically significant (p=0.591). This result was in agreement with the study of Nayak et al.[4] that the causes of injury were vehicular accidents (77.4%), falls (19.4%), and assault (3.2%). RTA was the more frequent mechanisms of injury described in several studies[6,9-12]. This high incidence of RTA in this study was attributed to the difficult traffic conditions and over speeding[13].

In this study the mean operation time was 92.3 ± 7.5 minutes in DCS group; whereas the mean total operation time was 90.4 ± 6.9 minutes in DF-LCP group; difference was not significant (p=0.484). Similar duration of surgery was reported in other studies[3,13].

In this study the mean length of postoperative hospital stay in this study was 6.0 ± 0.9 days in the patients in DCS group and was 5.9 ± 0.9 days in DF-LCP group. The mean length of postoperative hospital stay of both groups were almost similar (p=0.695). Hakeem et al.[5] reported the average hospital stay was 8 days (range 4-15 days) in their series of patients treated with DCS; while Nayak et al.[4] found the mean length of hospital stay was 9 (ranged 6 to14) days in their series of patients treated with LCP.

In the current study the mean union time was 20.6 ± 5.0 weeks in the patients in DCS group and was 18.7 ± 3.3 weeks in DF-LCP group. The mean union time of both groups were almost similar (p=0.238). This result correlated with other studies.[6,7,14].

In the present study post operative complications were similar in both groups such as superficial wound infection, postoperative stiffness, varus deformity and implant failure[17,19]. Ali and Shahabuddin,[15] found that overall infection rate was 5.71%, stiffness of knee joint in 17.14%, limb shortening up to 1.5 cm in 5.71% in their patients treated with DCS. Supanich,[7] found varus deformity $>5^0$ in 22%, knee stiffness (flexion$<90^0$) in 4% and leg length discrepancy>2 cm in 4% of their patient treated with DCS; while varus deformity $>5^0$ was in 15%, knee stiffness (flexion$<90^0$) in 4% and leg length discrepancy>2 cm in 4% of their patient treated with DF-LCP.

In this study functional outcome was excellent in 13.3%, good in 33.3%, fair in 33.3% and poor in 20.0% cases in the DCS group; while in DF-LCP group functional outcome was excellent in 53.3%, good in 20.0% fair in 6.7% and poor in 20.0% of cases. The functional outcome of either method of fixation was almost similar (p=0.080).

Ali and Shahabuddin,[15] found that outcome was excellent in 57.1%, good in 17.1%, moderate in 8.6% and poor in 17.1% of their patient treated with DCS. Sharma,[13] reported the overall results were excellent in 32% of patients, good in 36% patients, moderate in 12% of patients and poor in 20% of patients of their series of patients treated with DCS. Dar et al.[14] found that outcome was excellent in 48%, good in 30%, fair in 17% and poor in 5% of their patient treated with DCS. Yeap and Deepak,[6] found excellent in 36.4% good in 36.4%, fair in 18.2% and failure in 9.1% of patients treated with DF-LCP. Supanich,[7] found that outcome was excellent in 48%, good in 30%, fair in 17% and poor in 5% of their patient treated with DCS; while excellent in 56%, good in 33%, fair in 7% and poor in 4% of their patient treated with DF-LCP and difference in the outcome between two groups was not statistically significant (p=0.961).

Conclusion:

It is concluded that for patients requiring management of AO type 33-B, 33-C fracture distal femur, dynamic condylar screw with plate and distal femoral locking compression plate fixation are equally effective for achieving satisfactory union and functional outcome. However a multicenter randomized control trial using C-ARM and a large sample size should be conducted to evaluate the DCS and PF-LCP in the management of patients with AO type 33-B, 33-C fractures.

Conflict of Interest: None.

Acknowledgement:

The authors thank to Dr. Md. Tabibul Islam, MD (Dermatology & Venereology), Assistant Professor, Department of Dermatology & Venereology, Sylhet MAG Osmani Medical College, Sylhet for his assistance in the analysis of data.

The following limitations were faced during this study (1) This study was conducted in a single tertiary care hospital, (2) sample size was small and (3) unavailability of C-ARM facilities in the study place duration of operation time was longer which may affect the complication as well as outcome.

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ORIGINAL ARTICLE OPEN ACCESS

Study of Factors Associated with Sarcopenia in COPD Patients

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Abstract

Introduction: *Sarcopenia is frequently associated with chronic diseases such as chronic obstructive pulmonary disease (COPD). Sarcopenia can be classified as physical frailty where frailty is associated with adverse health outcomes. Sarcopenia was found to be associated with worsening lung function in male COPD patient. Objective was to find out the factors associated with sarcopenia in COPD patients.* ***Materials & Methods:*** *This was cross-sectional observational study was carried out Different Privet Medical in Chandpur and Chandpur Medical College Hospital, Chandpur. Patients diagnosed with COPD according to Global Initiative for Chronic Obstructive Pulmonary Disease (GOLD) guidelines were included in this study. Exclusion criteria were unstable cardiac disease, an exacerbation within the preceding 4 weeks, predominant neurological limitation to walking (eg, significant hemiplegia) or contraindication to bioelectrical impedance analysis (BIA) including an implanted pacemaker or defibrillator. All participants gave written informed consent. EWGSOP criteria were applied to outpatients with stable COPD.* ***Results:*** *In uniavariate analysis, age, moderate COPD, severe COPD, obesity, non-elective admission over the past 12 months, MMRC scale and MAP were significantly associated with sarcopenia. In multivariate analysis, age, moderate COPD, severe COPD, obesity and MMRC scale were significantly associated with sarcopenia.* ***Conclusion:*** *Prevalence of sarcopenia was 26%. Independent factors associated with sarcopenia Age (>70 years) years (adjusted odds ratio (AOR) 4.387. Sarcopenia affects about one-quarter of COPD patients. Age, severity of COPD, MMRC scale, and BMI status were the factors associated with sarcopenia.*

Keywords: *Airway obstruction, Body composition, Sarcopenia, COPD.*

Number of Tables: *03;* ***Number of References:*** *22;* ***Number of Correspondence:*** *06.*

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Introduction:

Sarcopenia is frequently associated with chronic diseases such as chronic obstructive pulmonary disease (COPD) and cancer. COPD, which is characterized by an irreversible airflow limitation, exacerbates respiratory distress as the disease progresses. The prevalence of sarcopenia in stable COPD was reported to be 15% to 25% in previous foreign studies[1]. Chronic obstructive pulmonary disease (COPD) has been described as a systemic disease. Sarcopenia is one of the systemic effects that are related to several adverse outcomes.

Sarcopenia can be classified as physical frailty where frailty is associated with adverse health outcomes[2,3]. Sarcopenia was found to be associated with worsening lung function in male COPD patients[4]. COPD patients also have relative or an absolute increase in fat mass which might contribute to systemic inflammation, loss of fat-free mass, and insulin resistance. Fat-free mass index, not body mass index (BMI), was significantly related to pulmonary function, dyspnea severity, quality of life, and reflected reduced skeletal muscle mass[5,6].

In patients with COPD, such changes have been shown to be related to exercise intolerance, impaired quality of life, and increased mortality[7]. Few studies in the literature have correlated the prevalence of sarcopenia with indices of COPD severity. In addition, to date, there have been no studies correlating sarcopenia with the prognosis of COPD or correcting sarcopenia by the BMI to avoid misdiagnosis in overweight patients.

Materials and Methods:

This was cross-sectional observational study was carried out Different Privet Medical in Chandpur and Chandpur Medical College Hospital, Chandpur during January 2019 to December 2019. Among 100 patients diagnosed with COPD according to Global Initiative for Chronic Obstructive Pulmonary Disease (GOLD) guidelines were included in this study. Exclusion criteria were unstable cardiac disease, an exacerbation within the preceding 4 weeks, predominant neurological limitation to walking (eg, significant hemiplegia) or contraindication to bioelectrical impedance analysis (BIA) including an implanted pacemaker or defibrillator. All participants gave written informed consent. EWGSOP criteria were applied to outpatients with stable COPD. Body composition, exercise capacity,

Received: 28 July 2020 *Accepted revised version:* 09 January 2021

functional performance, physical activity and health status were assessed. Using a case–control design, response to PR was determined in patients with sarcopenia and a propensity score-matched non-sarcopenic group for Uniavariate and multivariate analysis. Data collected was analysed using SPSS software version 23 and p value was considered <0.05 as significant.

Results:

Thirty eight (38.0%) patients were belonged to age 61-70 years, 94(94.0%) were male, 42(42.0%) were complete primary education level, 91(91.0%) were smoker, 53(53.0%) were moderate COPD, 39(39.0%) were hypertension, 94(94.0%) patients used inhaled corticosteroid, 64(64.0%) had normal BMI, mean MMRC scale was found 0.73±0.64, mean barthel scores was 18.0±2.1, mean MAP was 96.2±10.8 mmHg, 38(38.0%) was found osteoporosis and 26(26.0%) was sarcopenia (Table-I).

Table I: Baseline characteristics of the study population.

	Number of patients	Percentage
Age (years)		
≤60	27	27.0
61-70	38	38.0
>70	35	35.0
Sex		
Male	94	94.0
Female	6	6.0
Educational level		
Illiterate	16	16.0
Primary	42	42.0
SSC	24	24.0
HSC	13	13.0
Graduate	5	5.0
Smoking status		
Smoker	91	91.0
Non smoker	9	9.0
Severity of COPD		
Mild	26	26.0
Moderate	53	53.0
Severe	21	21.0
Comorbid diseases		
Diabetes mellitus	10	10.0
Hypertension	39	39.0
Dyslipidemia	10	10.0
Chronic arthritis	9	9.0
Cancer	3	3.0
Medication uses		
Inhaled corticosteroid	94	94.0
Systemic steroid	1	1.0
Oral hypoglycemic drugs	6	6.0
Statin	10	10.0
NSAIDs	1	1.0
BMI (kg/m^2)		
Underweight (<18.5)	11	11.0
Normal (18.5–24.9)	64	64.0
Over weight (25.0–29.9)	18	18.0
Obesity (≥30.0)	7	7.0
History of fall at least two times over the past 12 months	1	1.0
Nonelective admission over the past 12 months	25	25.0
Mean MMRC scale	0.73	±0.64
Mean Barthel scores	18.0	±2.1
Mean Chula IADLs scores	9.1	±0.3
Mean MAP (mmHg)	96.2	±10.8
Mean Gait speed (m/s)	1.4	±0.2
Mean Handgrip strength (kg)		
Male	26.8	±6.0
Female	22.0	±3.8
Mean skeletal mass index (kg/m^2)		
Male	7.0	±0.8
Female	6.5	±0.5
Osteoporosis	38	38.0
Sarcopenia	26	26.0

In uniavariate analysis, age, moderate COPD, severe COPD, obesity, non-elective admission over the past 12 months, MMRC scale and MAP were significantly associated with sarcopenia (Table-II).

Table II: Uniavariate analysis for sarcopenia.

	OR	95% CI (lower-upper)	P value
Age (>70 years)	4.387	1.430-9.703	0.027^s
Male	1.121	0.472-3.497	0.741^{ns}
Smoker	0.157	0.022-1.143	0.068^{ns}
Moderate COPD	8.479	1.245-46.726	0.009^s
Severe COPD	0.158	0.027-0.930	0.041^s
Diabetes mellitus	3.961	0.392-40.034	0.243^{ns}
Hypertension	2.719	0.162-45.721	0.487^{ns}
Dyslipidemia	0.791	0.042-14.823	0.875^{ns}
Chronic arthritis	3.258	0.509-20.860	0.212^{ns}
Cancer	2.027	0.159-11.697	0.838^{ns}
Inhaled corticosteroid	1.084	0.430-2.730	0.864^{ns}
Systemic steroid	0.808	0.169-3.996	0.087^{ns}
Oral hypoglycemic drugs	0.257	0.044-1.506	0.132^{ns}
Statin	1.160	0.482-2.795	0.740^{ns}
NSAIDs	1.045	0.136-8.034	0.967^{ns}
Obesity (≥30.0kg/m^2)	0.265	0.127-0.793	0.036^s
History of fall at least two times over the past 12 months	1.226	0.143-9.566	0.983^{ns}
Nonelective admission over the past 12 months	1.942	1.027-2.930	0.047^s
MMRC scale (>0.4)	1.572	1.132-3.434	0.048^s
MAP (>100 mmHg)	6.479	1.124-24.976	0.018^s
Osteoporosis	1.784	0.783-3.465	0.274^{ns}

In multivariate analysis, age, moderate COPD, severe COPD, obesity and MMRC scale were significantly associated with sarcopenia (Table-III).

Table III: Multivariate analysis for sarcopenia.

	OR	95% CI (lower-upper)	P value
Age (>70 years)	2.408	1.624-8.471	0.039[s]
Moderate COPD	6.448	1.338-39.812	0.011[s]
Severe COPD	1.685	1.031-2.382	0.048[s]
Obesity (≥30.0 kg/m^2)	0.462	0.219-0.970	0.043[s]
Nonelective admission over the past 12 months	0.933	0.651-1.479	0.124[ns]
MMRC scale (>0.4)	1.885	1.031-2.738	0.048[s]
MAP (>100 mmHg)	0.764	0.204-0.986	0.581[ns]

Discussion:

In this study observed that thirty eight (38.0%) patients were belonged to age 61-70 years, 94(94.0%) were male, 42(42.0%) were complete primary education level, 91(91.0%) were smoker, 53(53.0%) were moderate COPD, 39(39.0%) were hypertension, 94(94.0%) patients used inhaled corticosteroid, 64(64.0%) had normal BMI, mean MMRC scale was found 0.73±0.64, mean barthel scores was 18.0±2.1, mean MAP was 96.2±10.8 mmHg, 38(38.0%) was found osteoporosis and 26(26.0%) was sarcopenia. In study of Limpawattana et al.[8] reported that the majority of them were men (112 cases, 92.6%) with an age older than 65 years old (maximum age was 92 and minimum age was 47 years old). Most of them were ex-smokers with a moderate degree in severity of COPD. Hypertension was the most common comorbid disease. Low skeletal muscle mass was the main component, followed by low handgrip strength. Low gait speed was found in the minority. The possible explanations are the differences in body composition of different ethnicities and Asian people appear to have a higher prevalence of sarcopenia than other regions[9]. The study in Brazil regarding the prevalence of sarcopenia in COPD using DXA was 40%; however, this report diagnosed sarcopenia using only low skeletal muscle mass which was defined as pre-sarcopenia in the current study. These figures were comparable to the report herein (48 cases, about 40%)[10]. Overall, the prevalence of pre-sarcopenia in this study is consistent with the previous data that reported the prevalence of sarcopenia in COPD using only low skeletal muscle mass that varied from 20% to 40% [4,11]. The prevalence of sarcopenic obesity in Asia in existing studies is about 15%; however, this current study used only skeletal muscle mass to detect sarcopenia[4,12].

