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Original Research Article

A Prospective Analysis of Patients with Surgical Jaundice: Clinical and Investigative Correlations

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Abstract: ***Introduction:*** Surgical jaundice, or obstructive jaundice, results from the blockage of bile flow due to benign or malignant conditions, leading to elevated bilirubin levels and associated symptoms. Early identification of the underlying cause is crucial for timely intervention and improved patient outcomes. This study aimed to evaluate the clinical aspects of surgical jaundice in patients admitted to DMCH. ***Methods:*** *This* prospective observational study was conducted at the Department of Surgery, Dhaka Medical College Hospital, over 12 months. A total of 100 patients were selected as study subjects by purposive convenient sampling technique. The diagnosis was established based on investigations. After data collection, all entries were checked for consistency and analyzed using SPSS version 26. ***Result:*** Among 100 patients with surgical jaundice (mean age 53.7±10.9 years), 57% had malignant causes, primarily carcinoma of the pancreatic head (32%), while 43% had benign causes, with choledocholithiasis (28%) being the most common. Jaundice was universal, and abdominal pain was the most frequent symptom, though malignancy was significantly associated with loss of appetite, weight loss, dark urine, and abdominal lump ($p<0.05$). Liver function tests showed significantly higher serum bilirubin and alkaline phosphatase levels in malignant cases ($p<0.001$). ***Conclusion:*** This study found that carcinoma head of the pancreas and choledocholithiasis are the most common causes of surgical jaundice. Overall, malignancy is the most frequent etiology of surgical jaundice. Abdominal pain was the most common clinical presentation in both malignant and benign cases. Loss of appetite and weight, dark urine, and a lump in the abdomen were found significantly higher among the malignant jaundice patients than in benign cases.

Keywords: Surgical Jaundice, Clinical evaluation, Liver Function Test, Pancreatic Head.

INTRODUCTION

Surgical Jaundice is a common surgical problem with variable causes ranging from benign causes like choledocholithiasis to malignant causes like carcinoma of the head of the pancreas. It results from failure of passage of bile to the intestine resulting from any pathology obstructing the biliary tree.[1] Each year, over a million new cases of cholelithiasis are detected in the United States, with roughly 8% having common bile duct stones. Each year, roughly 25,000 new cases of pancreatic carcinoma are diagnosed, almost half of which are associated with jaundice, and 7,000 to 8,000 new cases of bile duct tumors are diagnosed. Pancreatic cancer affects 8-10 people per 100,000, making it the most common cause of malignant Surgical jaundice and the presenting symptom in more than three-quarters of cases [2]. The treatment and prognosis of Surgical jaundice depend upon the etiology and level of biliary

