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Editorial

Dengue NS1 rapid strip test: how sensitive it is?

For last two decades Dengue has emerged as an important public health problem for Bangladesh , specially for last few years. . It is imposing a great burden on our health care facilities, health expenditure with increased morbidity and mortality. Dengue is caused by an arbovirus , has four serotypes . Each serotype has some speciality in their presentation . Clinical feature ranges from asymptomatic infection to life threatening DHF and DSS. To reduce mortality early detection, appropriate classification , proper management and timely referral is of utmost importance.

NS1 Antigen

NS1(non structural) is a highly conserved non-structural glycoprotein secreted by virus-infected cells during the acute phase of dengue,[2-3] and it is essential for virus viability.[4]

Detection method

Detection of NS1 antigen is the most important test within first three days. This test become negative within 4-5 days. This can be done by rapid strip test or by Elisa . The recent availability of a rapid dipstick test, the Dengue NS1 Ag Strip (Bio-Rad Laboratories, Marnes-la-Coquette, France), that can provide results within 15 minutes could serve as a useful bedside diagnostic tool. The Dengue NS1 Ag Strip is a lateral flow immune chromatography test for the detection of the NS1 antigen. The manufacturer recommended that the NS1 Strip be read at 15 minutes and again at 30 minutes for doubtful samples or negative samples in patients with suggestive clinical information.

Sensitivity and specificity

It is highly specific (almost 100%) but its sensitivity differs greatly(62% to 90%) . Many factors affect its sensitivity such as day of testing ,detection methods, different manufacturer, primary or secondary infection, different serotype, level of viraemia. etc. reduced sensitivity of the NS1 strip was found on day 1 compared with days 2 and 3 of illness.,after 3rd day to 5th sensitivity falls up to 70% . NS1 is more sensitive in primary than secondary infection.Sensitivity increased from 62.4% with NS1 alone to 75.5% with NS1 and IgM positive .NS1 Elisa test is more sensitive than NS1 rapid strip test 5. In one study highest sensitivity was noticed in DENV 1 and lowest with DENV.[4]

CONCLUSION:

Though NS1 rapid strip test has made easy the diagnosis of dengue much earlier with certainty but reasons of false negative results should be kept in mind while interpreting the result. Clinical clues and other laboratory findings such as lower WBC and platelet count , increased hematocrit should be looked for before making a negative diagnosis of Dengue.

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Original Article

Comparison Between Primary Choledochorraphy Versus T-Tube Drainage After Open Choledochotomy – A Prospective Study At Mugda Medical College Hospital

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ABSTRACT

Background : *Choledochotomy followed by T-tube drainage has long been a gold standard surgical treatment for choledocholithiasis. It is still a preferred choice in many hospitals where minimal invasive procedures are not feasible but it has its own sets of problems, mainly prolonging hospital stay and leakage around T-tube. This study was designed to assess the outcome of primary Choledochorraphy of Common Bile Duct (CBD) in terms of operative time, duration of hospital stay & post-operative complications, which would help form a basis for future application on a wider scale.*

Methods : *We conducted a prospective randomized study of 45 patients divided into two groups at our surgical unit of Mugda Medical College & Hospital, Dhaka to see the effectiveness of primary closure and compared the results with those patients who had T-tube drainage.*

Results : *There was no mortality and retained stones in both groups. Two of 23 patients in the T-tube group and one of 22 patients in primary closure group suffered from minor bile leakage. There was no major bile leakage in any of the groups. Wound infection was seen in two patients in T-tube groups and one patient in primary closure group. In follow up assessment, there was no intra-abdominal collection in both groups. Overall post-operative complications include biliary complications, wound infection and intra-abdominal collections, were seen in four patients in T-tube group and three patients in primary closure group, that was not statically significant difference. The post-operative hospital stay after primary closure was 4-7 days as compared to after T-tube drainage which was 7-18 Days. The median follow up duration for both groups was 06 months.*

Conclusion : *Primary closure of common bile duct following CBD exploration is a safe and cost effective alternative to routine T-tube drainage.*

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Keywords:
Choledocholithiasis, open choledochotomy, Choledochorraphy.

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INTRODUCTION

Chloledocholithiasis develops in about 10–15% of patients with gallbladder stones[1] and literature suggests that com-mon bile duct (CBD) stones are encountered in approxi-mately 7–15% of patients undergoing Cholecystectomy.[2] there are two methods for extracting CBD stones either endoscopically, by endoscopic retrograde cholangio-pancreatography (ERCP), or surgically, by an open or laparoscopic method. In case of smaller stones endoscopic retrograde cholangiopancreatography

(ERCP) is suggested and surgery is required in case of larger stones or when ERCP fails. Surgical exploration of CBD i.e choledochotomy may be done either open or by laparoscopically. After the CBD exploration, stones are removed and traditionally, common bile duct (CBD) is closed over T-tube.

The purpose of using T-tube drainage after open CBD exploration are post-operative drainage of common the bile duct to reduce edema and intra luminal pressure of CBD to visualize and extract retained bile duct stones.[3] But it is not exempt from complications, which are present in up to 10% of patients.[4] The most frequent of these is bile leakage after removal, which is reported to occur in 1–19% of cases.[5-9] Some of these complications are serious, such as bile leak, tract infection or acute renal failure from dehydration due to inadequate water ingestion or a very high outflow, particularly in elderly patients. In addition, having bile drainage in place for at least 3 weeks causes significant discomfort in patients and delays their return to work.[10-12]

The role of T-tube has been challenged since Thornton and Halsted described primary duct closure after CBD exploration more than a century ago. Compared to T-tube drainage, primary closure has its advantages which include shorter operating time, lesser duration of stay at hospital, lower incidence of bile leak and wound infections etc. Hence, primary closure of CBD is a relatively safe and feasible treatment procedure as compared to T-tube drainage after open choledocholithotomy. This study was carried out at Mugda Medical College Hospital to assess the benefits of choledochorraphy versus T-tube drainage following open choledocholithomy in terms of operating time, post-operative complications and time span of hospital stay.

PATIENTS AND METHODS

This was a prospective study conducted from January 2017 to December 2018 at surgical unit of Mugda Medical College & Hospital, Dhaka. Forty five patients, admitted with obstructive jaundice, CBD stones suggested by ultrasound, Magnetic Resonance cholangiopancreatography (MRCP) where ultrasound could not confirm the presence of stone or the presence of stones in the CBD palpated peroperatively. were included in the study. The patients were evaluated with routine investigations including full blood counts, liver function tests, renal function tests, serum alkaline phosphatase, X-Ray chest P/A view, coagulation screening and abdominal ultrasonography. To rule out malignancy contrast enhanced computerized tomography was done in selected cases. Patients with pancreatitis, suppurative cholangitis and malignancy were excluded. All patients were given antibiotics before they were taken for elective open surgery. The CBD was opened through a supraduodenal vertical incision between stay sutures. Stones were taken out and saline flushing followed to ensure no distal obstruction.

Patients were randomly selected to undergo either one of the two surgical options, Group A: exploration with primary closure of CBD in 22 patients and Group B : exploration with T-tube drainage in 23 patients. Primary closure of CBD was done with interrupted suture of No. 3-0 vicryl on an atraumatic needle. A sub hepatic drain was kept 48 hours in all patients. T-tube cholangiography was done on the seventh postoperative day in all T-tube drained patients. Once patency of CBD was confirmed and there was a free flow of dye, the intermittent clamping of T-tube was done and the T-tube was removed on the 12th postoperative day. Postoperatively, ultrasound and liver function tests were done. Follow up was taken for next 06 months.

We compared the postoperative complications, postoperative hospital stay and the total cost of treatment between the two groups. Bile leakage is defined as any yellow bile-like fluid coming out of the sub hepatic drain or after the removal of the drain aspiration of yellow colored bile like fluid under ultrasound guidance from sub hepatic peritoneal space (300mL). The data was analyzed in statistical program SPSS version 11.0. Fisher's exact test of chi-squared was applied for categorical variables to calculate frequencies and percentages among the groups. All the parameters were calculated on 95% confidence interval. If the value of pd"0.05 it was considered statistically significant.

RESULTS

CBD exploration was performed in 45 patients, out of which 22 had primary closure of CBD after stone removal. A T-tube drain was placed in 23 patients. The mean age of patients who had primary closure was 45.4 ± 13.29 years (median 46 years; range: 20 – 65 years) and that of T-tube drains was 51.56 ± 11.06 years (median 45 years; range, 25 - 70 years). There were 04 males (18.18 %) and 18 females (81.81 %) in

the primary closure group, and 03 males (13.04 %) and 20 females (86.95%) in T-tube group (Table 1). The clinical presentation of choledocholithiasis is listed in Table 1. Most of the patients in both groups presented with biliary colic (63.6% and 78.2%). Other clinical presentations were acute cholecystitis and jaundice, which were nearly of same frequency in each group. Out of 45 patients, 08 patients had comorbidities like diabetes mellitus and hypertension (22.72% and 13.04%). 19 patients (86.36%) in the primary closure group had concomitant gallstones and 18 (78.26%) in the T-tube group as evident by preoperative abdominal ultrasound (Table 1).

Preoperative abdominal ultrasound showed the size of CBD and number of CBD stones, which was then confirmed during the operation. The mean diameter of CBD was 1.52±0.36cm (median, 1.45cm; range, 1.2–2.3cm) in patients who had primary closure and 1.64±0.55cm (median, 1.50cm; range, 0.6–2.6cm). The maximum number of stones (10) was noted in the T-tube drain group. Twenty patients in the primary closure group did not suffer any complication. One patient had a bile leakage that subsided on the third postoperative day. There was no biliary peritonitis. The total complication rate in this group was 4.54% (Table 2). In the T-tube drain patients, biliary complication occurred in three patients, accounting for 13.04%. Two patients had bile leakage (8.69%) after removal of the T-tube that was managed by ultrasound guided aspiration. In both of these patients, the T-tube was removed on the twelfth postoperative day. One patient had postoperative jaundice because of a blockage of the duct caused by the T-tube. The T-tube was removed and jaundice gradually subsided. Wound infection was seen in one patients in T-tube groups and one patient in primary closure group (Table 2). There was not any recurrence of CBD stones seen up to 6 months follow up and postoperative ultrasound findings were almost normal (Table 2).