In current study observed in uniavariate analysis, age, moderate COPD, severe COPD, obesity, non-elective admission over the past 12 months, MMRC scale and MAP were significantly associated with sarcopenia. Limpawattana et al.[8] also reported univariate analysis were entered in the multiple regression models: age, severity of COPD, MMRC scale, nonelective admission over the past 12 months, BMI, MPA, and presence of osteoporosis. Advancing age and severity of COPD showed high magnitudes of associations. Commonly, a progressive loss of muscle mass occurs at the age of 40 and is greater after 70 years[13]. Higher MMRC scale represented poorer pulmonary function that is also found its association with sarcopenia in this study[14,15]. Being underweight increased the risk of sarcopenia compared to obesity, the results support the findings that lower BMI was related to lower lean mass in COPD patients[10]. Subsequently, cigarette smoking alone did not show a significant association with sarcopenia[10,16]. Sarcopenia has been studied as an independent factor for decreased bone mineral density (BMD) due to the systemic consequences of COPD[17].

In multivariate analysis, age, moderate COPD, severe COPD, obesity and MMRC scale were significantly associated with sarcopenia. Limpawattana et al.[8] reported after multicollinearity was checked, advanced age (>75 years), greater severity of COPD, MMRC scale, and nonobese patients were the factors associated with sarcopenia in this study. There were factors associated with sarcopenia using multivariate analyses: age, severity of COPD, MMRC scale, and BMI. Advancing age and severity of COPD showed high magnitudes of associations. Commonly, a progressive loss of muscle mass occurs at the age of 40 and is greater after 70 years[18]. The decline in gait speed and grip strength was faster than muscle mass especially after the age of 70 years[18,19]. The MMRC scale increased the risk of sarcopenia. This finding was similar to the prior report[20,21]. This scale had been widely studied regarding its correlation with pulmonary function tests. Additionally, it could predict morbidity and mortality in COPD patients[22]. Higher MMRC scale represented poorer pulmonary function that is also found its association with sarcopenia in this study[22].

Conclusion:

Prevalence of sarcopenia was 26%. Independent factors associated with sarcopenia Age (>70 years) years (adjusted odds ratio (AOR) 4.387. Sarcopenia affects about one-quarter of COPD patients. Age, severity of COPD, MMRC scale, and BMI status were the factors associated with sarcopenia.

Conflict of Interest: None.

Acknowledgement:

The authors would like to acknowledge all patients and their guardian for cooperate with this research and also be great full to Biopharma Limited to support all the way from the completion of the study.

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DOI: https://doi.org/10.3329/medtoday.v33i1.52161

ORIGINAL ARTICLE OPEN ACCESS

Prevalence of Anemia in Chronic Kidney Disease

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Abstract

Introduction: *Anemia in CKD is associated with cognitive impairment, sleep disturbances, CKD progression, cardiovascular co morbidities, and higher mortality. Direct healthcare costs are higher in CKD patients with anemia.The aim of the present study was to evaluate the prevalence of anemia in chronic kidney disease patients at a tertiary level teaching hospital in Dhaka.* ***Materials and Methods:*** *It was an observational type of descriptive study, conducted in the Dhaka National Medical College, Dhaka, during the study period of January 2019 to April 2019. The study was approved by the institutional ethical committee.* ***Results:*** *Most of the patients (44.56%) belonged to the middle age group 40 - 60 years. Male patients (64.40%) are suffering from more CKD than the female patients (35.50%). Most of the patients (58.41%) are anemic. 45% CKD patients also suffering from diabetes mellitus. Most of the patients (51.48%) treated with oral iron agents for anemia in CKD patients.* ***Conclusion:*** *In this study most of the chronic kidney disease patients are anemic. Improving our understanding of the molecular mechanisms underlying anemia of CKD holds promise for developing pharmacological agents that more closely target the underlying pathogenic mechanisms of this disease for improved efficacy and reduced treatment related adverse outcomes.*

Keywords: *Anemia, CKD.*

Number of Tables:*03;* ***Number of Figures:*** *02;* ***Number of References:*** *20;* ***Number of Correspondence:*** *05.*

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Introduction:

Chronic kidney disease (CKD) is a prevalent, worldwide condition, and the number of patients affected continues to increase. In the United States, it is estimated that, by 2010, > 2 million people will be afflicted with CKD. Although the most severe form of CKD is kidney failure and the need for renal replacement therapy (hemodialysis, peritoneal dialysis, or renal transplantation), many more patients are affected by less severe forms of CKD. The National Kidney Foundation (NKF) Kidney Disease Outcomes Quality Initiative (KDOQI) defines CKD based on glomerular filtration rate (GFR) and divides the disease into five distinct stages. In Stage 1 CKD, the GFR is ≥ 90 ml/min/1.73 m^2. Stages 2, 3, and 4 CKD are defined by a GFR of 60–89 ml/min/1.73 m^2, 30–59 ml/min/1.73 m^2, and 15–29 ml/min/1.73 m^2, respectively. The final stage, Stage 5, occurs when the GFR is < 15 ml/min/1.73 m^2 or when patients require dialysis[1]. Anemia is a common feature of CKD associated with poor outcomes. Anemia was first linked to CKD over 170 years ago by Richard Bright. As kidney disease progresses, anemia increases in prevalence, affecting nearly all patients with stage 5 CKD. Anemia in CKD is associated with reduced quality of life and increased cardiovascular disease, hospitalizations, cognitive impairment, and mortality. Anemia in CKD is typically normocytic, normochromic, and hypoproliferative[2]. Anemia occurs due to the reduction of function of kidney. One of the lesser known functions of the kidneys is the production of erythropoietin, a signaling molecule that stimulates red blood cell production, in response to decreased oxygen levels in the blood. Any disruption of this process, e.g., secondary to a functional abnormality due to CKD, has the potential to produce anemia, a condition in which the number of circulating red blood cells, and therefore the level of hemoglobin, is lower than normal. Other possible causes of anemia in CKD patients include

Received: 11 September 2020 *Accepted revised version:* 23 January 2021

iron deficiency, inflammation, and the accumulation of uremic toxins[3]. The correction of anemia has been shown to improve cardiac and cognitive functions, quality of life, physical activity, shorten the hospitalization period and decrease mortality[4]. Since the introduction of recombinant human erythropoietin, erythropoiesis-stimulating agents (ESA) have become the cornerstone of CKD anaemia treatment and have reduced requirements for transfusion, improved the quality of life and reduced left ventricular hypertrophy and morbidity and mortality in these patients[5]. The target Hb of >13 g/dl might lead to increase in the risk of CVD although maintaining a high Hb of >12 g/dl without Erythropoietic stimulating agent is not harmful for CKD patients. It is desirable to determine the target Hb in dialysis patients depending on their ages. Taken all the international guidelines we should consider administration of ESA when the Hb level becomes <11 g/dl in pre-dialysis patients and <10 g/dl in dialysis patients[6]. The aim of the present study was to evaluate the hemoglobin level in chronic kidney disease patients at a tertiary level teaching hospital in Dhaka.

Materials and Methods:

An observational, cross sectional study was conducted from January 2019 to April 2019 among patients attending at nephrology outpatient department of the Dhaka National Medical College after obtaining requisite consent from the patients. Only known case of chronic kidney patients were included in this study. Once the consultation by the physician was over the patients were interviewed. The interviews were held in the corridor just outside the medical outpatient department. After taking informed consent and informing details about the procedure, blood sample was taken for measuring hemoglobin. If the patient hemoglobin level <13 g/dl (male) or <12g/dl (female) then he or she considered as an anemic. All filled questionnaires were entered into the computer for subsequent analysis using SPSS method version 20.1. The study was approved by the institutional ethical committee.

Results:

According to table I: the age structures of the patients have been categorized in years into three groups. Overall 23 (22.78%) patients were in < 40 years old while 45 (44.56%) patients were 40-60 years old, 32 (31.69%) patients belong to > 60 years age group. Most patients belonged to the middle age group 40 - 60 years. According to figure 1: Total numbers of patients both male and female were 101. It comprised of 65 (64.40%) male and 36 (35.50%) female. Male patients are suffering from more CKD than the female patients. According to table 2: 59 (58.41%) CKD patients suffering from baseline anemia. 42 (41.58%) CKD patients' hemoglobin levels are normal. According to figure 2, 45% CKD patients suffering from diabetes mellitus. According to table 3: Most of the patients (51.48%) treated with oral iron agents for anemia in CKD patients. 21.78% patients treated with erythropoietin agent and 26.73% patients treated with both oral iron and erythropoietin agent.

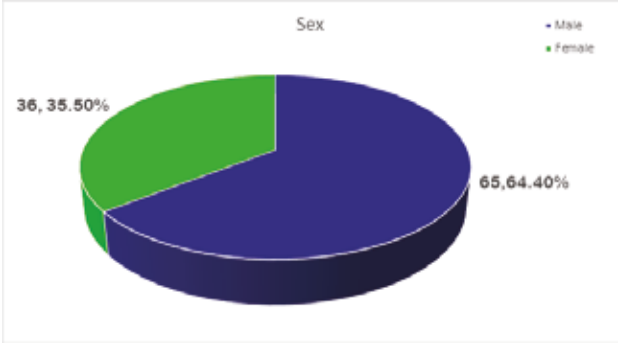

Figure 1: Pie chart showing percentage of sex distribution of patient.

Table-I: Age distribution of the study population (n=101).

Age in years (Range 08-98 years)	Frequency	Percentage (%)
<40	23	22.78
40-60	45	44.56
>60	32	31.69
Total	**101**	**100**

Table-II: Hemoglobin status of the CKD patients (n=101).

Anemic status	Frequency	Percentage (%)
Baseline Anemia	59	58.41%
No baseline anemia	42	41.58%

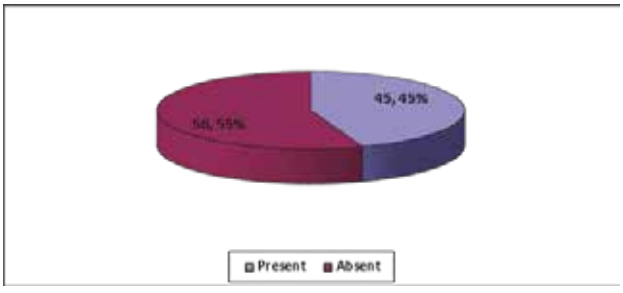

Figure 2: Pie chart showing presence of DM in the CKD patients (n=101).

Table-III: Management of anemia of the CKD patients (n=101).

Treatment	Frequency	Percentage (%)
Oral iron	52	51.48%
Erythropoietin agent	22	21.78%
Oral iron+ Erythropoietin agent	27	26.73%

Discussion:

Chronic kidney disease (CKD) is one of the most widespread diseases and it is deemed to be a real public health problem worldwide[7]. This study showed that male patients (64.40%) were suffering from chronic kidney disease than the female patients (35.50%). In the Bangladesh scenario it is noticed that female populations are reluctant to utilize health care facilities even if they are critically ill and especially by the lower socio-economic strata. Similar results were obtained in the study conducted

by Amoako et al. (2014)[8]. Dissimilar results were obtained in the study conducted by Anupama and Uma (2014)[9]. Their study revealed that female patients (54.43%) suffering from more chronic kidney disease than male patients. In our study, the most (44.56%) common age groups were 40-60 years. Similar results were obtained in the study conducted by Bapat et al. (2008) study. Their study showed that 41-60 years patients (42.6%) suffering from more chronic kidney disease than other aged patients[10]. Anemia is common in patients with chronic kidney disease increasing the risk of cognitive impairment, sleep disturbances, cardiovascular comorbidities, need for dialysis, and all-cause mortality[11]. In our study 58.41% CKD patients suffering from anemia which is higher than the number reported by Alan S. GO. et al. (2006) study. In their study they reported that 42.58% patients suffering from baseline anemia[12]. Multi-morbidity, defined as the presence of two or more chronic health conditions in an individual, is a growing concern whilst caring for CKD patients. Some individual co-morbidity are known risk factors for CKD progression. In addition, multi-morbidity may increase the treatment burden on patients, lead to poly-pharmacy, and have negative impacts on patient quality of life[13]. In our study 45% CKD patients also suffering from DM. Similar results were obtained in the study conducted by Finkelstein, FO et al. study (2009). Their study stated that 45.7% CKD patients suffering from DM[14]. Many patients with advanced chronic kidney disease (CKD) are in negative iron balance as a result of reduced dietary intake, impaired absorption from the gut, and increased iron losses. This is particularly true in hemodialysis (HD) patients, for whom supplemental iron is often essential to keep pace with blood loss and the requirements for erythropoiesis[15]. In our study 51.48% patients treated with oral iron agent for anemia in CKD patients. Dissimilar results were obtained in the study conducted by Sang Royl Ryu et al. (2016) study[16]. In their study they stated that 27.7% patients treated with oral iron agent. Erythropoiesis-stimulating agents (ESAs) have been used to manage anemia in chronic kidney disease (CKD) to reduce transfusion requirements and anemia symptoms[17]. The introduction of erythropoietin (Epo) in clinical practice, more than two decades ago, altered completely the management of patients with chronic kidney disease (CKD)[18]. In our study 22% patients treated with Erythropoietin agent for anemia in CKD patients. N Dimkovic stated that early administration of erythropoietin is recommended especially in high-risk patients: the elderly, diabetics and those with coronary artery and peripheral artery diseases[19]. Administration of Erythropoietin may be associated with exacerbation of hypertension in about 5% of patients that will require dose adjustment or switching to a different ESA[20].