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obstruction [3]. If not diagnosed in time and treatment is delayed then there is a high morbidity and mortality in the patients with Surgical jaundice.[4] In Surgical jaundice, there is an increase in the conjugated fraction of bilirubin.[2] The conjugated bile in the liver encounters an obstacle to its elimination in the duodenum. This may be due to disturbances of excretion such as hepato-cellular injury or abnormalities of the flow between the hepatocyte and the ampulla of Vater, such as gallstones of the main bile duct, periampullary neoplasm, or pancreatitis.[5] Patients suffering from Surgical jaundice usually present with severe abdominal pain, fever, nausea, vomiting, and pruritus due to retained bile salts. They may also suffer from coagulopathy, sepsis, and renal failure which are the major complications of patients with Surgical jaundice.[2] The nature of these clinical manifestations usually depends on the original etiology and the progress of the disease process.[1] The etiology of Surgical jaundice varies greatly depending upon the geographical region as well as the age of the patients. In neonates, the common causes of Surgical jaundice include biliary atresia and neonatal hepatitis while in young and middle-aged patients' common causes include cholelithiasis, primary sclerosing cholangitis, external compression over the bile duct, and biliary stricture. With advancing stages, the likelihood of malignant diseases such as cholangiocarcinoma, carcinoma head of the pancreas, periampullary carcinoma, and any other malignant growth compressing over bile duct increases.[4] The pathogenesis of Surgical jaundice ranges from malignant to benign. Malignant causes include cholangiocarcinoma and pancreatic adenocarcinoma, while benign Surgical jaundice mainly originates from choledocholithiasis and chronic pancreatitis.[6] Information about the level and cause of the obstruction can be known by various anatomic imaging modalities.[7] Computed tomography (CT), endoscopic ultrasound (EUS), endoscopic retrograde cholangiopancreatography (ERCP), helical CT cholangiography, Magnetic Resonance Cholangiopancreatography (MRCP), radionuclide imaging, and ultrasonography are the commonly used invasive and non-invasive radiological techniques to investigate hepatobiliary lesions.[8] ERCP is considered the Gold standard in the evaluation of biliary trees, but it is an invasive technique associated with complications like pancreatitis.[7] MRCP is an important noninvasive imaging investigation in the preoperative evaluation of patients with Surgical jaundice.[9] Although non-invasive, CT involves exposure to radiation and contrast and has low sensitivity in detecting biliary diseases.[10] Even though many new imaging modalities are available, because of the cost- effectiveness, easy availability, and non-invasive nature USG can be considered as a first-line imaging tool. [11] Laboratory investigations like liver function tests help in the diagnosis of the cause of Surgical jaundice.[7] However, the management of Surgical jaundice solely depends on its etiology as gallstones are treated by removal of stones using endoscope; bile duct stricture or obstruction by tumors is treated by the endoscopic stent, which may be used to relieve obstruction temporarily till definitive treatment is done which include surgical removal of tumors, chemotherapy or radiotherapy.[2] Many patients present with advanced surgical jaundice requiring various examinations to determine the cause and level of obstruction.[8] Prolonged and progressive Surgical jaundice induces fatigue, malnutrition, bile stasis, cholangitis, and endotoxemia, and is associated with hepatic dysfunction, coagulopathy, infections, anastomotic leakage, and delayed recovery after the surgical operation.[12] Surgical jaundice, often known as surgical jaundice, is a frequent problem across the world. There is a great discrepancy in the recognized causes of Surgical jaundice at various places.[13]A poorly chosen operation can result in significant morbidity and death. Early and correct diagnosis of the etiology of Surgical jaundice might guide surgeons in appropriately managing such patients, hence enhancing patient quality of life and increasing survival rates hence it is critical to evaluate the presence and nature of blockage prior to surgery.[14] Therefore this study aimed to evaluate the clinical aspects of surgical jaundice in patient admitted in DMCH.

METHODS

This prospective observational study was conducted at the Department of Surgery, Dhaka Medical College Hospital, over 12 months. Patients with Surgical jaundice admitted to the Department of Surgery, DMCH were considered as the study population. A total of 100 patients were selected as study subjects by purposive convenient sampling technique.

Inclusion criteria:

- Age: >18 years of age.
- All patients with symptoms of Surgical Jaundice
- Raised serum bilirubin level

Presence of dilatation of intrahepatic biliary duct of 2 mm or more or extrahepatic biliary duct of 4 mm or more in ultrasonography

Exclusion criteria:

- Patients with medical jaundice
- Cirrhosis of liver
- Not willing to participate.
- Too ill.

A detailed history of socio-demographic characteristics and clinical presentation, including age, sex, and symptoms like clay-colored stools, anorexia, weight loss, and pruritus, was recorded and correlated with examination findings such as jaundice, scratch marks, abdominal mass, and hepatomegaly. An initial diagnosis was made, followed by further evaluation with liver function tests to assess bilirubin and serum alkaline phosphatase levels. Ultrasonography of the hepatobiliary system and pancreas was performed to detect

abnormalities in intra- and extra-hepatic biliary channels, the common bile duct, gallstones, or any abdominal mass. Advanced imaging modalities such as ERCP, CT scan, PTC, and MRCP were utilized if ultrasound was inconclusive or when indicated. The final diagnosis was established based on these investigations. After data collection, all entries were checked for consistency and analyzed using SPSS version 26 (IBM Corp., Armonk, NY). Frequencies and percentages were calculated for qualitative variables, while the arithmetic mean and standard deviation described quantitative variables. The independent sample t-test was used for comparing symmetrically distributed continuous variables, whereas Pearson's Chi-square test and Fisher's exact test were applied to categorical variables where appropriate. A p-value <0.05 was considered statistically significant. The results were then presented using tables, figures, and graphs as necessary. Ethical clearance was taken from the ERC of Dhaka Medical College and Hospital. Informed written consent was obtained from each of the participants