Table 1. Demographic characteristics of patients

	Group (n = 45)						
	Primary Closure (n = 22)			T-tube drain (n = 23)			*P* value
Age	Mean age ± SD	Median	Range	Mean age ± SD	Median	Range	NS
	45.4 ± 13.29	46	20 – 65	51.56 ± 11.06	45	25 – 70	
Gender							
Male		4 (18.18 %)			3 (13.04 %)		NS
female		18 (81.81 %)			20 (86.95 %)		NS
Symptoms							
Biliary colic		14 (63.63 %)			18 (78.26 %)		NS
Acute cholecystitis		6 (27.27 %)			6 (26.08 %)		NS
Jaundice		11 (50 %)			14 (60.86 %)		NS
Concomitant Gallstone		19 (86.36 %)			18 (78.26 %)		NS
Co morbidities		4 (18.18 %)			3 (13.04 %)		NS

Results are expressed as mean ± standard deviation, median, range. NS = not significant

Table 2. *Postoperative complications*

	Group (n = 45)		
	Primary Closure (n = 22)	T-tube Drain (n = 23)	*P* value
Bile leakage	1 (4.54 %)	2 (8.69 %)	NS
PostoperativeJaundice	0	1 (4.34 %)	NS
Wound infection	2 (9.09 %)	1 (4.34 %)	NS
Retained stone	0	0	-
Recurrence of CBD stone	0	0	-

Results are expressed as number and percentage. CBD = common bile duct, NS = not significant

Table 3. Operative time, Hospital stay & Follow up.

	Group (n = 45)						
	Choledochorraphy (n = 22)			T-tube drain (n = 23)			*P* value
Operative Time (Min)	Mean ± SD	Median	Range	Mean ± SD	Median	Range	NS
	58.6 ± 0.6	57.5	50 - 70	64.95 ± 0.5	70	60 - 80	
Hospital Stay (Days)	5.1 ± 1.1	5.0	4 - 7	13.6 ± 2.3	15.0	7 - 18	0.008
Follow up (Months)	5.26 ± 0.7	6.0	4 - 6	5.7 ± 0.5	6.0	4 - 6	NS

The mean operative time is closer in both the groups, that was in the primary closure group 58.6 ± 0.6 minutes (median, 57.5 min; range, 50 – 70 min), compared to the T-tube drainage group which was 64.95 ± 0.5 (median, 70 min; range, 60 – 80 min) (Table 3). The mean postoperative hospital stay in the primary closure group was 5.1 ± 1.1 days (median, 5.0 days; range, 4–7 days), compared to the T-tube drainage group which was 13.6±2.3 (median, 15.0 days; range, 7–18 days) (Table 3, Fig 1). The mean duration of follow-up in the primary closure group was 5.62±0.7 months (median, 6.0 months; range, 4–6 months) and in the T-tube drain group it was 5.7± 0.5 months (median, 6.0 months; range, 4–6 months) (Table 3).

Results are expressed as mean ± standard deviation, median, range. The data was analyzed in statistical program SPSS version 11.0. Fisher's exact test of chi-squared was applied for categorical variables to calculate frequencies and percentages among the groups. All the parameters were calculated on 95% confidence interval. If the value of pd"0.05 it was considered statistically significant. NS = not significant.

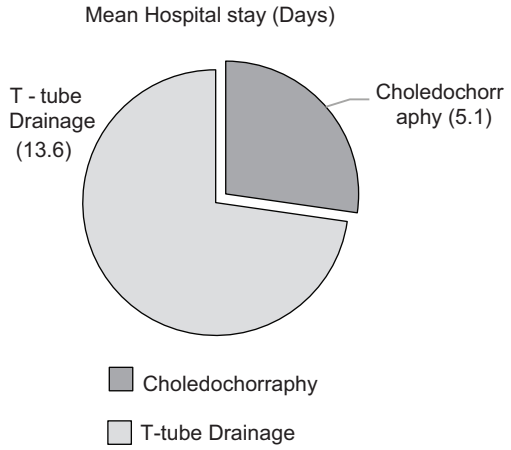

Fig.-1. *Mean hospital stay after Choledochorraphy and T-Tube Drainage After Open Choledochotomy*

DISCUSSION

In the modern 'minimally invasive approach' era, the current standard protocol for the treatment of CBD stones is to clear and drain the CBD by ERCP, followed by laparoscopic cholecystectomy. However, these minimally invasive approaches are not widely practiced in many developing countries due to the lack of equipment and trained endoscopists. Even in the developed world, in rural settings, there is lack of equipment for these techniques[13]. As suggested by a Cochrane database review published in 2006 ERCP was less successful than open surgery in CBD stone clearance and was associated with a higher mortality. There is also an increased recurrence rate of CBD stones following endoscopic removal[14]. Traditionally, exploration of the CBD has been done by the placement of a T-tube. The T-tube drainage is helpful to prevent bile stasis, decompress the biliary tree, and minimize the risk of bile leakage. A T-tube has also provided an easy percutaneous access for cholangiography and extraction of retained stones. Despite these potential advantages, morbidity rates related to T-tube presence have been reported to be at a rate of 4% to 16.4%. The T tube-related complications include accidental T-tube displacement leading to CBD obstruction, bile leakage, persistent biliary fistulas, and excoriation of the skin, cholangitis from exogenous sources through the T-tube, and dehydration and saline depletion[15,16]. Additionally, CBD stenosis has been reported as a long term complication after T-tube removal. After discharge, in dwelling T-tubes become uncomfortable, requiring continuous management, thus restricting patient's activity because of the risk of dislodgement. Regardless of the technique, the practice of using T-tubes versus primary closure of the bile duct is a subject of discussion, now days the trend is towards primary closure[17]. Many authors have advocated primary closure of the CBD following stone

removal[16]. Primary closure without a T-tube is safe and associated with a lower complication rate[18]. The four requirements for a safe and successful primary closure of common bile duct are patent Vater's ampulla, complete removal of all intra-ductal calculi, absence of pancreatic pathology and meticulous suture of the duct[19,20]. This randomized and prospective study shows that hospital stay in the T-tube group (4-7 in primary group versus 7-18 in T-tube) was longer than primary closure group which is in agreement with studies conducted by Zhang et al, Ambreen et al and Kyoun Tah Noe et al[21-23]. In our study In T-tube group, wound infections, biliary fistula around T-tube were more common. The main drawback of T-tube was that it was uncomfortable, require continuous management, and it restricts the patient's activity because of risk of dislodgement[24]. It also affects the patient's life quality[25]. In primary closure group, the postoperative hospital stay was shorter, and the hospital expenses were also lower than in the T-tube group. It has no effect on patient's life quality after discharge from hospital. The use of primary closure was limited in the treatment of patients with severe acute biliary pancreatitis, acute pyogenic cholangitis, or ampullary stenosis because they required CBD decompression and drainage or other preferable therapeutic options. A CBD diameter that was too small (<8 mm) might be a contraindication for primary closure because smaller diameter might increase the risk of bile duct stricture[26].

Over the period of time, T-tube drainage was used less frequently as the approach changed from routine to a very selective use. To minimize postoperative complications, the indications for T-tube must be strictly followed, such as CBD stones secondary to intrahepatic duct stones or if there is undefined residual stone in the intrahepatic or extra hepatic ducts on intraoperative choledochoscopy; vague patency of the Oddi's Sphincter or failure to pass choledochoscope and Bakes dilator through Vater's ampulla due to edema or obstructed stones; acute suppurative cholangitis with severe edema of the CBD wall. According to the results of this early experience, primary closure did not increase the risk of bile leakage after the operation. Post-operative hospital stay and operation time were shorter and the hospital expenses were lower. Additionally, with primary closure, we could definitely avoid T-tube-related complications. Therefore, we can conclude that primary closure without external drainage after choledochotomy is feasible, safe, and cost effective. Postoperative primary closure should be preferred in most cases after CBD exploration. However, randomized trials on a larger scale of patients and with a longer follow-up are necessary to address the issue of stenosis and other issues after primary closure.

CONCLUSION

In open choledochotomy, primary closure of the CBD is performed safely in selected patients with improved patient care. Choledochoscopy ensures clearance of the CBD and eliminates the need for a T-tube. The number of hospital admission days is less and average cost of treatment is much lower than in the patients with a T-tube. From this study, we have concluded that after open surgery for CBD stones, primary closure of CBD is safe and effective with shorter hospital stays and lower costs.

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Original Article

Early outcome of Conventional Coronary Artery Bypass Grafting with Peri- Operative Hyperglycaemia In Diabetic And Non- Diabetic Patients In NICVD, Dhaka.

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ABSTRACT

Background: *Peri-operative hyper glycaemia has been defined as the average of all blood glucose test obtained by venous or arterial sampling on the day of and the day after surgery. Here the association between peri-operative hyper glycaemia and outcomes among patients undergoing coronary artery bypass grafting was measured.*

Objectives: *Evaluation of early outcome of conventional coronary artery bypass grafting with perioperative hyperglycemia in diabetic and non-diabetic patients & to compare the outcomes in both the groups.*

Methodology: *The study was a prospective observational analytic study conducted in National Institute of Cardiovascular Diseas es, Dhaka from January 2010 to December 2011 in 60 patients having ischaemic heart disease with or without diabetes mellitus.*

Result: *Postoperative ventilation time and ICU stay both were significantly longer in the diabetic group as compared to their non-diabetic counterparts ($p<0.001$). Pneumonia and all other infections and complications were also more in the former group. None in either group died. The diabetic group stayed on an average 4 days more than the non-diabetic group ($p<0.001$).*

Conclusion: *The study concluded that outcome of coronary revascularization in non-diabetic patients with peri-operative hyper glycaemia is better than that in diabetic patients with peri operative hyper glycaemia.*

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Keywords:
Conventional Coronary Artery Bypass Grafting, Peri-Operative Hyper Glycaemia

INTRODUCTION

Coronary artery disease (CAD) is the leading cause of cardiovascular mortality worldwide, with more than 4.5 million deaths occurring in the developing world. Despite a recent decline in developed countries, both CAD mortality and the prevalence of CAD risk factors continue to rise rapidly in developing countries[1].