Conclusion:

In our study, most of the patients are anemic. In most of the patients the severity of anemia can be easily reduced by the use of erythropoietin agents and intravenous iron as necessary in the primary care setting. Monthly follow-up is required to evaluate general cardio renal health and to ensure that HB levels do not overshoot the optimal range of 11-12 g/dl.

Conflict of Interest: None.

Acknowledgement:

The authors are grateful to the entire staff of the nephrology department of Dhaka National Medical College Hospital, Dhaka for their cooperation and support during the study period.

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DOI: https://doi.org/10.3329/medtoday.v33i1.52162

ORIGINAL ARTICLE OPEN ACCESS

A Comparative Study on Serum Magnesium in Pre-eclampsia and Non Pregnant Women

Heera Lal Roy*[1], Susmita Nargis[2], Farhana Ferdaus[3]

Abstract

Introduction: *There are many Hypertensive disorders in pregnancy like preeclampsia, eclampsia etc. Pre-eclampsia is the most common medical complication of pregnancy associated with increased maternal and infant mortality and morbidity. Some studies have implicated that low serum calcium levels may have a role in pre-eclampsia but other studies failed to find relation between low levels of these trace elements and pre-eclampsia.* ***Materials and Methods:*** *This cross sectional study was carried out in the Department of Biochemistry, Sylhet MAG Osmani Medical College in collaboration with the Department of Obstetrics and Gynaecology, Sylhet MAG Osmani Medical College Hospital during the period from January 2016 to December 2016. This Study was occured in among 31 pre-eclampsia patients, aged 20 to 40 years, and gestational age ranges from 20 to 40 weeks and 31 age matched normotensive non-pregnant women having no proteinuria. Serum magnesium was measured by Colorimetric method.* ***Results:*** *The mean serum magnesium level was 3.24 (±1.42) mg/dl in pre–eclampsia and was 3.30 (±1.5) mg/dl in normal women. The mean serum magnesium level did not differ significantly between the subjects of pre–eclampsia and normal women ($t=0$; $p<.05$).* ***Conclusion:*** *The means of both data sets are equal. So we can conclude that there is no significant difference between them.*

Keywords: *Pre-eclampsia, Magnesium.*

Number of Tables: *03;* ***Number of References:*** *23;* ***Number of Correspondence:*** *03.*

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Introduction:

Preeclampsia is one of the commonest causes of maternal mortality and morbidity[1]. The incidence of preeclampsia in developing countries is estimated to be 4–18%[2]. Thus, 16% of all maternal death in developed countries and 9% of maternal deaths in Asia and Africa are said to be due to hypertensive disorders in pregnancy[3, 4]. A worldwide perinatal and neonatal mortality rate of 10% is associated with preeclampsia[5]. Current evidence suggests that the endothelial dysfunction seen in preeclampsia may persist years after the episode, and therefore preeclamptic women may be at high risk of cardiovascular diseases later in life[6].

Though the etiology of preeclampsia remains unclear, many theories suggest abnormal placental implantation and abnormal trophoblastic invasion as possible causes[7]. The molecular basis of this condition is unresolved in study[8]. It has been postulated that fluctuations in maternal serum ions may be the precipitating cause of elevated blood pressures in preeclampsia[9,10]. Dietary deficiency of mineral ions has been shown to have a harmful effect on the pregnant mother and growing fetus and possibly complicate preeclampsia[11]. Dietary deficiency of magnesium has been established to play a role in blood pressure regulation and hence development of preeclampsia[12]. Evidence supporting routine magnesium supplementation for all pregnant women has not been substantiated by research, though most studies have reported reduced magnesium levels in pregnancy and worse levels in preeclampsia[13]. However, other studies have also reported a nonsignificant change in the serum magnesium levels of preeclamptic women compared to normal women[14].

Materials and Methods:

This cross-sectional study was carried out in the Department of Biochemistry, Sylhet MAG Osmani Medical College in collaboration with the Department of Obstetrics and Gynaecology, Sylhet MAG Osmani Medical College Hospital during the period from January 2016 to December 2016. 31 pre-eclamptic patients, aged 20 to 40 years, and gestational age ranges from 20 to 40 weeks and 31 age matched normotensive non pregnant women having no proteinuria were included in group-A and Group-B respectively. Pregnant subjects were Primi & having essential hypertension, systemic or endocrine disorders, malabsorption syndrome, and patients on magnesium supplementation were excluded. Detailed history about present pregnancy regarding pre-eclampsia and exclusion criteria were asked. Data were collected from the selected subjects on variables of interest using a semi-structured questionnaire by interview, observation, clinical examination, investigation and from the history. Blood pressure was measured in supine position or sitting position. Urine was tested for gross proteinuria (heat coagulation test).

Received: 10 July 2020 *Accepted revised version:* 03 October 2020

The pre-eclamptic patients were diagnosed by the presence of persistent hypertension (more than 140/90 mm of Hg).

Results:

The mean age was 28.45 (±7.54) years in pre–eclampsia and 31.03 (±8.9) years in normotensive non-pregnant women; difference was not significant (t=0, p<.05) (Table I), the means of both data sets are equal so we can conclude that there is no significant difference between them.

Table-I: Age of the respondents.

Age of pre-eclampsia women	Number	Percentage %	Age of pre-eclampsia women	Number	Percentage %
20-24	14	45.16	20-24	13	41.93
25-29	6	19.35	25-29	3	9.67
30-34	4	12.90	30-34	2	6.45
35-39	2	6.45	35-39	3	9.67
≥40	5	16.12	≥40	10	32.25
Total	31	100	Total	31	100
Mean age 28.45 (±7.54)			Mean age 31.03 (±8.9)		

The mean serum magnesium level was 3.24 (±1.42)mg/dl in pre–eclampsia and was 3.30 (±1.5)mg/dl in normal women. The mean serum magnesium level did not differ significantly between the subjects of pre–eclampsia and non pregnant women (t=0; p<.05) (Table- II). The means of both data sets are equal so we can conclude that there is no significant difference between them.

Table-II: Serum Mg+ level of the respondents.

Serum Mg+ of pre-eclampsia women mg/dl	Number	Percentage %	Serum Mg+ of Non-pregnant women mg/dl	Number	Percentage %
1-2.9	15	48.38	1-2.9	15	48.38
3-4.9	12	38.70	3-4.9	11	35.48
5-6.9	4	12.90	5-6.9	5	16.12
7-8.9	0	0	7-8.9	0	0
≥9	0	0	≥9	0	0
Total	31	100	Total	31	100
Mean 3.24 (±1.42)			Mean 3.30 (±1.5)		

The mean body mass index was 26.45 (±2.17) Kg/M^2 in pre-eclampsia and 19.26 (±7.9) mg/M^2 in normotensive non-pregnant women. The mean body mass index in pre-eclampsia was significantly higher compared to normotensive non-pregnant women (t=6.601; p<0.001) (Table- III).

Table-III: BMI of the respondents.

BMI of pre-eclampsia women Kg/M^2	Number	Percentage %	BMI Non-pregnant women Kg/M^2	Number	Percentage %
>18	0		>18	4	
18-20	0		18-20	7	
21-23	4		21-23	14	
24-26	8		24-26	4	
27-29	19		27-29	2	
Total	31	100	Total	31	100
Mean 26.45 (±2.17)			Mean 19.26 (±7.9)		

Discussion:

Serum concentrations of various macrominerals are altered during pregnancy with changes in the mother's physiology and the requirements of growing fetus. Changes on serum level of Magnesium (Mg) during pregnancy were estimated. In addition, it has been reported that reduction in serum level of Mg during pregnancy might be possible contributors in etiology of pre-eclampsia (PE), and supplementation of these minerals to diet may be of value to prevent PE[15]. The mean age was 28.45 (±7.54) years in pre–eclampsia and 31.03 (±8.9) years in normotensive non-pregnant women (Table I), the means of both data sets are equal so we can conclude that there is no significant difference between them.This result was consistent with the study of Golmohammad lou et al.[16] that the mean age of the pre-eclampsia women was 25.70 ± 1.20 years. Akhtar et al.[17] that the mean age of the pre-eclampsia mother was 25.20 ± 4.85 years also supported this result.

In the current study, the mean serum magnesium level was 3.24 (±1.42) mg/dl in pre–eclampsia and was 3.30 (±1.5) mg/dl in normal women. The mean serum magnesium level did not differ significantly between the subjects of pre–eclampsia and normal women (t=0; p<.05). This result was supported by different studies[18,19,20] that there was no significant difference between the plasma magnesium of the patients and controls. But several other studies[21,22] showed that there was significantly lower serum magnesium in pre-eclampsia than that of normal pregnancy.

The mean body mass index was 26.45 (±2.17) Kg/M^2 in pre-eclampsia and 19.26(±7.9) mg/M^2 in normotensive non-pregnant women. The mean body mass index in pre-eclampsia was significantly higher compared to normotensive non-pregnant women (t=6.601; p<0.001). Several other studies did not show significant difference of body mass index between the two groups (p>0.05)[14]. But Akhtar et al.[23] found that the mean body mass index of the subjects with pre–eclampsia was 25.30 (SEM 0.36) Kg/M^2 and normal women was 23.48 (SEM 0.28) Kg/M^2. There was a significant difference of body mass index between the two groups (p<0.001).

Conclusion:

Serum Magnesium is very essential during pregnancy. This study showed that serum magnesium level did not differ significantly between pre-eclamptic and non pregnant women. It may be concluded that serum magnesium have no association in occurrence of pre-eclampsia. However further multicenter study involving large sample needed should be carried out to find the association between preeclampsia and serum calcium.

Conflict of Interest: None.

Acknowledgement:

The author thanks to Dr. Susmita Nargis, Associate Professor (Biochemistry), Ad-din Sakina Women's Medical College, for her assistance in statistical analysis.

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ORIGINAL ARTICLE OPEN ACCESS

Effects of Iron and Amloki (Emblica Officinalis) on Serum Zinc Level in Anaemia with Pregnancy

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Abstract

Introduction: *Pregnancy is associated with several trace elements deficiency in developing countries. Supplementation of iron in iron deficiency anaemia (IDA) has several side effects including alterations of serum zinc level. Traditionally, amloki is used as a well known supplement in pregnancy, which is rich in trace elements. Aims were to determine the effects of iron and amloki on serum zinc level in IDA with pregnancy.* ***Materials and Methods:*** *This Prospective, longitudinal and interventional study was done by non blinded, non randomized sampling followed by inclusion and exclusion criteria. This study was performed in the Department of Physiology, Dhaka Medical College, Dhaka on 43 pregnant women between 13th to 20th weeks of gestation with IDA from July 2016 to June 2017. They were recruited from Outpatient Department of Obstetrics and Gynaecology of Dhaka Medical College Hospital. Anaemic pregnant women supplemented with oral iron and amloki were considered as study group (A) and control group (B) were with only iron supplementation for 45 days. Serum zinc level was estimated in the laboratory of the Department of Soil, Water and Environment, University of Dhaka, Dhaka. For statistical analysis, Paired Student's 't' test and Unpaired Student's 't' test were considered using SPSS 22.0 version.* ***Results:*** *Significant decrease ($p<0.001$) of serum zinc level was observed after intervention of iron in both groups. In this study, there was no significant difference in serum zinc level in between study and control group.* ***Conclusion:*** *It can be concluded that oral iron supplementation causes decrease in serum zinc level in IDA with pregnancy. Amloki shows no significant role in preventing decrease of serum zinc level in this study.*

Keywords: *Iron deficiency anaemia, Pregnancy, Amloki, Zinc.*

Number of Table: *01;* ***Number of Figure:*** *01;* ***Number of References:*** *21;* ***Number of Correspondence:*** *05.*

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Introduction:

Qualitative or quantitative deficiency of haemoglobin or red blood cells in circulation is called anaemia which leads to decreased oxygen carrying ability of blood to organ and tissues[1]. Iron deficiency anaemia (IDA) is the most common type and considered for one-half of anaemia cases. Low iron stores in the body causes decreased red blood cell production[2,3].

In organisms after iron, zinc is the second most important transitional metal. Zinc is the only metal presents in all enzyme classes and required for catalytic activity of many enzymes. For normal growth and development of pregnancy, childhood and adolescence zinc is essential. Even at low concentration it is an effective antimicrobial agent. For proper sense of taste and smell zinc is required. Dietary zinc is absorbed from the duodenum to blood through DMT[1]. In blood, zinc is transported by albumin (60%) and transferrin (10 %). Zinc is excreted through feces, skin and saliva[4,5].

Pregnancy with IDA is usually associated with decreased serum zinc level. Serum zinc reduces due to increased demand and haemodilution in pregnancy, and also for formation of zinc-protoporphyrin due to deficiency of iron[6,7]. There are some interactions between iron and zinc during absorption and transport in the blood. The divalent metal transporter1 (DMT1) is the common transporter for both ferrous iron and zinc in the proximal small intestine from lumen to the enterocyte[8]. So, dietary intake of iron can influence the absorption of zinc. Different iron preparations are used to treat IDA in pregnancy which can lead to zinc deficiency[9].