RESULTS

A majority (44%) of the patients were aged between 51 to 60 years followed by 26% were above 60 years, 6% were below 30 years and 24% were 30 to 50 years. The mean age of the patients was 53.7±10.9 years. [Table 1]

Table 1: Distribution of the patients according to Age group (n=100)

Age group (years)	Frequency (n)	Percentage (%)
<30	6	6
30 to 50	24	24
51 to 60	44	44
>60	26	26
Mean± SD (ranged)	53.7±10.9 (18 to 72)	

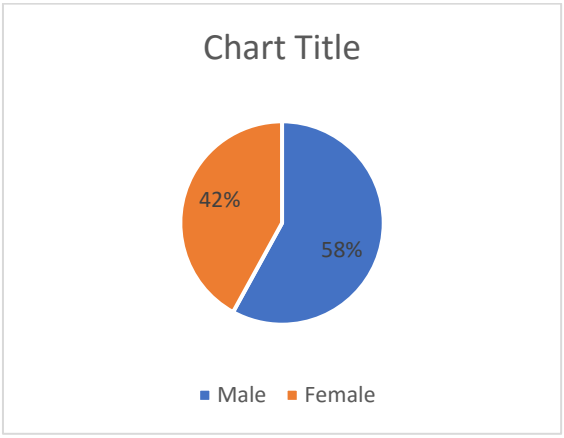

Figure 1: Distribution of the patients according to gender (n=100)

Among all, 58% of the patients were male and 42% were female.

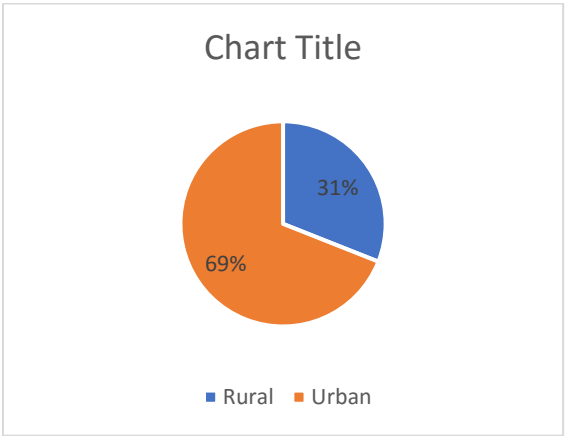

Figure 2: Distribution of the patients according to residence (n=100)

Among all, 69% of the patients were from urban areas and 21% were from rural areas.

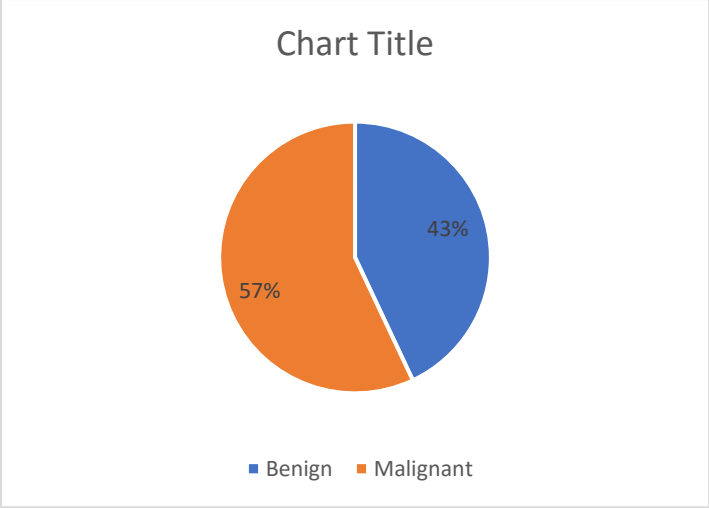

Figure 3: Distribution of the patients according to causes of surgical jaundice (n=100)

Among all, 57% of the patients had malignant surgical jaundice and 43% had benign surgical jaundice.