Fish and associates[2] found that in diabetic patients a blood glucose level less than 11.1 mmol/L carried a 36% higher risk and a blood glucose level of 13.9 mmol/L or more carried a 63% higher risk of infective complications.

A post-operative serum glucose level (250 mg/dl) was associated with a 10 fold increase in complications. Similar findings were reported by McAlister and coworkers[3].

The detrimental effects of elevated intra operative glucose levels were also reported in a retrospective

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observational study of 409 cardiac surgical patients by Gandhi and coworkers[4].

The South Asian countries of India, Pakistan, Bangladesh, Srilanka and Nepal contribute the highest proportion of the burden of the cardiovascular diseases compared to any other regions[5].

Coronary artery bypass surgery under CPB and cardioplegic arrest has been considered the gold standard operation for coronary revascularization[6].

Hyperglycemia is commonly present in the peri operative period in patients undergoing cardiac surgery in both diabetic and non-diabetic patients even during administration of insulin. Because of cardio pulmonary bypass induced alterations in insulin secretion and resistance[7].

Furnary and colleagues[8] have made a strong argument that the true risk factor is not diabetes per-se but rather hyperglycemia with its attendant glycometabolic impairment and relative overutilization of free fatty acids.

MATERIALS AND METHOD

The study was a prospective, observational analytic study done in National Institute of Cardiovascular Diseases, Dhaka, From January 2010 to December 2011.

Inclusion criteria:

1. Patients with known history of diabetes or random blood glucose >= 200mg/dl or 11mmol/l, were considered as diabetics. While, persons with no history of diabetes or random blood glucose level <200mg/dl or <11mmol/l were considered as non-diabetes.
2. Scheduled for on-pump CABG.
3. Age < 60 years, irrespective of sex.

Exclusion criteria:

1. Age> 60 years.
2. Patients having redo surgery.
3. Any concomitant surgery (e.g. CABG with congenital/valve surgery).
4. Patients with low ejection fraction (<35%).

RESULT

The findings obtained from data analyses are documented below:

RISK FACTORS DISTRIBUTION

Table I. *Comparison of risk factors distribution between groups*

Risk factors	Group		p-value
	Diabetics (n = 30)	Non-diabetics (n = 30)	
Smoking habit*	16(53.3)	15(50.0)	0.771
HTN*	25(83.3)	21(70.0)	0.222
Dyslipidemia*	26(86.7)	18(60.0)	0.020
Family H/O IHD*	4(13.3)	0(0.0)	0.038
Overweight or obese*	7(23.3)	9(30.0)	0.559

Figures in the parentheses indicate corresponding %;
* **Chi-squared Test (χ^2)** was done to analyse the data.

Baseline biochemical characteristics

Table II. *Comparison of baseline biochemical characteristics between groups*

Biochemical characteristics	**Group**		***p-value**
	Diabetics (n = 30)	Non-diabetics (n = 30)	
FBS# (mmol/L)	7.8 ± 0.9	5.6 ± 0.6	< 0.001
Blood sugar 2 hrs after breakfast# (mmol/L)	11.8 ± 1.7	7.1 ± 0.7	< 0.001
Hemoglobin# (g/dl)	13.1 ± 1.2	12.8 ± 2.8	0.609

Data were analyzed using **Unpaired t-Test** and were presented as **mean ± SD**.

Peroperative variables

Table III. *Comparison of Preoperative variables between groups*

Peroperative variables	Group		p-value
	Diabetics (n = 30)	Non-diabetics (n = 30)	
XCT# (minute)	99.7 ± 26.2	92.3 ± 21.9	0.206
ECCT# (minute)	176.1 ± 54.3	151.9 ± 37.9	0.229
Ionotropes used	30(100.0)	30(100.0)	—-
Total operative time# (minute)	192.2 ± 35.6	186.7 ± 29.3	0.405
RBS# (mmol/L)	15.4 ± 1.5	12.0 ± 0.6	0.006

Figures in the parentheses indicate corresponding %;
Data were analyzed using **Unpaired t-Test** and were presented as **mean ± SD**.

Postoperative variables

Table IV. Comparison of postoperative variables between groups

Postoperative variables	Group		p-value
	Diabetics (n = 30)	Non-diabetics (n = 30)	
RBS on the 1st POD# (mmol/L)	15.3 ± 1.4	12.7 ± 0.5	< 0.001
Ionotropes used	25(100.0)	25(100.0)	—-
Ventilation time# (hours)	12.8 ± 1.1	8.8 ± 1.2	< 0.001
ICU stay# (hours)	35.4 ± 5.5	30.4 ± 2.3	< 0.001
Sternal infection¶	3(10.0)	2(6.7)	0.500
Harvest site infection¶	6(20.0)	2(6.7)	0.127
Pneumonia*	6(20.0)	1(3.3)	0.051
Renal dysfunction*	4(13.3)	2(6.7)	0.335
CVA*	3(10.0)	0(0.0)	0.119
Perioperative MI*	4(13.3)	1(3.3)	0.177
Hospital stay#	11.4 ± 2.1	7.5 ± 1.6	< 0.001

Figures in the parentheses indicate corresponding %;
¶ **Chi-squared Test (c^2)** was done to analyse the data.
* **Fisher's Exact Test** was done to analyse the data.

Data were analyzed using **Unpaired t-Test** and were presented as **mean ± SD**.

DISCUSSION

Some of the findings presented in the result section need further explanation to come to a conclusion. The demographic characteristics, co-morbidities, NYHA functional class except dyslipidemia, were almost similar in diabetic group and non-diabetics. The preoperative fasting blood sugar and blood sugar level two hours after breakfast increased on the day of and the day after surgery, but the rise was more pronounced in the non-diabetics indicating that stress played a role in this unusual rise.

Postoperative ventilation time, ICU stay, pneumonia and all other infections and complications were more

in diabetic group. Consequently the diabetic group required longer hospital stay after CABG which on an average was 7 days more than the non-diabetic group. As all the baseline characteristics, except dyslipidemia (which might be due to metabolic derangement that usually occurs in the diabetics) were almost identical between diabetic and non-diabetics the better outcome in the non-diabetics could be attributed due to lower perioperative blood glucose compared to the diabetic ones.

In the study of Estrada et al (2003) infections occurred in 6.6% patients (n = 36) with diabetes and 4.1% patients (n = 42) without diabetes ($p = 0.028$). Patients with diabetes stayed in the hospital after surgery 0.97 days longer (95% confidence interval 0.3 to 1.6 days) than patients without diabetes (p = 0.004). These findings are consistent with findings our study[9].

20% of patients have diabetes mellitus that undergo coronary artery bypass grafting (CABG) each year in the United States[10, 11] and perioperative hyperglycemia in patients with diabetes is associated with higher infection rates[12] which compares favorably with our study. Patients with diabetes undergoing cardiac surgery with postoperative glucose greater than 200 mg/dL have a 17 to 86% increased risk of infection[12].

None of the patients died during hospital stay or within 30 days following surgery. Estrada and colleagues (2003) however, showed a 30-day mortality of 3.7% (n = 20) for patients with diabetes and 2.3% (n = 24) for patients without diabetes (p = 0.13). The reason of absence of mortality in our study as compared to Estrada's study might be that the latter study was conducted about a decade ago, since then management strategy of diabetic patients undergoing CABG has been improved. Another reason might be that the sample size in our study was too small compared to Estrada's study (n = 1574) leaving a scope of chance error to play a role[9].

The risk of infection was increased by 78% when the patients were in the highest quartile of blood glucose (253 to 352 mg/dL) and 17% when they were in the lowest quartile (121 to 206 mg/dL)[12].

Thus, from the data of our study and the recent randomized trials, the significance of perioperative glycemic control on outcomes of CABG is evident. Perioperative hyperglycemia is also associated with increased resource utilization both in patients with and without diabetes. Strict glycemic control has, therefore, both medical and economic significance.

CONCLUSION

From the findings of the study and discussion thereof, it can be concluded that outcome of coronary revascularization in non-diabetic patients with perioperative hyperglycemia is better than that in diabetic patients with perioperative hyperglycemia. Diabetic patients suffer from pneumonia more often than the non-diabetics. Other infections were also considerably higher among the diabetics. Longer hospital stay is also common among them.

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Original Article

To assess the administration of short term intravenous antibiotic in case of open reduction and internal fixation in orthopedic surgery

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ABSTRACT

Objectives: *To minimize irrational use of antibiotics by implementing guidelines for antibiotics usage in orthopedic surgery.*

Methods: *The observational study was conducted from April 2018 to April 2019 at Orthopedic department of Mugda medical college and hospital, Mugda, Dhaka. Data was collected from medical records related to study period. Prophylactic antibiotic were given according to the American college of orthopedic recommendation 2009. Surveillance was done by surgical site infection rates and infectious morbidity. Data was analyzed on SPSS 13.*

Result: *Therapeutic use of antibiotic was rationalized, reducing the use of therapeutic antibiotics. Surgical site infection rates were less than 5% (include only deep surgical site infection that required further surgical toileting under anesthesia. That is only 1/50). Superficial surgical site infection occurred in only 3/50 cases that were cured by only regular dressing. Cost of antibiotics per patient decreased by 90%. Decrease in the length of the hospital stay and workload on nursing stuff was also observed.*

Conclusion: *Implementing guidelines for antibiotic use in Orthopedic surgery and translating it into our protocols was effective in decreasing the irrational antibiotic consumption and increasing the rational use of antibiotic in the hospital.*

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Keywords:
Antibiotics, Orthopedic, Open reduction and internal fixation, Surgical site infection

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INTRODUCTION

Antibiotics are powerful and effective drugs in the fight against infectious diseases caused by bacteria, and have saved millions of lives since their first appearance about 50 years ago. Rational use of antibiotics is extremely important as injudicious use can adversely affect the patient, cause emergence of antibiotic resistance and increase the cost.