Indian mythology believes amloki as the first tree to be created in the

Received: 08 July 2020 *Accepted revised version:* 20 December 2020

universe. It is a medium sized tree. Leaves are small, oblong, narrow and pinnately arranged. Fruits are globose ½ - 1 inch in diameter with central depression, fleshy and 6-lobed, with 6 small seeds. The tree is 30-40 ft in height and circumference of stem usually extends up to 3-6 ft and rarely up to 9 ft. Stem is usually curved, branches are strong and extended. Bark is thin and brownish in colour. Leaves resemble to tamarind leaves. Raw fruits are green in colour and become greenish yellow on ripening. Tree is known as Phyllanthus emblica, Emblica officinalis (latin name) from the Family: Euphorbiaceae[10,11,12].

In India, so many researches have done on Emblica officinalis as an important ingredient of different ayurvedic preparation to cure IDA in pregnancy. Most of these researches have proved that Amloki has the efficacy to increase haemoglobin level and improves iron status during pregnancy[13,14].

Amloki is renowned for its nutritional elements, which is rich in polyphenols, minerals (0.7%), considered as one of the richest source of vitamin C11,12. Many researchers have found presence of significant amount of zinc and other trace elements in amloki[15,16]. So, The study was undertaken to observe the effect of iron and amloki supplementation on serum zinc level in iron deficient pregnant women.

Materials and Methods:

On 43 pregnant women with IDA, this prospective interventional study was done. This study conformed to the Helsinki Declaration and was approved by the concerned departments, Research Review committee and Ethical Review Committee of Dhaka Medical College, Dhaka. After, fulfilling all the ethical aspects this study was performed in the department of Physiology of Dhaka Medical College. Subjects were in between 18 to 36 years having gestational age of 13th to 20th weeks. They were recruited from the outpatient department of Obstetrics and Gynaecology of DMCH, Dhaka on the basis of inclusion and exclusion criteria. Subjects were explained about the nature, purpose and benefit of the study in details. They were counselled for voluntary participation and allowed to withdraw from the study whenever they feel like. Informed written consent was taken from the participants. All the informations were recorded in a prefixed questionnaire. A detailed of pregnant females including socio economic condition, food habit, parity, menstrual history were taken along with haematological examination. They were free from any known cardiac, renal, liver and endocrine disorders. Compliance to the supplementation was monitored by regular telephonic communications. Amloki capsules and iron tablets were given in boxes for 45 days and participants were encouraged to continue the supplied medicine daily. Serum zinc level was estimated in the laboratory of the Department of Soil, Water and Environment, University of Dhaka, Dhaka. This parameter was studied 2 times in all subjects of control and study groups, i.e. at the beginning of the study (baseline) and after 45 days of study period. Diet and physical activity of the patients remained unchanged during the course of study. Clinically diagnosed and confirmed (Hb 8 to <11 gm/dl) patients of iron deficiency anaemia were selected and divided into two groups, 25 pregnant women with IDA, were supplemented with oral amloki capsules (1.072 gm) thrice daily and iron tablet [ferrous fumarate (200mg) + folic acid (0.02 mg)] once daily for 45 days, were considered as study group (Group A). Again, 21 pregnant women with IDA, supplemented with only iron tablet once daily for 45 days were considered as control group (Group B). One subject discontinued the study due to reluctance in group A after two weeks, while 2 subjects from control group left Dhaka after 4 weeks of study. So, finally 24 subjects of study and 19 subjects of control groups completed the study.

The amloki capsule (Amlahills) was authentified by the Department of Pharmaceutical Chemistry, Faculty of Pharmacy, University of Dhaka, which was manufactured by Isha Agro Developers PVT.LTD, India.

Paired Student's 't' test and Unpaired Student's 't' test were performed using SPSS Version 22.0 for statistical analysis. Mean ± SD were used for data expression. The p value < 0.05 was taken as level of significance.

Results:

The results are shown in table I and Figure 1. In this study, the mean serum zinc level was almost similar in A1 and B1 groups, and no statistically significant differences were observed. In group A2, the serum zinc ($p<0.001$) level was found significantly decreased in comparison to that of A1. Again, in group B2, the serum zinc ($p<0.001$) level was found significantly decreased in comparison to that of B1. While, in group A2, decreases in serum zinc ($p=0.286$) was not statistically significant in comparison to that of B2.

Table –I: Serum zinc level in respective groups (n=43).

Parameter	Groups			
	A_1 (24)	A_2 (24)	B_1 (19)	B_2 (19)
Zinc(μg/dl)	57.18 ± 12.03	54.28 ± 11.08	53.30 ± 16.17	50.09 ± 14.30

Statistical analysis

Parameter	*p* value			
	A_1 vs A_2	A_1 vs B_1	B_1 vs B_2	A_2 vs B_2
Zinc	<0.001	0.372	<0.001	0.286

Results are shown as mean ± SD. Paired t- test was considered for comparison within groups and unpaired t-test to compare between groups. The significance of the tests were calculated & p value < 0.05 was considered as level of significance.

N= Total number of subjects, n = number of subjects in each group;

A1: Study group (At baseline)

A2: Study group (After intervention with Amloki and iron tablet)

B1: Control group (At baseline)

B2: Control group (After intervention with iron tablet)

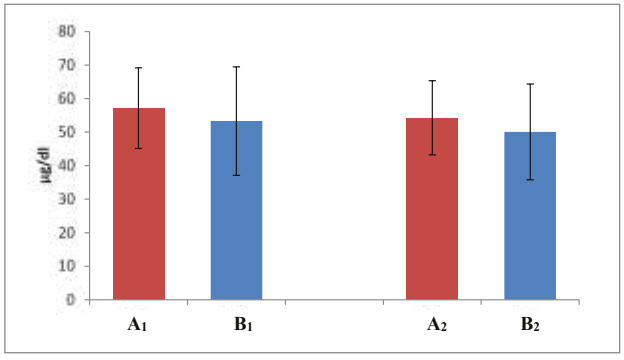

Figure-1: Mean serum zinc level in different groups (n=43).

N= Total number of subjects

A1: Study group (At baseline)

A2: Study group (After intervention with amloki and iron tablet)

B1: Control group (At baseline)

B2: Control group (After intervention with iron tablet)

Discussion:

In this study, the decrease in serum zinc (p=0.286) level was not statistically significant in amloki and iron supplemented group in comparison to that of only iron supplemented group. But decrease in serum zinc level (p<0.001) was found statistically significant in both groups in comparison to their baseline value.

O´Brien et al. (1999) also found no significant difference in serum zinc level in between (iron + zinc) supplemented group and only iron supplemented group[9]. They found significant decrease in serum zinc level in iron supplemented group in comparison to without iron supplemented group. Different researchers also found that, supplementation of iron during pregnancy causes decreased zinc absorption[17,18].

In pregnancy, serum zinc level decreases due to increased demand and hemodilution. Normally, iron bind with protoporphyrin IX to form haem. But, in case of iron deficiency, zinc replaces iron and combines with protoporphyrin IX. This combination further decreases serum zinc level in pregnant women with iron deficiency anaemia[19,6,20].

Some researchers suggested that, supplementation of iron can inhibit the absorption of zinc. Divalent metal transporter 1 (DMT1) in the duodenal enterocyte, is the common transporter for iron and zinc. These three elements compete to bind with the same transporter. When iron is supplemented, there is increased iron concentration at the site of absorption. Increased concentration of iron causes competitive displacement of zinc and copper from DMT1. Again, exposure to supplemental iron leads to down regulation of DMT1. That will subsequently decrease zinc absorption[21,7]. In this study, no significant differences were observed in serum zinc level in between amloki with iron supplemented group and only iron supplemented group, after 45 days of supplementation. Though amloki contain significant amount of zinc, it could not prevent the decrease of serum zinc level in iron deficient pregnant women. The cause may be due to improper iron and zinc ratio, as iron-zinc ratio > 2:1 can impair zinc absorption. Again, supplementation of iron during pregnancy may decrease zinc absorption[9].

Though, the actual mechanisms responsible for decreased serum zinc by oral amloki supplementation cannot be explained from the present experiment as the phytochemical study of amloki powder was not done.

Conclusion:

The results concluded that oral iron intervention for the treatment of IDA in pregnancy causes decreased serum zinc level. In this study, Amloki shows no significant effect on serum zinc level.

Conflict of Interest: None.

Acknowledgement:

The authors acknowledge Department of Pharmaceutical Chemistry, Faculty of Pharmacy and Department of Soil, Water and Environment, University of Dhaka for their kind cooperation.

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ORIGINAL ARTICLE OPEN ACCESS

Neurodevelopmental Co morbidities of Poorly-Controlled Childhood Epilepsy: A Case-Control Study

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Abstract

Introduction: *The epilepsy associated co morbidities are often underestimated, consequently, undertreated. The aim of the present study was to determine neurodevelopmental co morbidities associated with poorly controlled childhood epilepsy.* ***Materials and Methods:*** *This retrospective study was performed from January 2007 to December 2008 at Paediatric Neurology outpatient department in Bangabandhu Sheikh Mujib Medical University, Dhaka, among the children with epilepsy of 7 months to 15 years age who had history of at least 6 months treatment with rational antiepileptic drugs daily with adequate compliance. There were two groups of patients; group 1, consisted of 50 poorly controlled epilepsy patients and group 2, comprised 50 well-controlled epilepsy patients. We retrospectively reviewed EEGs and medical records from these children. Features of neurolodevelopmental co morbidities were compared between the two groups.* ***Results:*** *In this study, initial EEG was abnormal significantly in poorly controlled group (OR= 5.27; p=0.025). Co morbidities- cerebral palsy, language and speech delay, motor delay, microcephaly and cognitive disability were significantly higher in poorly-controlled epilepsy group compared to well-controlled epilepsy group (60.0% vs. 24.0%, p <0.001; 74.0% vs. 38%, p <0.001; 72% vs. 40%, p <0.01; 60% vs. 30.0%, p <0.01; 70% vs 32%, p <0.001 respectively).* ***Conclusion:*** *The study showed several neurodevelopment co morbidities that can be identified early in the course of childhood epilepsy which can predict development of poor seizure control. Knowledge of these co morbidities will help us to discriminate our patient and can inform therapeutic choices.*

Keywords: *Neurodevelopment, Co morbidities, Poorly- controlled epilepsy.*

Number of Tables: 04; Number of References: *33;* ***Number of Correspondence:*** *03.*

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Introduction:

Epilepsy is still an issue that perplexes the epileptologists worldwide, with a reported impact on 50 million populations[1]. Seizures affect 4-7% of children[2]. Epilepsy is considered to be present when two or more unprovoked seizures occur at an interval greater than 24 hours apart[3]. One or more seizures per month over a period of 6 months or more even after experiencing trials of at least two different antiepileptic drugs alone or in combination at optimum doses with adequate compliance is called intractable epilepsy[4]. Epilepsy is refractory when seizures are so frequent or severe that they limit the patient's ability to live life fully according to his or her wishes or necessitate the use of medications that, although effective, produce adverse effects[5]. Neurodevelopmental function is a basic brain process that may be needed for learning and productivity[3].

The term "co morbidity" refers to one or more other disease among people with an index disease[6].With the reconceptualization of epilepsy as a disease of brain network, it is great timing to rethink epilepsy and those associated comorbidities, including cognitive and behavioral co morbidities, psychiatric co morbidities, cardiovascular disease and migraines[1].The epilepsy associated co morbidities are often underestimated, consequently, undertreated. Furthermore, cognitive deficits always remain despite seizure greatly control[7]. Cognitive and behavioural co morbidities are often seen in children with epilepsy, and are more common and severe in refractory epilepsy. These comorbidities are associated with worse quality of life, increased behavioural and language problems and worse social skills, all of which adversely affect long-term psychosocial functioning. The location of the epileptic focus can, to a certain degree, predict the type(s) of comorbidity[8].

Epilepsy may disrupt brain functions necessary for language development by its associated intellectual disabilities or directly as a consequence of the seizure disorder. Any process that impairs language function has long-term consequences for academic, social, and occupational adjustments in children and adolescents with epilepsy. Furthermore, impairments in specific language abilities

Received: 07 November 2020 *Accepted revised version:* 13 February 2021

can impact memory and learning abilities[9]. Epilepsy appear in more than 20% of children with cerebral palsy, unspecified cognitive impairment, pervasive developmental delay, as well as in specific genetic syndromes associated with cognitive impairment. In addition, there are different types of epilepsy that may be associated with different types of developmental disability. Both the paper electroencephalogram (EEG) and the video EEG remain the most valuable tools that are used to evaluate patients with both epilepsy and a developmental disorder[10]. There are different studies regarding the co-morbidity of epilepsy and numerous childhood onset conditions, like cerebral palsy, autism, down syndrome, and mental retardation[11,12,13]. A recent study in pediatric population with cerebral palsy indicates that 35% have a history of epilepsy[14]. Among individuals with severe/profound mental retardation, increased rates of underlying neurological abnormalities are manifested by a higher frequency of mixed seizure disorders and an onset of seizures in infancy or early childhood. This factor contributes to higher rates of uncontrollable seizures and neuropsychiatric complications. One Bangladeshi study showed that the neuropsychiatric, developmental and pain disorders are quite common co morbid conditions among epilepsy patients[15].

As literatures were reviewed there were few published data about this type of study in our country. But there is no study in our country related to co morbidities and poor seizure control. There are a number of conditions to be co morbid with epilepsy, the improved knowledge base of which is very much important. The awareness of co morbidities can improve diagnosis. Some co morbidities may influence the prognosis of epilepsy. The recognition of co morbidities can inform therapeutic choices. This study is aimed to find out the different neurodevelopmental co morbid conditions in poorly-controlled childhood epilepsy patients.

Materials and Methods:

This case-control study was conducted from January 2007 to December 2008 at Paediatric Neurology OPD, Bangabandhu Sheikh Mujib Medical University. 50 cases of poorly-controlled epilepsy in group-1 and 50 cases of well-controlled epilepsy in group-2 were enrolled in the study. Children of either sex with epilepsy aged 7 months to 15 years with history of at least one unprovoked seizure per month for 6 or more months and history of treatment with 2 or more rational antiepileptic drugs (AED) daily, either singly or in combination for at least 6 months and adequate compliance to antiepileptic drugs were considered as case. Children of either sex with epilepsy, aged 7 months to 15 years who had been seizure-free during 6 months after start of treatment were considered as control. Poorly controlled epilepsy was defined as one or more seizure per month over a period of 6 months or more even after experiencing trials of at least two different antiepileptic drugs alone or in combination at optimum doses with adequate compliance. Well-controlled epilepsy was defined as no seizure during 6 months after start of treatment with AED.