The most common malignant cause was carcinoma head of the pancreas (32%) followed by Cholangiocarcinoma (11%), periampullary carcinoma (9%), Carcinoma gallbladder (5%) Besides, the most common benign cause was Choledocholithiasis (28%) followed by Benign biliary stricture (13%) and Choledochal cyst (2%). [Table 2]

Table 2: Distribution of the patients according to type of malignant and benign cause (n=100)

Type of causes	Frequency (n)	Percentage (%)
Malignant cause		
Ca head of the pancreas	32	32
Periampullary Ca	9	9
Cholangiocarcinoma	11	11
Carcinoma Gallbladder	5	5
Benign cause		
Choledocholithiasis	28	28
Benign biliary stricture	13	13
Choledochal cyst	2	2

All the patients had jaundice besides, the most common clinical presentation was abdominal pain in both malignant and benign cases. Loss of appetite and weight loss, dark urine, and a lump in the abdomen were found significantly higher among the malignant jaundice patients than in benign cases. [Table 3]

Table 3: Distribution of the patients according to clinical presentation (n=100)

Clinical presentation	Malignant surgical jaundice	Benign Surgical jaundice	Total	p-value
Jaundice	57 (100)	43 (100)	100(100)	-
Abdominal pain	56 (98.2)	41 (95.3)	97(97)	0.576**
Dark urine	38 (66.7)	12 (27.9)	50(50)	<0.001*
Pale Stool	12 (21.1)	7 (16.3)	19(19)	0.614*
Loss of appetite	44 (77.2)	23 (53.5)	67(67)	0.018*
Loss of weight	43 (75.4)	13 (30.2)	56(56)	<0.001*
Itching	41 (71.9)	26 (60.5)	67(67)	0.284*
Fever	22 (38.6)	12 (27.9)	34(34)	0.293*
Lump in abdomen	24 (42.1)	4 (9.3)	28(28)	<0.001**

P-value was determined by the *Chi-square test and **Fisher Exact test. Data was presented with frequency (%) and within parenthesis percentage over a column in total. Serum bilirubin and ALP levels were significantly higher in malignant surgical jaundice than in benign surgical jaundice.

Table 4: Distribution of the patients according to Liver Function Test (n=100)

Liver Function Test	Malignant surgical jaundice	Benign Surgical jaundice	p-value*
Serum bilirubin (mg/dl)	12.26±1.2	9.36±1.5	<0.001
Serum alkaline phosphatase (IU)	883.3±156.8	566.7±109.8	<0.001

*p-value was determined by independent sample t-test. Data was presented with mean±SD.