As per the World Health Organization rational use of drugs requires that patients receive medications appropriate to their clinical needs in doses that meet their own individual requirements for an adequate period of time, and at the lowest cost to them and

their community (WHO 1987)[1]. The use of antibiotic prophylaxis has been shown to prevent post-surgical wound infection. When employed rationally significant reduction in the mortality and morbidity and saving in resources can be achieved.

The purpose of antibiotic prophylaxis is to prevent post-operative infections, which are the primary cause of morbidity and mortality in patients undergoing surgery today. Aseptic techniques alone could decrease but do not completely eliminate bacterial contamination of the surgical field. Therefore the need for antibiotics to supplement aseptic technique becomes more widely accepted[3].

In Bangladesh there are no proper prophylactic guidelines. In most hospitals and clinics including our hospital conventional therapy is given usually for 7-10 days. It increases the cost for the patient, increase workload on hospital staff and result in emergence of antibiotics resistance. Despite the knowledge about effectiveness of prophylactic antibiotics, administrative regimens are often inappropriate and secondly, duration of prophylaxis is often longer than recommended. This over and prolonged use contributed to overwhelming rates antibiotic resistance in Bangladesh and thus increases in surgical site infection rates.

Literature review suggests that prophylactic antibiotics when given in appropriate dose and at proper time, 30 minutes before surgery, provides effective tissue concentration prior to intra-operative bacterial contamination and thus reduces infectious morbidity[4]. Numerous antibiotics have been used, but there is no consensus as to the most appropriate agent. The duration of antibiotic administration has not been defined precisely, but it appears that a single dose of an antibiotic with a sufficiently long half-life can be as effective as prolonged courses of prophylaxis. Three dose antibiotics given pre-operatively has less cost, less potential for toxicity and less chance of promoting resistant bacteria.

The American College of Orthopedic has issued a practice bulletin on antibiotic prophylaxis for orthopedic procedure. The choice of an appropriate antimicrobial agent for prophylaxis should take into account that the agent must be of low toxicity, have an established safety record, not be used routinely to treat serious infections, have spectrum of activity including the microorganisms, have a spectrum of activity including the microorganism most likely to cause infection, achieve therapeutic concentration in relevant tissues during the procedure be administered for a short time ensure its presence in surgical sites of the incision[2].

The cephalosporin has emerged as the drugs of choice for the most operative procedures because of their broad antimicrobial spectrum and the low incidence of allergic reactions and side effects. Injectable Cefuroxime can be used agent because of its reasonably long half-life (3.5 hours) and low cost.

In our hospital setting therapeutic antibiotics were given injudiciously in multiple dosages at the consultant discretion and personal choice, as there were no proper guidelines being followed. To address this issue we took a quality care initiative by implementing ACOO guidelines (2009) for prophylactic antibiotic usage in Orthopedic and studied the decrease in irrational use of antibiotics and the impact on surgical site wound infection in orthopedic patient[4].

The observational study was conducted at Orthopaedic department of Mugda medical college and hospital, Mugda , Dhaka from January 2018 to April 2019.

During the planning phase i.e. January 2018 we worked with the staff to increase their awareness and practices about infection control policies, explained the rationale, methodology of implementing guidelines to all doctors and stuff.

The guidelines were implemented from February 2018. during the study period, teaching and monitoring of infection control practices were done monthly. To ensure compliance with the guidelines and to monitor decrease in the irrational use of therapeutic antibiotics, a monthly report was presented.

Records all the patients who received three doses of cefuroxime 1.5gm during induction and then two doses of cefuroxime 750mg within 24 hours post-operative of open reduction and internal fixation.

Patient who had any coexisting condition like diabetes mellitus, Chronic kidney diseases, active pulmonary tuberculosis, age more than 60 years are excluded from our study. If operation time more than 3 hours given another 750mg cefuroxime intravenously per operatively. Those

are sensitive to cephalosporin are also excluded from the study.

A protocol was implemented emphasizing on giving bath prior to surgery where possible, avoid removal of hair with razors, effective hand washing and scrubbing techniques, decreasing operating room traffic during surgery, maintaining effective sterilisation of the operating room, and instruments as per the standard criteria. Check dressing at 3rd postoperative day and discharge the patient at 7th postoperative day because we know that bacterial colonization may be occur at 7th postoperative day.

An approval from the ethical review committee was sought prior to the study.

Within 48 hours before to surgery, a baseline assessment was performed that included the measurement of vital signs (pulse rates, blood pressure and body temperature, general physical, systemic and local examination. Blood and urine samples were sent for haematology, blood chemistry and urine analysis.

On discharge, the patients were instructed to contact if they experience signs and symptoms of infection. All patients were monitored for 3 months of post operatively. The outcome measures were febrile morbidity and infectious morbidity including wound infections and scar dehiscence.

RESULT

1. Age distribution of the patients:

The age of the studied patients were ranging from 18 to 60 year. In this study most of the patients 23(46%) belongs to the age group18-30 and 31-40 years 16(32%), followed by age group 41-50. From the data it is seen that younger patients were include more in this study. The scenario is reflected in table -2

Table-1. Distribution of the study subjects by their age:

Age in year	Frequency	Percent
18-30	23	46
31-40	16	32
41-50	07	14
51-60	04	08

2. SEX DISTRIBUTION:

Out of 50 patients 38 cases (76%) were males and 12 cases (24%) were females with a male and female ratio 19:6

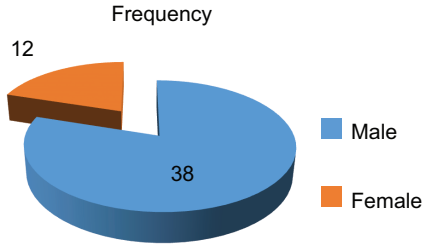

Figure-1: Distribution of the Respondents by their sex

3. Occupation of the patients:

Table 2 indicates that 21(42%) of the patients were businessmen and 11(22%) were student. Other occupations are also shown in the following diagram.

Table-2: Distribution of patients by occupation

Occupation	Number	Percentage
Businessman	21	42
Housewife	10	20
Service holder	08	16
Student	11	22
Total	50	100

4. Distribution of the patients according to fracture in extremity:

Out of 50 patients 29 cases (58%) were operated in upper extremity and 21 cases (42) were operated in lower extremity.

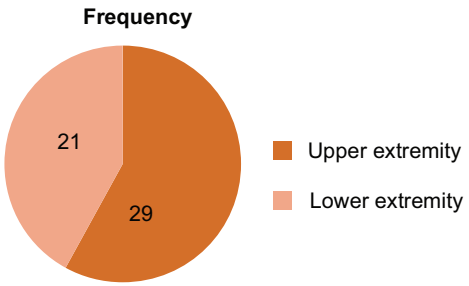

Figure-2: *Distribution of the Respondents by extremity involvement*

5. Side of operation: Among the studied patients more than half (70%) were operated on right side and less than half (30%) were operated on left side.

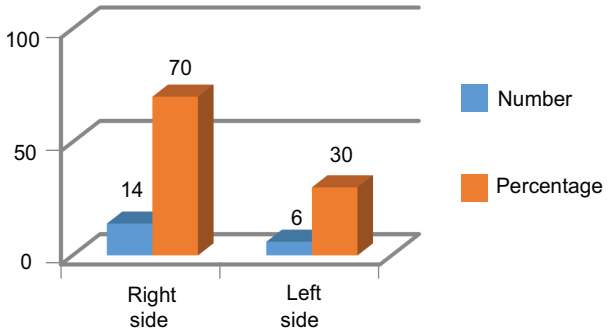

Figure-3: *Distribution of the patients by side of operation.*

6. POST-OPERATIVE HOSPITAL STAY :

The average duration of hospital stay after operation was 06 days ranging from 5 to 12 days. 27 (54%) patients stayed in the hospital for 03- 06 days, followed by a group of 12 (24%) 07-09 days. Only 04 patients (08%) had to stay longer than usual that is for 13-15 days.

Table 3: Comparison of the patients by post operative hospital stay

Postoperative hospital stay	Number	Percentage
13-15 days	04	08
10-12 days	07	14
7-9 days	12	24
3-6 days	27	54
Total	50	100

7. Complications:

Four (04) patients developed surgical site infection in early post operative period. Out of 04 one developed deep surgical site infection and rest 03 developed superficial surgical site infection. Surgical toileting done incase deep surgical site infection under anesthesia and take pus for culture sensitivity test. Given antibiotic according to culture sensitivity and infection was controlled after seven days antibiotic. On the other hand superficial surgical site infection patients given no antibiotic only surgical dressing done.

Table-4: Distribution of patients according to post operative SSTI

Name of complication	Number	Percentage
Superficial Surgical site infection	03	06
Deep Surgical site infection	01	02

DISCUSSION

The scientific rationale for antibiotic prophylaxis is to inhibit or eliminate contaminating micro-organisms that gain access to the surgical site during the procedure, which reduces the probability of an established infection. Thus, the goal of administering preoperative antibiotics is to allow for adequate tissue (blood, soft tissue, and bone) concentrations by the time of incision. These antibiotics should exceed the minimum inhibitory concentration (MIC) for the organisms likely to be encountered for the duration of the operation. This depends on the antibiotic used. There are a number of studies, which validate the importance of the preoperative dose of antibiotics in decreasing surgical site infection (SSI) incase open reduction and internal fixation in long bones by various type of implant. However, there are conflicting opinions as to the optimal timing of this dose. Some studies suggest that within 2 h of incision is best, while others recommend scheduling the dose as close to surgical incision as possible. We use second one in our study. There are several institutional guidelines which support a 1 h preoperative dose of antibiotics as a Surgical Care Improvement Project (SCIP) measure. In addition to these guidelines, it is critically important to have surveillance measures in place to document compliance with these protocols.

The American Academy of Orthopaedic Surgeons (AAOS), the Centers for Disease Control (CDC), and SCIP guidelines recommend that prophylactic antibiotics be completely infused within 1 h before the surgical incision.