Once the child was reporting, a structured questionnaire was completed, containing pre-defined variables of neurodevelopmental co morbidities that may help predicting the poor seizure control. Then a detailed history including gender, age of onset, initial EEG status, cerebral palsy, language and speech delay, motor delay, cognitive disability and Microcephaly etc. were recorded and medical records were reviewed. Details regarding antiepileptic drugs were recorded i.e. number of drugs, duration of therapy, dosage and compliance. It was noted whether the choice of drugs were correct or incorrect in relation to seizure type and the dosage schedule was proper according to body weight. Thorough physical examination including neurodevelopmental and psychological assessment was done. Cognitive status was determined by results of tests of global cognitive functioning. Clinical syndromes like Autism, Attention-Deficit Hyperactivity Disorder (ADHD), Down syndrome were included under variable, cognitive disability. All study patients were seen by a consultant Paediatric Neurologist of the unit. Seizures were classified using the International League Against Epilepsy (ILAE) classification of epileptic seizure. First Interictal EEG recordings obtained with a 19 channel Electroencephalograph, employing scalp electrodes placed according to the international 10-20 system were studied. Serum drug level was not measured. An antiepileptic drug was considered to have failed if it did not control seizures in spite of good compliance or if medication was discontinued because of unacceptable side effects. A drug used acutely to treat status epilepticus was not counted as one of the two AEDs. Child was a case or a control. Group1 consisted of poorly controlled epilepsy patients and Group2 comprised well-controlled epilepsy patients. A comparison of various neurodevelopmental co morbidities between the two groups was done. Data were analyzed using statistical package SPSS (version 15.0). Standard tests of significance, such as Chi-square test was applied for categorical variables and 't' test was done for quantitative variables. 95% confidence interval (CI) and p values were also computed. P-value of <0.05 was considered significant. Binary logistic regression analysis was performed to determine independently significant variables.

Results:

Table I shows that 54% of the poorly-controlled epilepsy patients and 44% of well controlled epilepsy patients were between 1-5 years age group. However there was wide spread distribution in different age groups. The mean age was found to be 4.59 ± 3.19 years in poorly-controlled group and 5.91 ± 3.72 years in well- controlled group. No significant statistical difference was observed between poorly-controlled and well-controlled group in respect to age ($p=0.062$). In poorly-controlled group 60.0% were males and 40.0% were females, while in well-controlled

group males and females were 66.0% and 34.0% respectively. There was no significant statistical difference between the two groups in respect to sex (p=0.534).

Table-I: Distribution of the subjects by demographic variables (n=100).

Variables	Groups		p value
	Group1 (n=50) No (%)	Group2 (n=50) No (%)	
Age (year)			
o ≤1year	5 (10.0)	1 (2.0)	
o 1-5 years	27 (54.0)	22 (44.0)	
o 5-10 years	16 (32.0)	20 (40.0)	
o >10 years	2 (4.0)	7 (14.0)	
Mean ± SD	4.59 ± 3.19	5.91 ± 3.72	0.062[NS(a)]
Sex			
o Female	20 (40.0)	17 (34.0)	
o Male	30 (60.0)	33 (66.0)	0.534[NS(b)]

[a]Unpaired t test was done to measure the level of significance. [b]**Chi-square test** was done to measure the level of significance. NS= not significant

Table II shows that 96.0% of the patients in poorly-controlled epilepsy group had abnormal EEG in contrast to 82.0% of the patients in well-controlled epilepsy group (p<0.05).

Table II: Distribution of the subjects by initial EEG status (n=100).

EEG	Groups		OR (CI)	p value
	Group1 (n=50) No (%)	Group2 (n=50) No (%)		
Normal	2 (4.0)	9 (18.0)		0.025*
Abnormal	48 (96.0)	41 (82.0)	5.27 (1.08-25.78)	

Chi-square test was done to measure the level of significance.***p<0.05**
Group1: Poorly- controlled epilepsy
Group2: well-controlled epilepsy **n =** number of patients

Table III demonstrates that associated cerebral palsy, language and speech delay, motor delay, Microcephaly and cognitive disabilities were significantly higher in poorly-controlled epilepsy group compared to well-controlled epilepsy group (60.0% vs. 24.0%, p <0.001; 74.0% vs. 38%, p <0.001; 72% vs. 40%, p <0.01; 60% vs. 30.0%, p <0.05; 70% vs. 32%, p <0.001 respectively.

Table III: Distribution of the subjects by neurodevelopmental co morbidities (n=100).

Variables	Groups		p value
	Group1 (n=50) No (%)	Group2 (n=50) No (%)	
Cerebral palsy (CP)	30 (60.0)	12 (24.0)	<0.001*
Motor delay	36 (72.0)	20 (40.0)	<0.01*
Language & speech delay	37 (74.0)	19 (38.0)	<0.001*
Microcephaly	30 (60.0)	15 (30.0)	<0.05*
Cognitive disability	35 (70.0)	16 (32.0)	<0.001*

Chi-square test was done to measure the level of significance. ***p** <0.05
Group1: Poorly- controlled epilepsy
Group2: well-controlled epilepsy **n =** number of patients

Table IV shows Binary logistic regression performed to assess the impact of several factors on poor seizure control. The model contained five independent predictors (cerebral palsy, motor delay, language and speech delay, Microcephaly and cognitive disability). Only two of the independent variables (language and speech delay and cognitive disability) made a unique statistically significant contribution to the model (P =0.020 and p= 0.014 respectively).

Table IV: Binary Logistic Regression Results for Detection of co morbidity.

Variables	Significance	Odds Ratio (OR)	95% CI for OR
Cerebral palsy	0.135	0.433	0.145- 1.298
Motor delay	0.270	0.525	0.168- 1.647
Language and speech delay	0.020*	0.306	0.112- 0.832
Microcephaly	0.680	1.285	0.390- 4.239
Cognitive disability	0.014*	0.305	0.118- 0.789

***Statistically significant (P<0.05)** **CI= Confidence Interval**

Discussion:

This study was done to search the neurodevelopmental co morbidities that are associated with the poor control of childhood epilepsy. This retrospective study demonstrated that there were a number of co morbid conditions that were associated with poor seizure control. Early identification of these factors might help in planning early intervention.

Table I illustrates the demographic characteristics of the patients. Age (mean± SD) at presentation of poorly controlled group was 4.59 ± 3.19 years and that of well-controlled group was 5.91 ± 3.72 years. No significant statistical difference was observed between poorly controlled and well-controlled group in respect to age (p=0.534). In poorly controlled group males were (60.0%) and females were (40.0 %) and in well-controlled group males and females were 66.0% and 34.0% respectively. In both groups males were predominant. No significant statistical difference was observed in this study in respect to sex between poorly controlled and well-controlled group (p=0.062) that is poor seizure control occurs with equal frequency in both sexes. This finding was supported by the study done by Kwan P et al.[16] who did not find any significant difference in sex between the groups that become seizure free and the group with uncontrolled seizure. They found that 52% of the patients with uncontrolled epilepsy were male and 47% were female, whereas 47% male and 53% female were found in patients who were seizure free. But Malik et al.[17] found that male gender was a risk factor for intractable seizures (p=0.001) and this finding was similar to that previously done by Akhondian et al.[18] The male predominance in this study was more likely to be because of a selection bias.

Table II shows that 96.0% of the patients in poorly controlled group have abnormal EEG in contrast to 82.0%

of patients in well-controlled group. EEG abnormality was significantly associated with poor seizure control (p= 0.025). This finding was similar to those done by many authors. Singhi et al[19] found that EEG was abnormal more in intractable epilepsy patients (69% cases). Banu et al.[20] found that EEG was abnormal in 80.8% cases and it was found to be associated with more than 4 times (OR= 4.09) risk to poor seizure remission (p= 0.0016). Similar finding was seen by Akhondian et al.[18] who found that the first EEG was abnormal in 96.1% of patients in the intractable group and in 83.8% of the patients in the well-controlled group (p=0.031). Another study carried out by Malik et al.[17] found that higher proportion of the patients with abnormal EEG continued to have seizures during the study period compared to patients with normal EEG (63% vs. 19%; OR= 7.28; 95% CI= 4.34-12.18; p-value<0.001.

Table III demonstrates that cerebral palsy, language and speech delay, motor delay and microcephaly and cognitive disability were present more in poorly-controlled epilepsy compared to well-controlled epilepsy (60.0% vs. 24.0%; 74.0% vs. 38%; 72% vs. 40% ; 60% vs. 30.0% and 70% vs. 32% respectively).

Cognitive disability previously called 'Mental Retardation' was found as a predictor of poor seizure remission (p <0.001)as shown in table III. This finding was relevant to that done by Ko and Holmes[21]. They showed that 20.1% patients in intractable group compared to 2.6% in controlled group had mental retardation (p=0.03). Singhi et al.[19] found that mental retardation was present in 11.0% of intractable epilepsy patients and it was found to be a poor prognostic factor. Oskoui et al.[22] showed that mental retardation at onset was a significant risk for intractability (OR=7.2). Huttenlocher & Hapke[23] found that the majority of children with uncontrollable seizures (61%) were mentally retarded and remission of seizures was much less frequent (1.5%/ year) in this group with mental retardation. One Bangladeshi study Chowdhury RN et al[15] showed that Mental retardation was more common and significantly associated (p=0.0001) with generalized epilepsy patients.

This study shows that 60% of the patients in poorly controlled group have Microcephaly compared to 30% of the patients in well controlled group. Microcephaly is significantly associated with poor seizure control (p <0.05). This finding is relevant to those done by many authors. Chawla et al.[24] found microcephaly in 58% cases of intractable epilepsy compared to only 1% cases of well-controlled epilepsy. But Berg et al.[25] found 23.7% microcephaly in cases compared to 3.1% in controls. Yilmaz et al[26] showed that Strong univariate association was observed between intractability and Microcephaly. Microcephaly is present in 29% in intractable epilepsy compared to 10.1 % in drug responsive group (p <0.001).

Motor delay was present in 72% of the cases in poorly controlled epilepsy as compared to 40% of the patients in well controlled group (p <0.01). Ko and Holmes[21] also found motor delay in 34% of intractable group compared to 7.7 of controlled group (p<0.01). Yilmaz et al[26] showed that Strong univariate association was observed between intractability and motor developmental delay. They found that motor delay is present in 82% in intractable epilepsy compared to 28.8% in drug responsive group (p <0.001). Oskui et al[27] found that this factor is predictive of poor seizure outcome (odds ratio 8.9).

Table III also shows that 60.0% of the patients in poorly controlled group have cerebral palsy in contrast to 24.0% of patients in well-controlled group(p <0.001). This finding was similar to those done by many authors. Chowdhury et al[15] found that cerebral palsy was more common and significantly associated (p=0.005) with generalized epilepsy patients. A study about children with cerebral palsy by Singhi et al[14] indicate that seizure control in children with cerebral palsy is difficult and could be achieved in just over half of the patients. Among the 105 children with CP & seizure, 45 (58.1%) children got seizure control, most of them requiring poly-therapy. Cerebral palsy is present in 13.9% of children with epilepsy as compared to 0.3% in general child population (odds ratio=55.9%) as shown by Aaberg et al[28]. It has been recognized that children with cerebral palsy have low seizure remission rates of about 12.9% to 14% and high relapse rates of 41.5% to 62.5% showed by Aksu et al[29] & Delgado et al[30].

The present study showed that language and speech delay was present in 74% cases of poorly controlled epilepsy in comparison to 38% of the cases in well-controlled group(p <0.001). Several studies (Fastenau et al[31] & Caplan et al[32]) found that children with absence epilepsy had worse language performance than children with focal epilepsy. In contrast, Hermann et al[33] found that children with focal but not generalized epilepsy had poorer language than controls. Ko and Holmes[21] found that 20.1% cases in intractable group had language delay compared to 7.7% in controlled group. But did not found any statistical difference between two groups (p=0.08). It is not only acute seizures or epileptiform discharges that cause language dysfunction, but that chronic changes to underlying networks may cause persistent language problems.

Independent co morbidities associated with poor seizure control after binary logistic regressions were language and speech delay and cognitive disability.

Conclusion:

The study showed several neurodevelopmental co morbidities that can be identified early in the course of childhood epilepsy which can predict development of poor seizure control. Knowledge of these comorbidities will help us to discriminate our patient and can inform therapeutic choices.

Conflict of Interest: None.

Acknowledgement:

Thanks and all praise to Almighty Allah, the beneficent, the merciful for providing us enough energy and patience to

complete this article. Our special thanks and gratitude to Prof (Dr) C.A. Kawser, Professor and Ex chairman, Department of General Paediatrics, Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh for providing instructions, encouragement and valuable advice from beginning of this study. We would like to express our sincere gratitude and gratefulness to all teachers, doctors and employee in the department of paediatrics, Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh for valuable suggestions and advices to complete this study.

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ORIGINAL ARTICLE OPEN ACCESS

Biochemical Features of Type 2 Diabetics in Kushtia District, Bangladesh.