DISCUSSION

In this, this study age range was 18 to 72 years whereas the majority (44%) of the patients were aged between 51 to 60 years followed by 26% above 60 years, 6% below 30 years and 24% were 30 to 50 years. The mean age of the patients was 53.7±10.9 years. In the study of Padhy *et al.,* the age group of 50-80 years [15]. Another study suggested that the occurrence of surgical jaundice was maximum in the 31–70-year age group [16]. Shukla *et al.,* also revealed that Obstructive jaundice is more prevalent in the 5th and 6th decade of life [17]. Among all, 58% of the patients were male and 42% were female which correlates with similar studies by Padhy *et al.,* revealed that among 100 cases of surgical jaundice, there was a slight male predominance at sex ratio 1:0.78 [15]. A previous study also revealed that males are more affected (55.72%) with obstructive jaundice as compared to females with a male-female ratio of 1.25:1 [14]. However, Shukla *et al.,* observed overall incidence of obstructive jaundice was higher in females compared to males [17]. However, a majority of the study observed male predominance over females [16,18]. Among all, 57% of the patients had malignant surgical jaundice and 43% had benign surgical jaundice. A similar type of etiological distribution has been found in the study done by Khan, in which it was observed that 58.71% of cases have malignant causes while 41.29% of cases have benign causes [14]. Gupta *et al.,* also observed that malignant causes (63.89%) were more frequent than benign causes (36.11%) [19]. In this study, the most common malignant cause was carcinoma head of the pancreas followed by Cholangiocarcinoma, periampullary carcinoma, and Carcinoma gall bladder. Besides, the most common benign cause was Choledocholithiasis followed by Benign biliary stricture and Choledochal cyst. In the study of Odongo *et al.,* among 42 participants with malignancies, Pancreatic head tumors were 27.8%, cholangiocarcinoma was 18.1%, duodenal cancers were 6.94%, and gall bladder cancer was 5.6% whereas the remaining 30 participants with benign etiologies, choledocholithiasis was 13.9%, biliary atresia was 9.7%, a pancreatic pseudocyst was 8.3%, Mirizzi syndrome was 6.9% and 1.4% each of chronic pancreatitis and choledochal cyst [18]. Khan explored the causes in detail whereas, among malignant causes, carcinoma of the pancreas was the most common cause, responsible for about 1/4th of overall causes for the development of obstructive jaundice. Besides, among the benign causes, choledocholithiasis (gallstone in the common bile duct) was the commonest cause, responsible for nearly 1/3rd of overall causes for the development of obstructive jaundice [14]. In the study of Shukla *et al.,* among malignancies periampullary carcinoma and advanced GB carcinoma occur with an equal frequency of 32 cases and choledocholithiasis (28%) is the most common benign aetiology [17]. Anand *et al.,* observed most common cause of obstruction was choledocholithiasis followed by malignancy [16]. In the study of Gupta *et al.,* among the malignant causes of obstructive jaundice, cancer head of the pancreas (60.87%) and cholangiocarcinoma (17.39%) were common causes whereas among the benign causes of obstructive jaundice, choledocholithiasis (76.92%) and benign biliary strictures (15.38%) were common causes [19]. Loss of appetite and weight, dark urine, and mass abdomen were found significantly higher among the malignant jaundice patients than in benign cases. In the study of Khan icterus– jaundice was the commonest symptom presentation (97.51%) in all patients with malignant etiology; and in 93.98% of patients with benign etiology. Other common representing symptoms include loss of appetite (79.60%); and loss of weight (76.12%) [14]. In a study by Gupta *et al.,* it was observed that jaundice (91.67%), loss of appetite (77.78%), and abdominal pain (75.00%) were the commonest presentations for obstructive jaundice cases [19]. In the study of Padhy *et al.,*85.7% of pain abdomen at 100%, fever with chills at 100%, lightening of the stool at 85.7%, darkening of urine at 85.7%, and itching at 28.6% [15]. Anand *et al.,* also observed similar clinical presentation among the patients and pale stool, dark urine, loss of weight, pallor, and melaena were found significantly higher among malignant cases than benign [16]. Clinical presentation depends on the severity of the disease. Serum bilirubin and alkaline phosphatase levels were found significantly higher among the malignant cases than benign which was consistent with the previous study [20]. Anand *et al.,* also revealed that there were significantly higher values of total bilirubin, direct bilirubin, and alkaline phosphatase in malignant conditions [16].

Limitations of The Study

The study was conducted in a selected hospital, which may limit the generalizability of the findings to the broader community. Additionally, the small sample size could affect the statistical power and reliability of the results. Since the sample was selected purposively, there is a potential risk of selection bias, which may influence the study outcomes.

CONCLUSION

Surgeons can better manage patients with obstructive jaundice by identifying the etiology of the condition early on. This study found that carcinoma head of the pancreas and choledocholithiasis are the most

common causes of surgical jaundice. Overall, malignancy is the most frequent etiology of surgical jaundice. Abdominal pain was the most common clinical presentation in both malignant and benign cases. Loss of appetite and weight, dark urine, and a lump in the abdomen were found significantly higher among the malignant jaundice patients than in benign cases.

RECOMMENDATION

Early identification of the etiology of obstructive jaundice is crucial for effective surgical management. As this study found malignancy, particularly carcinoma of the pancreatic head, to be the most common cause, along with choledocholithiasis, timely diagnosis through clinical assessment and advanced imaging is recommended. Given the significant association of symptoms like loss of appetite, weight loss, dark urine, and abdominal lump with malignant jaundice, these should be considered key indicators for early intervention. To enhance the generalizability of findings, a multicenter study with a larger sample size is recommended for a more comprehensive understanding of the disease spectrum and management outcomes.

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