1. The AAOS recommendation for the use of intravenous antibiotic prophylaxis, recommendation 2, states that "timing and dosage of antibiotic administration should optimize the efficacy of the therapy. Prophylactic antibiotics should be administered within 1 h before skin

incision. When a proximal tourniquet is used, the antibiotic must be completely infused before inflation of tourniquet.

2. The US advisory statement recommends that antimicrobial prophylaxis be administered within 1 h before incision and discontinued within 24 h after the end of the operation.
3. First or second generation cephalosporin should be administered for routine perioperative surgical prophylaxis because of its broad spectrum of action, cost effectiveness, and the need to preserve newer and more expensive therapies for drug resistant microorganisms and emerging pathogens. These antibiotics cover gram positive organisms and clinically important aerobic gram negative bacilli and anaerobic gram positive organisms. Additionally, they have excellent distribution profiles in bone, synovium, muscle and hematomas. Many studies have documented that minimum bactericidal concentrations for most non methicillin resistant *Staphylococcus aureus* (MRSA) organisms are achieved rapidly in these tissues ie within minutes after their administration. The optimal prophylactic antibiotic should be bactericidal (penicillin, cephalosporin, vancomycin, or amino-glycosides), not simply bacteriostatic (clindamycin). The agent should also have a half life that covers the decisive interval (the first 2 h after incision or contamination) with therapeutic concentrations from time of incision to wound closure. Failure to maintain tissue concentrations above the MIC increases the risk of wound infection.

This study provides evidence that by implementing standard guideline/protocols, quality care and patient safety goals can be achieved. By implementing guidelines for antibiotic prophylaxis, we were able to rationalize the use of therapeutic antibiotics. Through this study we were to achieve our objective of decreasing the irrational antibiotic usage. Additional benefits included cost effectiveness, decreased length of stay and decreased workload on the nursing stuff.

Surgical site infection (SSIs) are one of the most common type of adverse event. Evidence has shown that SSIs increase mortality, increase readmission rate, length stay , associate cost, and economic burden. The overall infection rate is around 5% but varies from surgeon to surgeon, hospital to hospital, one procedure to another, and even from patient to patient. Our result of SSIs rates is little high about 8% but it is accept in case orthopedic surgery. in our study deep SSI rate is only 2% that is very acceptable. We followed our patients for 3 months of post operatively that post discharge surveillance is important in achieving more accurate SSI rates.

Prevention of SSI remains the basic concern of the surgeons and appropriate prophylactic antibiotics can reduce these potential infections as proposed by many researchers.

Selection of appropriate antibiotic for the procedure, its dose, timings and duration are important contributing factors. Literature shows that about 30 -50% of antibiotic use in hospitals is for surgical antibiotic prophylaxis, and between 30-90% of this prophylaxis is inappropriate. The antibiotic is either given at the wrong time or continued for a long period, thus making it ineffective. Apart from the prophylaxis, skill of the surgeon, good haemostasis, minimal tissue trauma, avoidance of dead space, and fluid collection, sterilisation of the theatre equipment and theatre premises are important factor to minimising infection. In our study we covered all aspect of sterilization, gave prophylaxis at appropriate time and effective dose to prevent wound infection and infectious morbidity.

Literature review shows that prolong antibiotic use would not show any difference in the incidence of post-operative infections. Prolong use of antibiotics did not reduce the rate of surgical site infection. Prolonged antibacterial coverage changed the bacterial flora from superficial species, thus it contributed to increase in resistant species outbreaks, for example, of methicillin-resistant staphylococcus aureus.

There is clear evidence supporting the standardized administration of pre-operative prophylactic antibiotics. However, it remains unclear how to do that in a broad fashion. Different impediments exist in every hospital and overcoming these obstacles is a challenge that requires a multidisciplinary effort. Multiple antibiotics are available and information about antibiotic use pattern is necessary to formulate a constructive approach to the problem of irrational drug use.

A combination of non-regularity and regularity intervention are required at all levels of healthcare setup in Bangladesh to control and avoid the emergence of drug resistant organism due to irrational use of antibiotic in hospital as well as community. the former includes in service training of health personnel, awareness sessions. regularity intervention includes implementation of standard protocols/guidelines in hospital setting, regulation of infection control practices, maintaining sterilizations, conducting audits. More evaluation research is needed on different types of intervention strategies in various healthcare setting for conclusive evidence to be collected for specific intervention strategy.

CONCLUSION

We were able to decrease irrational use of antibiotics by implementing the guidelines and translating to our protocols. Additional benefits of this quality improvement project were cost-effectiveness and decreased workload of the nursing stuff.

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Original Article

Study of Body Weight and BMI in Third Trimester of Pregnancy

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ABSTRACT

Background: *During pregnancy there is progressive anatomical & physiological changes for continuous support for the increasing demand of the fetus.*

Objective: *To assess the body weight & BMI in third trimester of pregnancy in order to find out the physiological changes and associated risk of overweight and underweight mother.*

Method: *This cross-sectional study was carried out in the Department of Physiology Mymensingh Medical College, Mymensingh, between the period of July, 2013 to June,2014. One hundred pregnant women in their third trimester of pregnancy aged 18-35years were enrolled in study group, aged matched 100 healthy non-pregnant women were control group. Height measured in meter and body weight in kilogram, BMI measured by the ratio of kilogram and square meter.*

Result: *Mean height were 1.51±0.05 which was insignificant. Mean body weight were 63.38±3.75 which was significantly higher in pregnant women than non-pregnant women.*

Conclusion: *Due to physiological adaptation the body weight and BMI is markedly increased in third trimester of pregnancy. So, Body weight and BMI measurement should be ensure during ante natal checkup.*

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INTRODUCTION

During pregnancy there is progressive anatomical and physiological changes not only confined to the genital organ but also to all system of the body. This is principally a phenomenon of maternal adaptation to the increasing demands of the growing fetus.[1]

Pregnancy can be established and maintained only if adequate amounts of progesterone are secreted prior to and throughout the course of that pregnancy.[2] As a consequence of the increased secretion of many hormones during pregnancy, including thyroxin, adrenocortical hormones, and the sex hormones, the basal metabolic rate of the pregnant women increases about 15% during the later half of pregnancy.[3]

The growth and maturation of the fetus are closely associated with the delivery of maternal nutrients, particularly glucose . This is most crucial in the third trimester and is directly related to the duration and degree of maternal glucose elevation.[4]

METHODS

This cross-sectional study was carried out in the Department of Physiology Mymensingh Medical College, Mymensingh between the period of July, 2013 to June, 2014. One hundred pregnant women without complication in their third trimester of pregnancy aged 18-35 years were enrolled in study group and aged matched 100 healthy non-pregnant

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women served as control group. Study subjects were selected by following random sampling procedure from Mymensingh medical college hospital and the protocol of this study was approved by Institutional Ethics Committee (IEC) of Mymensingh Medical College. All the subjects were free from diabetes, hypothyroidism, cushing syndrome, polycystic ovary, renal & cardiovascular disorder.

Before recruitment aim, benefit and procedure of study was explained and their informed written consent from each subject were taken. Thorough physical examination of all subjects BMI and body weight were measured. The statistical analysis done by Student's Unpaired 't' test.

RESULT

The result expressed as height in meter, body weight in kg, BMI in kg/m^2.Height of control & study group were 1.51±0.04 and 1.51±0.05 respectively (P<0.6471) . Both the result were not statistically significant. In Table-I and Figure-1 mean (±SE) body weight of control and study group were 56.63±5.29 and 63.38±3.75 respectively. In study group the mean body weight were highly significant than control group.(P<0.0001).

Table I. *Shows distribution of different physical parameters of control and study group:*

Parameters	Control Group Mean±SD	Study Group Mean±SD	Mean Difference	t-value	Level of significant
Physical Parameters:					
Age (yrs)	25.27±4.59	25.41±3.60	0.14	0.24^{NS}	0.8211
Height (meters)	1.51±0.04	1.51±0.05	0.003	0.46^{NS}	0.6471
Weight (kg)	56.63±5.29	63.38±3.75	6.75	10.41**	0.0001
BMI (kg/m^2)	24.79±2.25	27.92±3.11	3.14	8.19**	0.0001

** indicates significant differences at 1% level of significance.
NS means not-significant.
SD means standard deviation.
All values are the mean ±SE
n = Total number of population.
Group I = Control group.
Group II = Study group.
NS = Not significant.
** = Highly significantly different from control; P< 0.0001

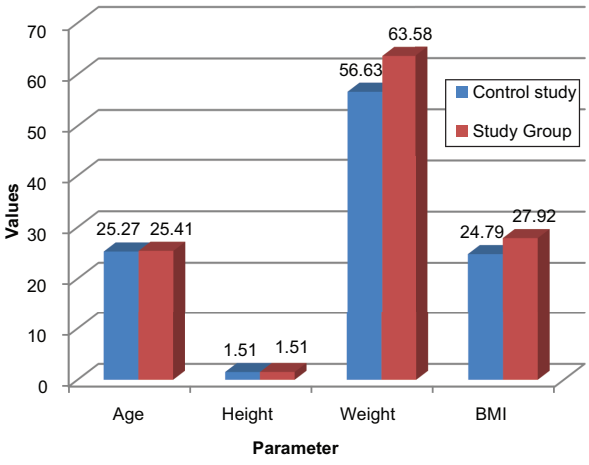

Figure-1. *Bar diagrammatic presentation of physical parameters in control & study group.*

Bar diagram shows body weight & BMI of study group were statistically high than control group and both were significantly increased in study group.

DISCUSSION

Pregnancy is a great stressful physiological condition in women during their reproductive period. From physiological point of view, pregnancy bring about important changes in structure, metabolic & endocrine functions of the mother. These changes along with placenta in the early part, feto-placental unit associated with pregnancy-all are adaptive in nature, allowing the mother to nurture the growing fetus.[5]

Successful outcome of pregnancy requires a large number of dramatic physiological adaptations. These adaptation involve changes of the metabolism in most organ systems, resulting in changes in the biochemical compositions of blood.[6]

Response of mother's body to pregnancy:
Various hormones can cause marked changes in pregnant woman's appearance. Sometimes resulting in the development of edema, acne, and masculine or acromegalic feature.[7]

1. The uterus:
The most striking change in the maternal organism during pregnancy is the enlargement of the uterus which increase in weight from 50 gm in the non-parous state to 1000gm at full term.