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Abstract

Introduction: *Biochemical analysis or laboratory tests assist to determine what happening to the body internally. The aim of the present study was to access the biochemical features of type 2 diabetic patients in Kushtia district, Bangladesh.* ***Materials and Methods:*** *The cross-sectional study was conducted in type 2 diabetes mellitus patients who presented to the OPD in three referral diabetic centers in Kushtia district, Bangladesh from August 2016 to July 2017. A total of 282 patients were included in the study. The collected data were checked, entered and analyzed using the computer program Statistical Package for Social Sciences (SPSS) version 22.* ***Results:*** *Biochemical study showed that mean blood hemoglobin level was 12.49±1.47g/dl, mean fasting blood glucose level of the patients was 8.86±1.67mmol/L and blood glucose level two hours after breakfast was 13.94±2.88mmol/L. The study showed that the patient having abnormal level of triglyceride (66%) were higher than normal level (34%).* ***Conclusion:*** *The subjects had higher triglyceride and LDL values (65.6% and 28.7% respectively). These higher percentages with abnormal lipid profile are likely to be more prone to cardiovascular diseases.*

Keywords: *Diabetes mellitus, Type 2 diabetes, Biochemical indices, Lipid profile.*

Number of Tables: *03;* ***Number of Figure:*** *01;* ***Number of References:*** *21;* ***Number of Correspondence:*** *04.*

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Introduction:

Diabetes Mellitus (DM) is a serious health hazard all over the world. In the South East Asian region there were 72 million adults with DM in 2013 and it is expected to rise to more than 123 million by 2035[1]. Diabetes mellitus is a chronic condition that arises when the pancreas fails to produce enough insulin or when the body cannot use the insulin produced effectively[2]. It is an increasing threat to the world's health service. Formerly described as a "disease of affluence", it has now become evident that, owing to demographic changes, cultural transition and population ageing, diabetes is now also a "developing countries problem" [3].

Type 2 diabetes accounts for more than 90% cases and is associated with older age and obesity[4]. It usually begins as insulin resistance, a disorder in which the cells do not use insulin properly. As the need for insulin rises, the pancreas gradually loses its ability to produce it[5]. The resulting hyperinsulinemia helps maintain normal glucose tolerance. In many individuals, this condition corresponds to the metabolic syndrome of insulin resistance which is defined by obesity, insulin resistance, hyperlipidemia, hyperinsulinemia and hypertension, and do not progress to diabetes always[6]. During the progression of the disease, beta cell function declines and the patient then has a fasting hyperglycemia. It occurs mostly after 40 years in obese subjects and its prevalence increases with age[7]. Glycemia is the concentration of glucose circulating in the blood. The glucose in the blood from two sources: an exogenous origin (food provides carbohydrates such as sugar, starches, fruits, which are degraded by enzymes, mainly glucose) and endogenous origin since the liver is an organ producing glucose through two pathways, glycogenolysis and gluconeogenesis[8]. Increased rates of hepatic glucose production result in the development of overt hyperglycaemia, especially fasting hyperglycaemia, in patients with type 2 diabetes[9]. In such conditions, lipolysis in adipose tissue is promoted leading to elevated circulating levels of free fatty acids[10]. In addition, kinetics of whole-body protein metabolism are elevated, and net balance is diminished in type 2 diabetes, independently of obesity[11].

Type 2 diabetes is a disease associated with abnormal carbohydrate metabolism which arises due to insulin deficiency as insulin is the key hormone responsible for glucose homeostasis in blood[12]. Consequently, elevation of blood glucose predominantly affects RBC's, vascular endothelial cells and walls of capillaries which often leads to microvascular complications in T2DM including retinopathy,

Received: 01 September 2020 *Accepted revised version:* 02 February 2021

nephropathy and neuropathy[13]. Hyperglycaemia can lead to vascular complications through various mechanisms[14].

Deformability of RBC's is one of the haemorheological parameters which is altered in type 2 diabetic patients. RBCs of type 2 diabetic patients tend to aggregate more easily when compared with healthy subjects. Excessive aggregation of RBC is one of the most important features in type 2 diabetic patients with poor glycaemic control. This has a direct effect on the WBV[15].

A significant percentage of type 2 diabetic patients have abnormal serum lipid. Recent studies have revealed that insulin resistance is not only associated with hyperglycaemia alone, but also with several other disorders which are associated with the concentrations of lipoproteins[16]. In type 2 diabetic patients, typical abnormalities frequently observed in lipid profile are elevated total and VLDL cholesterol, triglyceride, low levels of HDL, and a large number of dense LDL particles[17]. It is well understood that diabetic dyslipidemia is a major hallmark of metabolic syndrome and found to play an extensive role in the pathogenesis of CVD[18]. Creatinine is a protein and its assay in blood and urine can evaluate renal function. If the rate is high, it means that renal function is disturbed[19].

Materials and Methods:

A descriptive, cross-sectional study was conducted from August 2016 to July 2017 among 282 (male were 144, female were 138, 142 resided in urban area and 140 resided in rural area) type 2 diabetic patients attending OPD in three referral diabetic centers in Kushtia district, Bangladesh. After arriving in the center the participants were asked about their fasting status by field volunteers. The investigation was carried out only after reporting of fasting state by the participants. Subjects were asked to sit on a chair and an appropriate blood was taken from the patients. Data were summarized in mean ± SD, frequency & percentage and presented in tables using Statistical Package for Social Science (SPSS) version 22. For all analyses, p value <0.05 was considered statistically significant.

Results:

The mean blood hemoglobin level was 12.49±1.47g/dl, in which male hemoglobin level was 12.85±1.48g/dl and of female was 12.11±1.36g/dl. The mean fasting blood glucose level of the patients was 8.86±1.67mmol/L and blood glucose level two hours after breakfast was 13.94±2.88mmol/L. The mean serum creatinine level of the male patients were 1.17±1.05mg/dl and female were 1.26±1.05mg/dl. The patients mean total cholesterol, low density lipoprotein; high density lipoprotein and triglyceride levels were 197.23±48.99mg/dl, 117.21± 44.65 mg/dl, 34.9 6±5.38mg/dl and 225.30±74.08mg/dl respectively (Table-I).

Table-I: Mean biochemical indices of the respondents (Diabetic Patients).

Biochemical indices	Male	Female	Male & female Combined	P-value	Normal Range
Blood hemoglobin level (g/dl)	12.85 ± 1.48	12.11 ± 1.36	12.49 ± 1.47	.000	M: 14-18, F: 11.5-16.5
Fasting blood glucose (mmol/L)	8.69 ± 1.48	9.04 ± 1.84	8.86 ± 1.67	.080	< 7.0
Bl. Glucose 2 hours after breakfast	13.86 ± 2.92	14.01 ± 2.84	13.94 ± 2.88	.673	< 11.1
Serum creatinin (mg/dl)	1.17 ± 1.05	1.26 ± 1.05	1.22 ± 1.05	.480	0.70 – 1.20
Total cholesterol (mg/dl)	198.49 ± 51.87	195.92 ± 45.96	197.23 ± 48.99	.660	Up to 200
LDL (mg/dl)	119.66 ± 48.34	114.65 ± 40.45	117.21 ± 44.65	.347	< 150
HDL (mg/dl)	35.31 ± 5.53	34.59 ± 5.21	34.96 ± 5.38	.263	M: >45, F: >35
Triglycerides (mg/dl)	217.57 ± 70.95	233.37 ± 76.63	225.30 ± 74.08	.073	50 - 150

HDL = High density lipoprotein
LDL = Low density lipoprotein

The mean fasting blood glucose levels for female in rural area was 9.16±2.03 and urban area was 8.93±1.65. Mean two hours after blood glucose levels for male in rural area was 14.36±2.92 and urban area was 13.32±2.83. Mean blood hemoglobin levels for male and female living in rural area were 12.75±1.49 and 11.98±1.36 (Table-II).

Table-II: Mean biochemical indices of the respondents (Diabetic Patients) in correlation to place of residence.

Biochemical indices:	Male	Female	Male & Female Combined
Blood hemoglobin level (g/dl)			
Urban	12.95 ± 1.48	12.23 ± 1.36	12.58 ± 1.46
Rural	12.75 ± 1.49	11.98 ± 1.36	12.39 ± 1.48
Fasting blood glucose (mmol/L)			
Urban	8.57 ± 1.43	8.93 ± 1.65	8.76 ± 1.55
Rural	8.79 ± 1.52	9.16 ± 2.03	8.96 ± 1.78
Bl. Glucose 2 hours after breakfast			
Urban	13.32 ± 2.83	13.92 ± 2.81	13.63 ± 2.82
Rural	14.36 ± 2.92	14.11 ± 2.90	14.25 ± 2.90
Serum creatinin (mg/dl)			
Urban	1.34 ± 1.25	1.23 ± 1.07	1.28 ± 1.16
Rural	1.01 ± 0.79	1.29 ± 1.03	1.14 ± 0.92

The distribution of patients with normal and abnormal levels of various lipid constituents differed. Majority of the patients 65.6% had abnormal levels of triglyceride followed by 31.2% with abnormal total cholesterol, 28.7% with abnormal LDL and 40.8% with abnormal HDL (Table-III).

Table-III: Lipid profile of the respondents (Diabetic Patients).

Lipids categories	Normal		Abnormal		Total		Normal values
	(n)	(%)	(n)	(%)	(n)	(%)	(mg/dl)
Total cholesterol	194	68.8	88	31.2	282	100.0	Up to 200
LDL	201	71.3	81	28.7	282	100.0	< 150
HDL	167	59.2	115	40.8	282	100.0	M >45, F>35
Triglycerides	97	34.4	185	65.6	282	100.0	50-150

According to Figure 1, the patient having abnormal level of triglyceride (66%) were higher than normal level (34%).

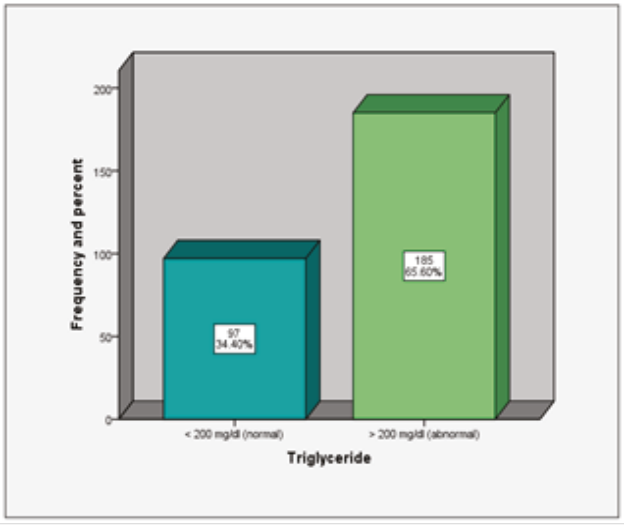

Figure-1: Showing distribution of normal and abnormal triglyceride level of the diabetics.

Discussion:

This study showed that mean fasting blood glucose levels for female in rural area was 9.16±2.03 and urban area was 8.93±1.65. So, the mean fasting blood glucose levels for females showed a fairly different values compared to mean following fasting blood glucose in our urban and rural population. Mean two hours after blood glucose levels for male in rural area was 14.36±2.92 and urban area was 13.32±2.83. Here, the mean two hours after blood glucose levels for males showed fairly different values compared to mean following two hours after blood glucose in our urban and rural population.

Study showed that the respondents had abnormal triglyceride in high percentage (65.6%)[20]. The mean values for lipid profile of the study were total cholesterol 197.23 ± 48.99mg/dl, low density lipoprotein 117.21 ± 44.65mg/dl, high density lipoprotein 34.96 ± 5.38mg/dl and triglyceride 225.30 ± 74.08mg/dl. Dyslipidemia does exist in diabetes mellitus and they are always at risk of macro-vascular complications. The abnormalities of lipid profile in diabetics include elevated total cholesterol, triglyceride, low density lipoprotein (LDL) and reduced high density lipoprotein (HDL)[21].

Conclusion:

Diabetes mellitus is a major public health problem that requires proper medical and dietary management. The subjects had higher triglyceride and LDL values (65.6% and 28.7% respectively). These higher percentages with abnormal lipid profile are likely to be more prone to cardiovascular diseases. The high intake of fruit and vegetables among the diabetics could be because of high level of awareness on the importance of fruits and vegetables to diabetes management as vegetables contain fiber, which helps reducing cholesterol thereby controlling blood glucose. Diabetes patients should be counseled to adopt healthy eating habits and encouraged them to improve their diets in order to prevent diabetes and its complications.

Conflict of Interest: None.

Acknowledgement:

The authors are grateful to the secretary ethical committee of each of the three diabetic centers to use patients from out-patient departments.

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ORIGINAL ARTICLE OPEN ACCESS

Accuracy of Clinical Diagnosis of Burst Appendix, a Study of 200 Cases in DMCH.

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Abstract

Introduction: *Acute appendicitis is the most common surgical emergency. If Simple acute appendicitis progress to perforation, then it is associated with a much higher morbidity and mortality. This study is aimed to evaluate the accuracy of clinical diagnosis of burst appendix.* ***Materials and Methods:*** *This observational study was carried out in the department of surgery, Dhaka Medical College Hospital, Dhaka, from January 2012 to December 2012.Total 200 cases of suspected burst appendicitis were included in this study.* ***Results:*** *Among the 200 cases of suspected burst appendix patients, majority of the cases 48% were of 25 – 34 years age group, 29.5% were of 15 – 24 years age group, 13% were of 35 – 44 years age group and other age group patients were few in number. Most of the cases 71% were male and 29% were female. Higher income group of patients are less sufferer 8%, middle income group and lower income group of patients are more sufferer 59% and 33% respectively. Depending on clinical features accuracy of clinical diagnosis of burst appendix is 76.5%. Diagnostic accuracy in male 78.17% and in female 72.41%.Total patients of confirmatory burst appendix was 153. 111 were male and 42 were female. Male and female ratio was 2.64:1. Diagnostic accuracy 77.9% in 15-24 years age group, 92.7% in 25-34 years age group, 50% in 35-44 years age group, 35.72% 45-54 years age group and 0% in >54 years age group of study population.* ***Conclusion:*** *Burst appendix present a challenge to the clinicians because there may be delay in diagnosis, as a result, delay in operation and may develop fatal complications. Surgeons have therefore been inclined to operate when the diagnosis is probable rather than wait until it is certain.*

Keywords: *Burst appendix.*

Number of Tables: *04;* ***Number of Figures:*** *03;* ***Number of References:*** *22;* ***Number of Correspondence:*** *04.*

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Introduction:

The appendix is a small, finger-shaped organ in the right lower quadrant of the abdomen. Acute appendicitis is the most common abdominal surgical emergency in the world[1] which is treated with surgical intervention[2]. It is caused by obstruction of appendix lumen with fecalith, which will lead to bacterial colonization, inflammation, ischemia and progress to perforation[3].