During early months the uterine wall becomes thicker than in the non- parous state but later it becomes thinner (5mm thick) and the fetus can be easily palpated through it.[8]

2. Gain in weight:
During pregnancy there is marked increase in body weight averaging about 12.5 kg during the whole 40-week period.[8]

Maternal weight gain in pregnancy:
The average weight gain during pregnancy is about 25-35 pounds, with most of this gain occurring during the last two trimesters. Of this about 8 pounds is fetus and 4 pounds is amniotic fluid, placenta and fetal membranes. The uterus increases about 3 pounds and the breast another two pounds, still leaving an average weight increase of 8 to 18 pounds. About 5 pounds of this extra fluid in the blood and extracellular fluid, and the remaining 3 to 13 pounds is generally fat accumulation.[7]

Average weight gain in pregnancy is 12.5 kg, with the rate of gain being fairly constant throughout a pregnancy. There is a positive correlation between maternal weight gain and birth weight.[9]

Body Mass Index (BMI) is a simple index of weight-for-height that is commonly used to classify underweight, overweight and obesity in adults[10].

Comparison of maternal weight gain in developed & developing countries:
Women belonging to ethnic groups characterized by a small body size have been reported to gain less weight on average during pregnancy than larger women. In less developed Asian countries, including Viet Nam, women generally have lower BMI and/ or a small gestational weight gain than in developed countries. In USA, for example, 2% of pregnant women have a BMI <18.5 and more than 50% have a BMI>25.[11]

A greater gain is needed in women with a low pre-pregnancy body mass index (BMI) to achieve desirable birth weight. There are also various socio-demographic characteristics (maternal age, diet, physical activity, genetic differences etc.) that are significantly affects gestational weight related factors.[12]

Causes of maternal weight gain in third trimester of pregnancy:
Weight gain during pregnancy represent two major components: i) the products of conception: fetus amniotic and the placenta and ii) maternal accession of tissues; expansion of blood and extracellular fluid, enlargement of uterus and mammary glands and maternal stores (adipose tissue). This gain in weight takes place almost entirely in the last 6 months. The rate of weight gain is not uniform throughout pregnancy. Approximately 5% of the total weight is usually gained in the first quarter and the remainder is gained fairly evenly throughout the rest of pregnancy.[13]

Weight gain in pregnancy has three phases ; first trimester very slight gain, second trimester-considerable linear increase due to growth of fetus, placenta, amniotic fluid together with the continuing lying down of maternal tissue and stores. Of the total weight increase about 10% and extracellular fluid for 13%, fat contribution 50% and protein 8%.[8]

Present study reveals Weight of control group of non-pregnant women of reproductive age (group I) and women in third trimester of pregnancy (group II) were 56.63±5.29 and 63.38±3.75 respectively. This weight was significantly increased (P<0.0001) . Again Body Mass Index (BMI) were 24.79±2.25 and 27.92±3.11 respectively. BMI was also significantly increased (P<0.0001).

This findings corroborate those of a similar study undertaken in Bangladesh by Islam M.N. in 2006,which reported exactly same pattern. That study showed that the overall relative change of

BMI with respect to gestational age is significant though it is insignificant in first trimester and significant in both second and third trimester.[14]

Women belonging to ethnic groups characterized by a small body size have been reported to gain less weight on average during pregnancy than larger women. In less developed Asian countries, including Viet Nam, women generally have lower BMI and/ or a small gestational weight gain than in developed countries. In USA ,for example, 2% of pregnant women have a BMI <18.5 and more than 50% have a BMI>25%.[15] The finding affirms the present study.

As the fetus and placenta grow and place increasing demand of mother, phenomenal alterations in metabolism occur. The most obvious physical changes are weight gain and altered body shape. Weight gain is due not only to the uterus and its contents but also to increase breast tissue, blood volume and water volume (about 6-8 L) in the form of extravascular and extracellular fluid. Deposition of fat and protein and increased cellular water are added to maternal stores. The average weight gain during pregnancy is 12.5 kg (27.5 lb).[16]

During normal pregnancy, approximately 1000 gm of the weight gain is attributable to protein. Half of this found in fetus and placenta, with the rest being distributed as uterine contractile protein, breast glandular tissue, plasma protein and hemoglobin. [16]

Total body fat increases in pregnancy, but the amount varies with total weight gain. During second half of pregnancy, plasma lipid increases (plasma cholesterol increases 50%, plasma triglyceride concentration may triple).[16]

Sultan MN et al. showed in their study that compared to pregnant women with weight gain in the second to early third trimester at or below IOM (Institute of Medicine) recommended rate , women who gained weight at a higher rate have a significantly higher chance of developing IGT.[15]

CONCLUSION

This study concludes that body weight and BMI in third trimester of pregnancy is increased due to physiological adaptation and overweight may cause difficulty in delivery and fetal abnormality. Therefore, routine examination of body and BMI are important to assess the physiological as well as pathological changes in third trimester of pregnancy.

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Original Article

Prevalence of Celiac Disease in Dyspeptic Patient Attending in Gastroenterology Department of An University Hospital in Bangladesh

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ABSTRACT

Celiac disease (CD) is an immune mediated disorder characterized by small intestinal mucosal injury and malabsorption caused by sensitivity to dietary gluten and gluten related proteins in genetically susceptible individuals (HLA-DQ2 and HLA-DQ8). In the past, CD was thought to be a European disease, but recently, in developing countries, including the Middle East and south Asia, gluten intolerant CD has become a widespread public health problem[4-6]. The estimated global prevalence is approximately 1-3% of the general population[7]. Aim of this study was to determine the prevalence of celiac disease in functional dyspeptic patients attending in indoor and outdoor department of BSMMU. In this prospective cross-sectional study, during a period of 18 months on January 2016 - June 2017. 215 patients with dyspepsia were initially enrolled. Then out of 215 dyspeptic patents, 55 were excluded due to having explainable gastrointestinal organic causes by physical examination and routine investigations with ultrasonography and upper GI endoscopy. Serological test IgA, anti-tissue transglutaminase antibody (tTG) were done. In patients with positive Anti tTG, titer (>50 iu/mL), re-endoscopy was performed and at least four biopsy samples from the distal portion of the duodenum were taken and send for histopathology. Among functional dyspeptic 160 patients, Anti tTG was positive in 17, of whom female were 5(12.5%) and male were 12(10%). Histological damage was classified as 3C category of Marsh (Total Villous Atrophy) in 0 cases, 3B (Subtotal Villous Atrophy) in 1(5.9%) and 3A (Partial Villous Atrophy) in 6(35.3%) cases, no patient found in Marsh 2 & 10(58.8%) patients were in Marsh 1 characterized by IEL >30/100 enterocytes. The high prevalence of celiac among dyspeptic symptomatic individuals indicates that they are a higher risk group for developing celiac disease. So, serologic assays of celiac disease in routine testing for dyspepsia is strongly recommended. Re endoscopy and biopsy should be taken in patient with positive serological test for celiac diseases to see the villous pattern.

Keywords:
Celiac disease, Gastroenterology ELISA, Dyspepsia

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INTRODUCTION

Celiac disease (CD) is an immune mediated disorder characterized by small intestinal mucosal injury and malabsorption caused by sensitivity to dietary gluten and related proteins in genetically susceptible individuals (HLA-DQ2 and HLA-DQ8), and produces a chronic inflammation of the small-intestinal mucosa thus altering absorption of some nutrients.[1]

In the past, CD was thought to be a European disease, but recently, in developing countries, including the Middle East and south Asia, gluten intolerance CD has become a widespread public health problem.[4] The estimated global prevalence is approximately 1-3% of the general population [7]. However, this prevalence varies from 0.14% to 1.17% in low risk, and from 2.4% to 44% in high risk populations.[6]

The spectrum of clinical features in adults is quite variable and extends from completely asymptomatic forms to several complex and widely differential clinical features such as persistent anemia, gastrointestinal symptoms (diarrhoea, abdominal pain, dyspepsia, constipation), hypertrans-aminasemia, osteoporosis, neurological symptoms (epilepsy, ataxia), hypoproteinemia, hypocalcaemia, dermatitis herpetiformis, recurrent, infertility and repeated abortions[7-8].

The diagnosis of celiac disease is based on the presence of serologic tests (ELISA) measurement of IgA antibodies to tissue transglutaminase and/or IgA endomysial antibodies [8]. However, the internationally accepted "gold standard" diagnostic test for coeliac disease is the demonstration of villous atrophy on a duodenal biopsy [9,10].

Functional dyspepsia is a chronic, relapsing and remitting disorder and there is likely to be a degree of symptom overlap between coeliac disease and functional dyspepsia [11]. A higher prevalence of CD in patients with dyspepsia was reported in a range of 2.0–9.6 times that of the general population. [12,13]

Unrecognized cases of CD have the potential to cause severe complications, such as ulcerative jejunoileitis, malignancy, autoimmune disease, persistent anaemia and osteoporosis [14,16]. Early detection of this disease can prevent many of its unwanted complications. Therefore, efforts to recognize the silent or atypical forms of CD among high-risk groups should continue. The aim of the study was to determine, the prevalence of CD in dyspeptic patients according to Rome III criteria by means of routine investigation and upper GI endoscopy first and then serology and finally duodenal biopsies in patients with positive serology, in Gastroenterology department of BSMMU Hospital in Bangladesh.

METHODOLOGY

After taking informed written consent, a total of 215 patients presenting with dyspepsia for more than 12 weeks were initially enrolled. Patients with a history of CD in their family and clinical or Para clinical data in favor of GERD, IBS, IBD, drug usage (NSAID), pancreatic, liver or gallbladder disease were excluded from study. After taking history, routine investigation, USG of whole abdomen and upper GI endoscopy 55 patients with various organic diseases has been excluded. Remaining 160 patients of functional dyspepsia were finally enrolled in the study. According to Rome III criteria, 88 (55%) had EPS & 72 (45%) had PDS like dyspepsia.