One of the major reasons for the perforation of the appendix is the delay in diagnosis and treatment of the acute appendicitis[2]. Delay in surgical intervention has been associated with increased rate of perforation from 3% in patients operated within 24 h of presentation to 31% in patients operated at 36 h[4] .Usually, the perforation may happen after 36 hours of the onset of symptoms but a slight majority of patients with a perforated appendicitis present more than 48 hours after symptom onset[5]. This is a life-threatening condition, as bursting of the appendix can result in spread of the infection in the entire abdomen. So, surgery is indispensable and should be performed without any unnecessary delay[6]. However, appendectomy can be complicated[7] after the perforation of the appendix, as compared to the surgery which is performed to remove an inflamed appendix which is intact and infected. The mortality rate of non perforated appendicitis is <1%; however, perforated appendicitis carries a higher mortality rate of around 5%[8] Furthermore, postoperative complication rates ranged between 10 and 19% for uncomplicated acute appendicitis and reaching 30% in cases of complicated acute appendicitis.

Received: *20 October 2020* ***Accepted revised version:*** *10 February 2021*

Materials and Methods:

This was observational study and carried out in the department of surgery, Dhaka Medical College Hospital, Dhaka, Bangladesh, from January 2012 to December 2012. Total 200 cases of suspected ruptured appendicitis were included in this study. We excluded children under the age of 15 years and Patients operated in the gynaecological department.

Some Operational definition, High income groups: Monthly income of guardian >20,000 taka. Middle income groups: Monthly income of guardian 10,000 - 20,000 taka. Low income groups: Monthly income of guardian <10,000 taka. Different types of variables evaluated like, Symptoms: Pain in abdomen, Nausea, Vomiting, Fever, Diarrhea, Anorexia, Abdominal distention, Duration of symptoms. Signs: General examination (Dehydration, Temperature, Pulse, BP). Abdominal examination: (Tenderness in RIF, Diffuse tenderness, Rebound tenderness, Pointing sign, Rovsing's sign, Psoas test, RIF muscle rigidity, Abdominal distention, Obliteration of liver dullness, Bowel sounds.) Rectal examination: (Tenderness on right side, Tenderness on recto-vesicl or recto-uterine pouch) Investigations: Laboratory findings, Plain x-ray abdomen, USG of whole abdomen. Operative findings: Site of perforation, Generalized peritonitis, Localized peritonitis, Localized abscess, Periappendiceal fluid collection, Extra luminal appendolith. Early postoperative complications: Fever, Wound infection, Pneumonia, Intra-abdominal abscess, Wound dehiscence Burst abdomen, Prolong paralytic ileus. Confounding variables: Age, Sex, Socioeconomic condition Nutritional status.

Detailed information were obtained in each case. Complete history was taken either from patients or accompanying attendants. Thorough physical examination were done. Relevant investigations and operation notes were collected. All the information was recorded in the fixed protocol. Collected data was classified, edited, coded and entered into the computer for statistical analysis by using SPSS.

Results:

Age group distribution of the study population, majority of the cases 48% were of 25 – 34 years age group, 29.5% were of 15 – 24 years age group, 13% were of 35 – 44 years age group and other age group patients were few in number.

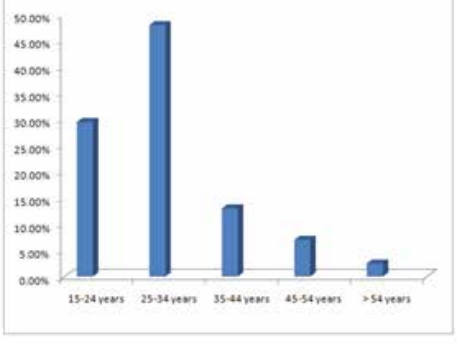

Figure-1: Age distribution of the study population.

Most of the cases 71% were male and 29% were female.

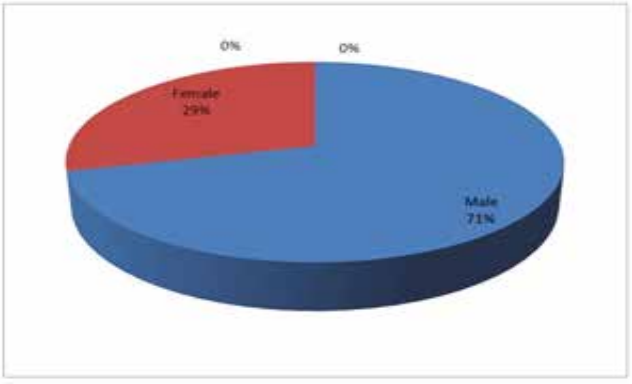

Figure-2: Sex distribution of the patients.

Socioeconomic status of the study population, 8% were from higher income group, 59% were from middle income group and 33% were from lower income group, classification was made from monthly income of guardian.

Table-I: Socioeconomic status of the patients.

Status	Numbers	Percentage
High income group	16	8%
Medium income group	118	59%
Low income group	66	33%
Total	200	100%

Burst appendix comprises 58.17% in the age group of 25-34 years and second peak of 30.06% in the age group of 15-24 years.

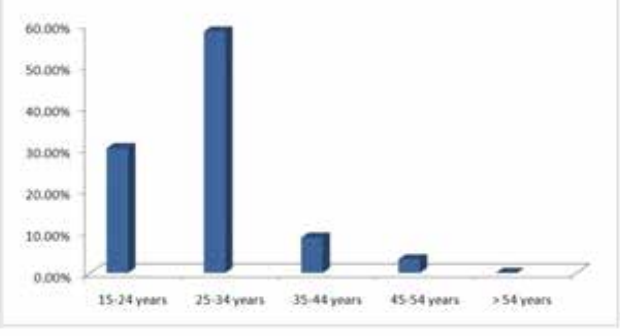

Figure-3: Age incidence of burst appendix.

Depending on clinical features accuracy of clinical diagnosis is 76.5%.

Table-II: Diagnostic accuracy.

Diagnosis	Number of Patients	Percentage
Correct Diagnosis	153	76.5%
Incorrect Diagnosis	47	23.5%
Total	200	100%

Diagnostic accuracy in male 78.17% and in female 72.41%. Total patients of confirmatory burst appendix were 153. 111 were male and 42 were female. Male and female ratio was 2.64:1.

Table-III: Diagnostic accuracy in relation to sex and male-female ratio of burst appendix.

Sex	Number of Patients	Correct of Diagnosis	Percentage	Male and Female of burst appendix
Male	142	111	78.17%	2.64:1
Female	58	42	72.41%	
Total	**200**	**153**		

Diagnostic accuracy 77.9% in 15-24 years age group,92.7% in 25-34 years age group, 50% in 35-44 years age group, 35.72% 45-54 years age group and 0% in >54 years age group of study population.

Table-IV: Diagnostic accuracy in relation to age.

Age of the Patients	Number of Patients	Number of Correct Diagnosis	Percentage
15 - 24 years	59	46	77.9%
25 - 34 years	96	89	92.7%
35 - 44 years	26	13	50%
45 - 54 years	14	5	35.72%
> 54 years	5	0	0%
Total	**200**	**153**	

Discussion:

Acute appendicitis is the most common abdominal surgical emergency and grievous complication of acute appendicitis is burst appendix. The lifetime risk of acute appendicitis is estimated to be 8.6% for men and 6.7% for women[9]. Males are affected one and half more times than female[10] while definite diagnosis could be done in 70–80% of patients[11] .The diagnosis of ruptured appendix remains mostly on the basis of clinical manifestation as like acute appendicitis. The problem in making a clinical diagnosis of burst appendix is that in addition to appendicitis, there are other possible surgical and non-surgical causes of lower abdominal pain. The signs and symptoms associated with appendicitis have been found to have sensitivity between 16 and 100 percent and specificity between 36 and 95 percent[12]. Differentiate between a perforated and a non-perforated appendix has been a matter of great debate since both have overlapping presentations. Extremes of ages, increasing duration of symptoms, pyrexia, tenderness outside right lower quadrant pain, leukocyte count, C-Reactive Protein levels, Erythrocyte Sedimentation Rate levels neutrophil to lymphocyte ratio and high bilirubin count were good predictors of perforation according to several studies. Inturn these parameters will provide a useful guide between the conservative or surgical treatment of appendicitis, and early use of antibiotics[13,14]. Over the years several scoring systems have been devised to distinguish between these two entities. Various studies show CRP, neutrophil ratio, serum bilirubin CT scan to be very useful in the early and confident diagnosis of perforated appendicitis[15,16]. However, all these modalities are expensive and mostly unavailable in emergency setups of third world countries. Therefore, the age-old tools of history taking and bedside examination remain extremely useful in picking up cases of perforated appendicitis. In their 2010 guidelines, the American College of Emergency Physicians (ACEP) also recommends the use of clinical signs and symptoms in stratifying patients suspected of acute appendicitis[17].

In this present series, I have studied only 200 cases of clinically diagnosed ruptured appendicitis and admitted in different surgical units of Dhaka Medical College hospital during the period from January 2012 to December 2012 about one year.

There had been many studies on the same and related subjects in home and abroad with various results. The following pages describe the comparative studies of the present study with other studies done in the century and elsewhere.

Figure 1 shows age group distribution of the study population, majority of the cases 48% were of 25 – 34 years age group, 29.5% were of 15 – 34 years age group, 13% were of 35 – 44 years age group and other age group patients were few in number.

Figure 2 shows that most of the cases 71% were male and 29% were female.

Table I shows socioeconomic status of the study population, 8% were from higher income group, 59% were from middle income group and 33% were from lower income group, classification was made from monthly income of guardian. It is generally believed that the lesser cellulose content of the diet may be related to the incidence of acute appendicitis. Enamul et al[18] was reported, 72.73% of patients were from middle income group, 25.55% of patients were from high income group and 2.22% of patients were from low income group. In our country, because of urbanization, food habit also changing. They are taking less cellulose content diet. So incidence of acute appendicitis in other way burst appendix is increasing in middle and low income group people.

In table II, Patients suspected burst appendix underwent emergency operation and operative findings revealed burst appendix in 153 patients out of 200 patients. So diagnostic accuracy was 76.5% and diagnostic error in 23.5%.Our results correlates to Williams RF et al study[19].Their diagnostic accuracy were 92%.

Table III shows diagnostic accuracy in male 78.17% and in female 72.41%.Total patients of confirmatory burst appendix was 153. 111 were male and 42 were female. Male and female ratio was 2.64:1. Our results are similar to Zambia is 1.6:1[20]. Males are commoner than female. It may be delayed presentation of man due to hiding the symptoms at working place for fear of loss of job.

Table IV and figure 3 shows that diagnostic accuracy 77.9% in 15-24 years age group, 92.7% in 25-34 years age group, 50% in 35-44 years age group, 35.72% 45 - 54 years age group and 0% in >54 years age group of study population. Burst appendix comprises 58.17% in the age group of 25-34 years and second peak of 30.06% in the

age group of 15-24 years. Our results correlate to USA study[21] and Deneke A[22].

Conclusion:

From the results of the present study it can be concluded that the accuracy of clinical diagnosis of burst appendix is about 76.5%. The role of available emergency investigations in diagnosis of burst appendix is not significant. To ascertain the significance of this results and its role in management of burst appendix patients large and multicenter studies are required. Burst appendix present a challenge to the clinicians because it can delay in diagnosis, result in delay in operation and can develop fatal complications. So we emphasize on careful history taking and physical examination in such cases which will make the difference between life and death.

Conflict of Interest: None.

Acknowledgement:

I would like to thanks all doctors and nursing staffs of surgery department of DMCH who participated and making this study possible.

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ORIGINAL ARTICLE OPEN ACCESS

Bacterial and Viral Vaccination (non EPI) Coverage among Students in Three Educational Institutions in Bangladesh

Tanzila Rawnuck*[1], Md Selim Reza[2], Sabiha Monowar[3]

Abstract

Introduction: *The implementation of the vaccine has already been shown to be a great success to reduce communicable diseases and its associated morbidity among human globally. The aim of this study was to figure out the actual rate of population who received non EPI bacterial and viral vaccines and to determine the risk factors associated with it.* ***Materials and Methods:*** *A retrospective observational study was conducted between September 2011 and August 2014 among 3600 students aged from 18 years to 24 years. Data of total 12 non EPI vaccines (5 bacterial - Cholera and ETEC diarrhea vaccine, Meningococcal, Pneumococcal, Tetanus and Typhoid; 7 viral- Chicken pox, Cervical vaccine, Hepatitis A, Hepatitis B, Measles Mumps Rubella vaccine, Rota viral and Seasonal flu vaccine) were collected from the individuals' vaccine cards. All vaccine timelines were categorized into timely, early, delayed and missed based on recommended time of vaccination. Different parameters were considered to determine the socio-demographic factors related to vaccination.* ***Results:*** *Total of 3600 study population were selected from three different institutes. Percentage of rural students was almost 3.2 times higher than that of urban. About 1746(48.5%) student were from middle class family. About 2125(59.03%) of the participant's had not adequate knowledge of vaccination. Out of 3600 study population for bacterial vaccine, rate of Tetanus vaccine was the highest in percentage which was 1248(34.67%). Percentage of other bacterial vaccines such as Cholera and ETEC diarrhea, Meningococcal, Pneumococcal and Typhoid vaccination percentages were only 27(0.75%), 29(0.81%), 111(3.08%) and 34(0.94%) respectively. Among viral vaccines, the highest receiving vaccine was Hepatitis B. 2763(76.75%) people were immune with hepatitis B vaccine. Percentage of Hepatitis A was 337(9.36%), Rota viral vaccine was 330(9.17%), Measles Mumps Rubella was 249(6.92%) and Chicken pox was 83(2.31%). The percentage was less in case of Cervical HPV and Seasonal flu vaccines which were 12(0.33%) and 20(0.56%) respectively.* ***Conclusion:*** *Vaccines have proven the potential capability to reduce vaccine-preventable diseases, however, findings from the study show that people have still not been aware of non EPI bacterial and viral vaccines which can protect people from life threatening diseases and their complications.*

Keywords: *Bacterial vaccine coverage, Viral vaccine coverage, Non EPI vaccine.*

Number of Tables: *02;* ***Number of References:*** *21;* ***Number of Correspondence:*** *05.*

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Introduction:

Immunization has become one of the major contributors to public health globally as it prevents communicable diseases among human[1]. Vaccines rarely provide full protection from disease. Nevertheless, Vaccines may be used to protect both individuals and whole populations[2, 3]. Vaccine contributes to the reduction of morbidity and mortality worldwide[4]. Despite the success rate of advanced vaccine approximately 1.5 million people die each year from vaccine-preventable diseases[5]. Vaccine-preventable diseases remain a potential public health problem in South-East Asia[6] including Bangladesh for its early or delayed, incomplete, and low vaccination coverage[7]. The objective of this study was to estimate the extent of coverage of life saving non-EPI bacterial and viral vaccines among the students of three different institutes in its time schedule, and to investigate the factors of incomplete and failure of timely vaccination.