In this prospective cross-sectional study, during a period of 18 months all patients with dyspepsia who fulfils the Rome III criteria attending indoor & outdoor department of gastroenterology of BSMMU, Dhaka, Bangladesh, were targeted for inclusion in the study.

During the recruitment period, the objective of the study was explained to the potential participants, and informed consent was obtained. Complete blood count done in all cases and total abdominal ultrasonography was done by expert radiologist in Radiology department of the hospital. Endoscopy was performed with an Olympus forward viewing video endoscope (GIF-015 Japan)) under topical lignocaine anesthesia. In between two patients, the endoscope and the biopsy forceps were carefully cleaned and sterilized by first keeping in immersed in cidex (2.2-2.4% activated glutaraldehyde solution, Johnson and Johnson ltd) for 10 minutes and then rinsing it with sterile distilled water. From 215 potential dyspeptic participants 55 patients were excluded due to having explainable gastrointestinal organic causes. 160 patients who had no explainable organic cause with possible diagnosis of functional dyspepsia were enrolled in the study and classified into two subtypes according to Rome III criteria: (1) Epigastric Pain Syndrome (EPS), where the predominant symptom is pain centered in the upper abdomen; (2) Postprandial Distress Syndrome(PDS), characterized by upper abdominal fullness, early

satiety, bloating, or nausea, with no report of painful discomfort in the center or upper abdomen. All groups were screened for IgA anti tissue transglutaminase antibody (tTG), which were detected by the ELISA test (BMD, Marne la Vallee, France). In patients with positive Anti tTG, titer (>50 iu/mL), re-endoscopy was performed and at least four biopsy samples from the distal portion of the duodenum were taken, fixed in 10% formaldehyde, and sent to the pathology laboratory. The pathologist was unaware of the clinical, serological or endoscopic diagnosis of the patients. The small intestinal biopsy was examined and reported according to the modified Marsh criteria for the analysis [17].

RESULTS

Out of 160 FD patients male were 120(75%) and female were 40 (25%), mean age was 31.31±9.83 years. Out of 17 CD patients 14 patients were less than 45 years and mean age of CD patient was 30.38 ± 10.15 years.

We have categorized the selected patients according their educational status into literate, primary education (up to class V), secondary (up to class X), higher secondary (up to class XII), graduate or post graduate and others. Among the selected individuals, 60 cases completed secondary level of education, 50 cases completed primary education, 30 cases completed higher secondary education, 10 cases were graduate or post graduate, 6 cases were illiterate and 4 cases were below primary but capable of reading and writing(Other).

Table 1 : *Demographic data of patients with functional dyspepsia*

		Number	Percent
Age: Mean ± SD 31.31 ± 9.83(16-60)	<25	61	38.1
	25-35	47	29.4
	35-45	36	22.5
	>45	16	10.0
Gender	Male	120	75
	Female	40	25
Literacy	Capable of reading and writing(Other)	4	2.5
	None/illiterate	6	3.75
	Primary	50	31.25
	Secondary	60	37.5
	Higher secondary	30	18.75
	Bachelor/masters	10	6.25
Occupation	House wife		19.4
	Service		20
	Businessman		18.1
	Farmer		7.5
	Students		17.5
	Laborer		10
	Others		7.5
Residency	Rural		
	Urban		

Table 2: *Clinical presentation of patients with functional dyspepsia*

Mean age (Years --+ SD)	31.31 ± 9.83 (16-60)
Age (Range years)	18-60
Female	4o
Male	120
EPS	88
PPS	72
Total duration of symptom	27.54 ± 21.84
Duration of symptom per month	8.22 ± 3.32
Serology (IgA tTG antibody) positive	17

Among functional dyspeptic 160 patients anti tTG was positive in 17, of whom female were 5(12.5%) and male were 12(10%). Mean duration of symptom was 43.50 ± 40.84 months in serology positive dyspeptic patients and 25.76 ± 18.00 months in serology negative patients.

Out of 88 cases of EPS group anti tTG was positive in only 3(3.4%) cases and in 72 cases of PDS group 14(19.4%) cases were serology positive.

In the tTG positive group mean Hb% was 12.67 ± 2.12 and was lower than that of t-TG negative group (13.81 ± 1.53) which was statistically significant (p.value-.oo7).

Table 3: Distribution of age and sex by tTG

Parameters	tTG		P value
	Positive	Negative	
Age in years			
d"25	7(11.5)	54(88.5)	
25-35	2(6.4)	44(93.6)	
35-45	7(11.1)	31(88.9)	
>45	1(12.5)	14(87.5)	
	17(10.0)	143(90.0)	
Mean±SD	30.38±10.15	31.42±9.82	0.689
Sex			
Male	12(10)	108(90)	0.999
Female	5(12.5)	35(87.5)	
Total	17(10.62)	143(89.38)	
Symptoms			
Duration in month	43.50±40.84	25.76±18	0.002
Days per month	11.06±4.17	7.90±3.07	0.001

Table-III showed that the age group of <25 yrs and 35-45 years showed the highest prevalence of positive anti tTG.

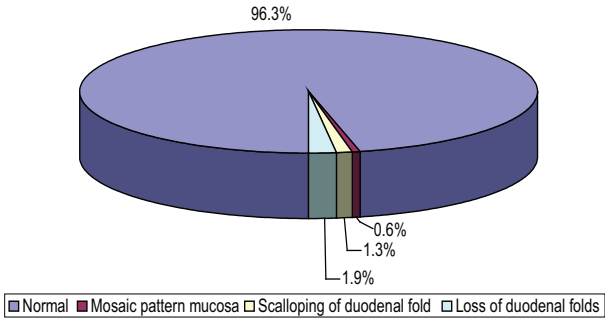

Figure-1: *Re-enndoscopy findings*

Re- endoscopy showed findings suggestive for CD in 6(3.75%) cases. Endoscopic markers of CD consisted of a decrease in the number of folds in 3 cases, an association with a mosaic pattern in 1 case, and in the remaining 2 case the endoscopic aspect of the mucosa was scalloped. Histological damage was classified as 3C category of Marsh (Total Villous Atrophy) in 0 cases, 3B (Subtotal Villous Atrophy) in 1(5.9%) and 3A (Partial Villous Atrophy) in 6(35.3%) cases, no patient in Marsh 2 & 10(58.8%) patients in Marsh 1 characterized by IEL >30/100 enterocytes

DISCUSSION

CD is a curable disease; however, it poses a challenging public health problem in developing countries [2]. It has been recommended to detect the symptoms of this curable disease in its initial presentation in order to prevent its unwanted complications. Three approaches have been suggested for CD screening [2]. One option is to perform a biopsy in all patients who undergo upper endoscopy [18]. This approach has been criticized due to the costly and invasive nature of this procedure. The second approach suggests using magnification tools. However, this approach is less practical and costly for screening [19]. The third approach offers the serology tests (tTG). In our study we used serological test at first to detect possible CD patients which was followed by biopsy and histopathology of the serology positive cases [3,9,10].

In this study, the prevalence of CD in dyspepsia using IgA anti tTG was 10.62%, a figure higher than

what has been reported in the general population [2,20]. Recent study in Western Iran showed prevalence of CD in dyspeptic patient was 7 % [21]. To our knowledge, this is the first study that reports the prevalence of CD in dyspeptic patients according to Rome III sub classification. Over the last decade, clinical researchers have revealed that CD is no longer a rare disease, and its subclinical or atypical form is quite prevalent [2].

In our study, furthermore, 14 out of 17 (82.35%) patients with positive serology or histopathology in favor of CD had the PDS type functional dyspepsia according to Rome III criteria. These pathological changes may be the mechanism that explains the higher prevalence of CD in this subtype group of dyspeptic patients. Moreover a delayed oro-cecal transit time (and a post-prandial decrease in gallbladder emptying rate have been found in untreated CD patients[22,23]. Normalization of oro-cecal transit time was observed after gluten withdrawal using a hydrogen lactulose breath test [24]. The diagnostic precision of the endoscopic observations [6/17 (32%)] was similar to that observed in other samples of dyspeptic patients) but lower than that found in patients at high risk of CD[25,26,28]. The discrepancy of our study compared with the latter could be explained by the fact that the operator paid more attention to the observation of the duodenal mucosa in the patients affected by pathologies already recognized as being at risk for CD.

Concerning the demographic characteristics of the 17 celiac patients (mean age 39.9 years; female/male ratio 6:5) our data are in agreement with what has already been observed in a multicenter retrospective study and in a screening study, both carried out in Italy[29,30]. A higher prevalence of females among celiac patients (12.5% *vs* 10%) has also been reported in a retrospective evaluation of adult patients referred to an endoscopy unit with mild digestive symptoms (dyspepsia, abdominal discomfort) or laboratory analytic alterations (anemia, iron deficiency or hypertransaminasemia)[10]. The rationale for the latter finding has not been clarified in the literature.

In our study the biopsies were carried out only in functional dyspeptic patients who were positive for IgA anti tTG antibody. It should be noted that regarding *H pylori* positivity the percentage of *H pylori*-positive celiac patients is similar to non-celiac patients and, as recently shown, clinical features of CD patients are unrelated to simultaneous presence of *H pylori* gastritis. So H. pylori study was not done[31]

In our study, more about 60% (10/17) of the patients were in the Marsh stage I, suggesting that diagnosis in an early stage can lead to proper management and prevention of late and severe complications. The reasons as to why most of the patients in this study were in the Marsh I stage is not clear, but to our knowledge the atypical pictures of CD in contrast to its classical forms may have less pathologic changes of gluten enteropathy in the gut. This study identifies a high prevalence of CD in functional dyspeptic patients (10.62%) using serology & diagnostic biopsy from the second part of the duodenum. The prevalence of CD was higher among female patients (12.5%>10%) and PDS type dyspepsia (20%). These findings suggest that performing a routine screening for CD by serological IgA anti tTG followed by diagnostic biopsy among(positive serology) at-risk patients (i.e., functional dyspeptic patients and female patients with PDS type functional dyspepsia) can identify CD in its earliest stage and can prevent or delay more complicated life threatening and terminal complications. Early screening and identification of CD in at-risk groups can increase the level of awareness and capacity of physicians in recognizing various clinical presentations of CD and allow them to treat patients accordingly.

CONCLUSION:

Based on the results that we have obtained, it can be concluded that in patients who have been diagnosed as having refractory functional dyspepsia after an upper GIT Endoscopy should be investigated for celiac disease serology. In serological positive patients, re-endoscopy should be done and biopsy should be taken from different parts of duodenum and histological study should be carried out according to modified marsh criteria. Particular attention should be given to females who report PDS type dyspepsia.

LIMITATIONS:

This study was carried out in a single center and sample size was small. Villous height and crypt length were not measured and IEL count was done only by H & E, no immunohistochemical study was done to count the lymphocytes.

Large scale population based prospective studies are needed to bring out the prevalence of CD in our country and also prevalence of CD in dyspeptic patients.

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Case Report

Dengue Hemorrhagic Fever Presenting with Acute Pancreatitis

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ABSTRACT

Dengue is an arthropod borne viral infection endemic in tropical and subtropical continent. Severe dengue is life threatening. Various atypical presentations of dengue have been documented. A39-year-old male had presented with severe dengue in Dengue hemorrhagic fever and with pain in abdomen due to pancreatitis. The pathogenesis of acute pancreatitis in dengue is not clearly understood, but various mechanisms are postulated. The awareness and timely recognition of this complication is very important for proper management.

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INTRODUCTION:

World health organization (WHO) currently estimates there may be 50 - 100 million dengue infections worldwide every year with over 2.5 billion people at risk of dengue. An estimated 500 000 people with severe dengue require hospitalization each year, a large proportion of whom are children.[1] Severe dengue (dengue hemorrhagic fever-DHF and dengue shock syndrome-DSS) is a potentially deadly complication due to plasma leaking, fluid accumulation, respiratory distress, severe bleeding, or organ impairment.

Various common complications of severe dengue are myocarditis, encephalitis, acute motor weakness, Guillane-Barre like syndrome, acute liver failure, lupus erythematosus, hemophagocytic syndrome, acute kidney injury, acute pancreatitis and so on.[2] The increase spread of disease has led to occurrence of more atypical presentations which may be potentially serious and result in increased morbidity and mortality.[3] It is critical that physicians who monitor dengue illnesses, should be aware and alert to these atypical manifestations.

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CASE REPORT:

A 39-year-old non-alcoholic, hypertensive male presented with complaints of fever for 2 days duration which is continues in nature and he also complaints vomiting and generalized weakness and admitted in medicine department. General examination is unremarkable. Blood pressure is normal (120/80 mm of Hg), pulse 110/minutes, respiratory rate was 20 breath/minutes. Abdominal examination revealed slight epigastric tenderness, Liver dullness was not obliterated and there was no palpable mass, organomegaly or free fluid. On the 2nd day of fever laboratory investigation shows dengue NS1 antigen was positive.Heamoglobin 11.10 g/dl,White blood cells count 4.97 K/ul, Neutrophils 72%,Lymphocyte 20%,monocyte 06%,Eosinophil 02%. Total Pletelets count 225K/ul, HCT 36.1, ESR 11. A provisional diagnosis was made as dengue fever and treated conservatively according the national guidelines.

On the 3rd day fever sub -sided and further investigation done. Investigation shows pletelets

count 65K/ul and HCT 37.40. On the 4th day pletelets count decreased to 31K/ul with HCT decrease to 34.7%. White blood cells also decreased to 2400/cumm. On the 5th day of fever patient complaints of epigastric pain from morning and slight respiratory distress. He also develops epistaxis few hours later and his epigastric pain increased. He also complaints of vomiting. His blood pressure was 90/60 mm of Hg. An urgent ECG was done. Tracing shows slight T inversion in lead II,III,V5 and V6. Immediate troponin I was done found normal (0.01ng/ml).NT-Pro BNP was also found normal (46.25pg/ml). For percussion patient was transferred to CCU and Echo was done and found normal. Investigation reports shows Hb 11.2g/dl, ESR 07, WBC 3500/cumm, Platelet counts 20000/cumm, HCT 37.3%, MCV 51.8fl, MCH 18.3pg, MCHC 35.4 g/dl. CRP 24mg/L, S. Creatinine 0.8 mg/dl,SGPT 317 u/l, SGOT 960 u/l. Serum electrolytes shows Na+ 131mmol/L, K+ 3.6mmol/L, Cl-91.0 mmol/L,CO2 21.0mmol/L, Serum albumin 2.6 g/dl, Serum Lipase 1441 U/L. USG of whole abdomen reveals 1.hepatomegaly with fatty change. (Grade-I), 2.Ascites (Mild) with mild pleural effusion.3.Prominant Pancreas.CT Scan whole abdomen was advised but not done.

Regarding the management of acute pancreatitis, it was decided to manage the case conservatively with parenteral antibiotics, proton pump inhibitors, antiemetic's and intravenous fluid management was done according to dengue national guideline and WHO recommendation was followed. Continuous blood pressure monitoring found stable. The fever had a short course and Serum amylase and serum lipase levels came down slowly. On 9th day serum amylase was 187 U/L, and serum lipase was 835 U/L. Patient was discharged on10th days of admission. Further serology report shows Den 3 serotype. After spending about one and half weeks in the hospital, the patient made an uneventful recovery and went home to his family. On follow-up he was found to be in good health with normal enzyme levels.

DISCUSSION:

In DF, abdominal and gastrointestinal symptoms are common.[4,5] Presentation with an acute abdomen in DF may pose a diagnostic dilemma and is a challenge for the treating clinician. In DHF, up to 40% of patients may present with abdominal pain.[4] Abdominal pain or tenderness and persistent vomiting are classified as warning signs.[6] These symptoms (abdominal pain and vomiting) have been noted in the majority of patients with severe dengue infection prior to clinical deterioration[7]. Hence, there is a need for close monitoring of patients with DF who display such warning signs. In a retrospective review of 8,559 patients with DF, 67% had abdominal and gastrointestinal symptoms. The most common symptom was nausea (52%), followed by abdominal pain (36%), and vomiting (29%).[4] In dengue infection, the causes of abdominal pain include hepatitis, pancreatitis, acalculous cholecystitis, and peptic ulcer disease[4]. Acute pancreatitis is a rare complication of DF.[2] In a study of DF by Khanna et al., the various causes of abdominal pain were reported to include acute hepatitis [n = 20 (36.4%)], acalculous cholecystitis [n = 9 (16.4%)], acute pancreatitis [n = 8 (14.5%)], appendicitis [n = 3 (5.5%)], spontaneous bacterial peritonitis [n = 2 (3.6%)], enteritis [n = 8 (14.5%)], peptic ulcer disease [n = 2 (3.6%)], and gastric erosions [n = 3 (5.5%)].[4]

In our patient, DHF was diagnosed according to the World Health Organization's (WHO) criteria. He presented with fever, epistaxis, thrombocytopenia (platelets $<100 \times 10^9$/L), and ascites, and his serology results were positive for nonstructural protein 1 (NS1) antigen and dengue immunoglobulin M (IgM) antibodies. He had continuous persistent vomiting that started on day 5 after the admission and stopped three days before discharge. His initial vomiting and epigastric pain were not relieved by parenteral pantoprazole, and he was hypotensive. We suspected acute pancreatitis and advised for serum amylase and lipase testing, and abdominal ultrasound. We diagnosed acute pancreatitis in view of clinical symptoms (abdominal pain and vomiting), hypotension, enlargement and prominent pancreas on ultrasound examination without features of hepatobiliary disorders, and increased serum amylase and lipase levels. We started intravenous fluid according to dengue national guidelines, intravenous antibiotics, and antiemetic's and proton pump inhibitors. Serum amylase and lipase levels decreased after one week. In DHF, the involvement of the pancreas may be due to direct viral invasion, secondary to host immune reactivity, or due to hypotension.[8]

Like septic shock, acute pancreatitis can be fatal.[9] As such, DHF/DSS can also cause mortality if not

treated. Therefore, acute pancreatitis as a complication of DHF is dangerous, and clinicians should know when to suspect in patients with DF. Acute pancreatitis as a complication of DHF may be underdiagnosed due to lack of awareness.[9] Hence, clinicians might not request serum amylase or lipase investigation, despite abdominal pain and vomiting. Lee *et al.* compared 14 patients with hyperlipidemia (one with additional hyperamylasemia) and 57 withoutHyperlipasemia and/or hyperamylasemia among 71 DHF patients who presented with abdominal pain. They found that three patients in the hyperlipidemia group had pancreatitis, all of whom had enzyme elevation > 3 times the of normal[10]. In acute pancreatitis, serum amylase usually rises within a few hours of the onset of symptoms and return to normal values within 3-5 days. However, because of sensitivity, specificity, and positive and negative predictive value limitations, serum amylase alone cannot reliably be used to diagnose acute pancreatitis; the more specific serum lipase test is preferred. Serum lipase remains increased for a longer period than amylase after disease presentation.[11] Abdominal pain and vomiting are common in DF, especially in severe DF. Even though important common causes include acute gastritis, hepatitis, and acalculous cholecystitis, acute pancreatitis should be kept in mind as one of the causes. Simple investigations like serum lipase, amylase (levels more than 3 times the upper limit of normal), and abdominal ultrasound will establish the diagnosis. In a patient with dengue illness who has abdominal pain, it is probably justified to estimate and monitor serum lipase and amylase levels and to perform serial abdominal sonography.[12]

CONCLUSION

To conclude, clinicians should be alert when there are warning symptoms (abdominal pain and persistent vomiting) in patients with DF and should do testing of serum lipase and amylase levels along with abdominal sonography. Even though acute pancreatitis is a rare complication, early diagnosis and prompt treatment is necessary to prevent morbidity and mortality.

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