Materials and Methods:

A retrospective observational study was conducted between September 2011 and August 2014 which occured among 3600 students of three different government institutes; Rajshahi University (RU), Rajshahi Medical College (RMC) and Rajshahi University of Engineering and Technology (RUET). A sum of 2450 students was selected from different departments of RU, about 600 students were enrolled from RMC and 550 students from RUET were participated in this study. They were divided in male and female groups. Students aged 18-24 years with the availability of vaccine cards and willing to participate in this study were included. Students who had no available vaccine cards, age limits were not matched and was not willing to participate were excluded from the study. All vaccine timelines were categorized into timely, early, delayed and missed based on recommended time of vaccination. Timely vaccination was considered as receiving

Received: 08 July 2020 *Accepted revised version:* 11 February 2021

a particular vaccine within the recommended time, whereas early and delayed vaccination was defined as administration of vaccine early and after the recommended time respectively. Missed vaccination was considered as failure to administration of a particular dose. Data were collected based on the availability of the vaccine card. Data of total 12 non EPI vaccines (Five bacterial- Cholera and ETEC diarrhea vaccine, Meningococcal, Pneumococcal, Tetanus and Typhoid; Seven viral- Chicken pox, Cervical vaccine, Hepatitis A, Hepatitis B, Measles Mumps Rubella vaccine, Rota viral and Seasonal flu vaccine) were collected from the individuals' vaccine cards. Written consents were taken from the respondents during the interviews. Study was conducted from September 2011 to August 2014, and different parameters were considered to determine the socio-demographic factors related to vaccination. SPSS version 19 was used for data analysis.

Results:

Table I shows total 3600 study population was selected from three different institutes. Among them, 2450, 600 and 550 were from RU, RMC and RUET respectively. Percentage of male 1898 (52.72%) was slightly higher than female 1702 (47.28%). Percentage of rural population 2743 (76.19%) was almost 3.2 times higher than urban population 857 (23.81%). The proportion of uneducated, primary/secondary education and highly educated parents were 791 (21.97%), 1571(43.64%) and 1238 (34.39%) respectively. Most of the study populations were from middle class family about 1746 (48.5%). Most of the participant's 2125 (59.03%) had not adequate knowledge about vaccine and its functions.

Table-I: Factors associated with rate of vaccination (n=3600):

Related factors		RU (2450)	RMC (600)	RUET (550)	Total number & percentage %
Sex	Male	1221	184	493	1898 (52.72%)
	Female	1229	416	57	1702 (47.28%)
Place of birth	Rural	1917	369	457	2743 (76.19%)
	Urban	533	231	93	857 (23.81%)
Parent's education	No education	543	71	177	791 (21.97%)
	Primary/ secondary level	1274	143	154	1571 (43.64%)
	Higher level	633	386	219	1238 (34.39%)
Economic status	Higher	522	288	129	1037 (28.81%)
	Middle	1343	114	289	1746 (48.5%)
	Lower	487	198	132	817 (22.69%)
Participant's awareness about vaccine	Aware	694	414	367	1475 (40.97%)
	Not aware	1756	186	183	2125 (59.03%)

Table II illustrates the rate of receiving different vaccines among participants. Out of 3600 study population for bacterial vaccine, rate of Tetanus vaccine was highest in percentage which was 1248 (34.67%). Percentage of other bacterial vaccines like Cholera and ETEC diarrhea, Meningococcal, Pneumococcal and Typhoid vaccination percentages were only 27 (0.75%), 29 (0.81%), 111 (3.08%) and 34(0.94%) respectively. Among viral vaccines, the highest receiving vaccine was Hepatitis B. 2763 (76.75%) students were immune with hepatitis B vaccine. Percentage of Hepatitis A was 337 (9.36%), Rota was 330 (9.17%), Measles Mumps Rubella was 249 (6.92%) and Chicken pox was 83(2.31%). Percentage was below in case of Cervical HPV and Seasona flu vaccine which were 12(0.33%) and 20(0.56%) respectively.

Table -II: Vaccination schedule for recommended vaccines in study population (n=3600):

Vaccine name	Total number of vaccine recipient with percentage (n) and %	Doses (D)	RU(2450)+RMC (600)+RUET(550)= 3600			
			Early	Timely	Delayed	Missed dose
Bacterial vaccine						
Cholera and ETEC diarrhea	27(0.75%)	D-1		27(0.75%)		
		D-2		26(0.72%)	1(0.03%)	
		D-3		21(0.58%)	6(0.17%)	
		D-4	1(0.03%)	14(0.39%)	12(0.33%)	
Meningococcal	29(0.81%)	Single		29(0.81%)		
Pneumococcal	111(3.08%)	Single		111(3.08%)		
Tetanus	1248(34.67%)	D-1		1248(34.67%)		
		D-2		1248(34.67%)		
		D-3	3(0.08%)	1124(31.22%)	121(3.36%)	
		D-4	2(0.06%)	1055(29.31%)	201(5.58%)	
		D-5		982(27.28%)	253(7.03%)	13(0.36%)
Typhoid	34(0.94%)	3 yearly		34(0.94%)		
Viral vaccine						
Chicken pox	83(2.31%)	D-1		83(2.31%)		
		D-2		83(2.31%)		
Cervical HPV	12(0.33%)	D-1		12(0.33%)		
		D-2		9(0.25%)	3(0.08%)	
		D-3		5(0.14%)	7(0.19%)	
Hepatitis A	337(9.36%)	D-1		337(9.36%)		
		D-2	1(0.03%)	275(7.64%)	58(1.61%)	
Hepatitis B	2763(76.75%)	D-1		2763(76.75%)		
		D-2		2763(76.75%)		
		D-3	1(0.03%)	1554(43.17%)	234(6.5%)	
		D-4		1603(44.53%)	166(4.61%)	20(0.56%)
Measles Mumps Rubella	249(6.92%)	D-1		146(4.06%)		
		D-2		146(4.06%)		
Rota viral	330(9.17%)	D-1		181(5.03%)		
		D-2		181(5.03%)		
Seasonal flu	20(0.56%)	Yearly		9(0.25%)		11(0.31%)

Out of total 3600 students, only 27 (0.75%) students were vaccinated with Cholera and ETEC diarrhea vaccine whereas after receiving first dose, timely vaccination was performed in 26 (0.72%), 21 (0.58%) and 14 (0.39%) in dose-2, dose-3 and dose-4 respectively, however, there was history of delayed vaccination in 1 (0.03%), 6 (0.17%) and 12 (0.33%) in dose-2, dose-3 and dose-4. At the same time in case of receiving dose-4 early vaccine was performed in 1(0.03%) student. Single-dose-bacterial-vaccine; Meningococcal and Pneumococcal were taken by 29 (0.81%) and 111 (3.08%) participants respectively. At the same time every 3-year-Typhoid-vaccine was received by 34 (0.94%) participants. In case of Tetanus vaccine the proportion students who had received 1st dose of vaccination was 1248 (34.67%). Timely vaccination rate was 1248 (34.67%), 1124 (31.22%), 1055 (29.31%) and 982 (27.28%) population in 2nd, 3rd, 4th and 5th dose respectively. However there was history of 121 (3.36%), 201 (5.58%) and 253 (7.03%) delayed vaccination in 3rd, 4th and 5th doses respectively. Just as early vaccination was also reported 3 (0.08%) in 3rd dose and 2 (0.06%) in 4th dose vaccination. In case of 5th dose about 13 (0.36%) participant failed to receive their scheduled vaccines. Viral-vaccine; Chicken pox had received by 83 (2.31%) participant and all took their 2nd dose of vaccine timely. Similarly Measles Mumps Rubella vaccine had taken by 146 (4.06%) population and following dose was also received at the schedule time by all. Three-dose- Cervical HPV vaccine recipient rate was only 12 (0.33%). Second dose had taken timely by 9 (0.25%) and delayed rate was 3 (0.08%). Third dose was received in the schedule date by 5 (0.14%) participant however delayed by 7 (0.19%) students.

About 337 (9.36%) of all students were received 1st dose of Hepatitis A vaccine. During the second dose schedule time early recipient rate was 1(0.03%), timely recipient rate was 275 (7.64%) and delayed recipient rate was 58 (1.61%). The highest received vaccine was Hepatitis B. Approximately 2763(76.75%) students had history of hepatitis B vaccination. Following dose was taken in the schedule date by all participants. At the time of dose, three 1(0.03%) had early vaccination history, 1554 (43.17%) took timely and 234 (6.5%) received delayed vaccine. Fourth dose timely recipient rate was 1603 (44.53%) whereas 166 (4.61%) had delayed vaccination and about 20 (0.56%) failed to receive the scheduled vaccine.

Two-dose-Rota-vaccine was received by 181 (9.17%) participant in their schedule time. Seasonal flu vaccine was received by 20 (0.56%) participant, out of that only 9 (0.25%) continued their yearly vaccination nonetheless 11 (0.31%) didn't continue this yearly vaccine as schedule.

Discussion:

Vaccination is the most effective interventions for preventing and lowering the burden of disease. Nonetheless, faulty and incomplete vaccination is a crucial problem for our country.

A number of factors were associated with the failure of the vaccination schedule in this study. Parents' education, economic status and awareness about vaccine were the most significant influencing factors. In this study, parents' education was significantly associated with the failure of timely vaccination. Who had no formal education, had completed a primary or secondary level of education were more likely to have failed to receive multi-dose vaccines as compared with who had completed a higher level of education. Similar patterns have been observed; parents with a lower educational level[8,9,10] were less likely to utilize immunization services[11,12,13].

Our results demonstrated that the financial status acted as an influencing factor for the failure of timely multi-dose vaccines (Cholera and ETEC diarrhea, cervical HPV, hepatitis A, hepatitis B), however, such failures were not observed in single-dose vaccines such as Meningococcal and pneumococcal vaccine. Similarly, more expensive vaccines like diarrhea, meningococcal, pneumococcal, typhoid, cervical HPV, Rota and seasonal flu vaccines were significantly more likely to be at higher risk of failing to receive. Only 0.75%, 0.81%, 3.08% 0.94%, 0.33%, 9.17% and 0.56% people had history of receiving those vaccines respectively. However, such relationship was not observed in tetanus vaccine which is a low cost vaccine.

It was observed that 0.36%, 0.56% and 0.31% didn't complete their vaccination schedule for Tetanus, Hepatitis B and seasonal flu vaccine respectively. Awareness about vaccine and diseases were another critical issue for utilization of vaccination services. Who was not aware about the relationship between vaccine and diseases were significantly more likely to have failed to receive multi-dose vaccines.

In case of multi-dose-vaccines, early vaccination was noted for Cholera and ETEC diarrhea, Tetanus, Hepatitis A and Hepatitis B. Delayed vaccination was reported for most of the multi dose vaccines. Early vaccination may cause failure to produce proper protective antibody response against diseases [14,15,16]. Whereas delayed [17, 18] and missed vaccination takes longer and inappropriate production of antibody [19, 20, 21]. Although small percentage of people received early vaccine than delayed vaccine however both are considered as inappropriate.

Conclusion:

Although Expanded Programme of Immunization (EPI) is one of the most vital and successful interventions of government in Bangladesh, and contributing significantly to reduce mortality and morbidity from vaccine preventable diseases, however, people are still not aware of other non EPI bacterial and viral vaccines which can protect people from life threatening diseases and their complications. Increasing of peoples' awareness of vaccines should increase the rate of vaccine-coverage and protect people from unusual health hazards.

Conflict of Interest: None.

Acknowledgement:

We are thankful to all staffs of Rajshahi University, Rajshahi Medical College and Rajshahi University of Engineering and Technology for their cooperation.

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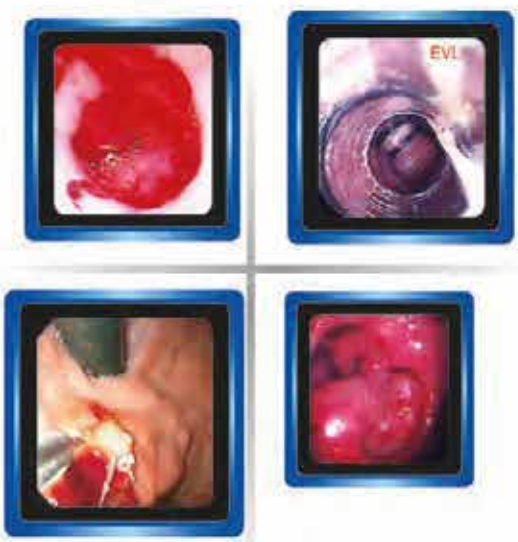

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