International Surgery Journal
Wilku KS et al. Int Surg J. 2021 Oct;8(10):2892-2900
http://www.ijsurgery.com
pISSN 2349-3305 | eISSN 2349-2902

DOI: https://dx.doi.org/10.18203/2349-2902.isj20213694

Original Research Article

A prospective study of clinico-radiological assesment and management of obstructive jaundice in Mmimsr, Mullana

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Received: 22 December 2020
Revised: 14 September 2021
Accepted: 15 September 2021

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ABSTRACT

Background: Obstructive jaundice poses diagnostic and therapeutic challenges. This study was undertaken to highlight the clinical and radiological assessment of obstructive jaundice in our setting and to approach for early diagnosis and treatment before irreversible tissue insult sets in.
Methods: Present study was prospective study conducted at Maharishi Markandeshwar Institute of Medical Sciences and Research, Mullana, Ambala. Data were collected on prescribed proforma and analyzed stastically.
Results: A total of 50 patients were studied. It is more common in productive adult with the mean age of 51.04±12.40 years. The male to female ratio was 1:1.08. Majority of the patients were having benign pathology (62%) and choledocholithiasis was the commonest benign cause. Abdominal ultrasound was the diagnostic imaging done in all patients and revealed dilated CBD (>1 cm) in 78% cases, dilated IHBR in 96%of cases and multiple CBD stones in 78.3% of cases. CT was reserved for suspected malignant and MRCP was planned in stone or benign causes. 70% patients were selected for ERCP and 62% of patients underwent definitive open procedure viz choledocholithotomy (40%), hepaticojejunostomy (12%).
Conclusions: Obstructive jaundice in our study was more prevalent in females and the cause is mostly CBD stones. The result suggests that early diagnosis and treatment plays vital role in the prognosis of patients with obstructive jaundice.

Keywords: Obstructive jaundice, ERCP, Hepaticojejunostomy, Dilated CBD, Dilated IHBR

INTRODUCTION

Jaundice or icterus is a yellowish staining of the skin, sclera and mucous membranes and is clinically apparent when the bilirubin level exceeds 2mg/dl (34.2 µmol/L). It indicates excessive levels of bilirubin in the blood which gets deposited in these tissues. It is most apparent in natural sunlight and is most noticeable on the face, trunk, and sclerae in fair-skinned patients whereas in dark-skinned patients, it is noticeable on the hard palate, sclerae, and conjunctivae. Pseudo jaundice may be found from carotinemia, uremia, and quinacrine.[1]

Obstructive jaundice is a common surgical problem that occurs when there is an obstruction to the passage of conjugated bilirubin from liver cells to intestine. Jaundice due to biliary obstruction may be caused by heterogeneous group of diseases that include both benign and malignant conditions.[2-5] Causes of jaundice can be classified into pre-hepatic, hepatic or post hepatic. It is among the most challenging conditions that contributes significantly to high morbidity and mortality.[2,3] Early diagnosis is very important especially in malignant cases, as resection is only possible at this stage.[1,6]

Obstructive jaundice is a clinical diagnosis that requires both clinical and diagnostic work up to elucidate the precise etiology. Therefore, a multi-disciplinary approach that requires the clinician, radiologist, endoscopist and interventional radiologist will lead to a better outcome.[4]

Untreated obstructive jaundice can lead to serious infection that spreads to other parts of the body. Immediate medical care should be sought for serious symptoms such as high fever, severe abdominal pain, abdominal swelling and nausea. Hence, prompt and accurate diagnosis is needed for management of obstructive jaundice.[7,8]

The study was aimed to find out the various causes of obstructive jaundice and efficacy of various modes of detection and treatment of obstructive jaundice.

METHODS

The study was a prospective study carried out in the Department of Surgery at Maharishi Markandeshwar Institute of Medical Sciences and Research, Mullana, Ambala from October 2014 to July 2016.

Sample collection

Total fifty patients with clinically apparent obstructive jaundice (deep jaundice, pruritus, clay colored stool) were carefully and randomly selected by applying specific inclusion and exclusion criteria.

Each selected patient than clinically radiologically and biochemically evaluated for the cause of obstruction and extent of jaundice, then was categorized for various available treatment options for relief of obstructive jaundice.

Inclusion criteria

All patients of either sex with age range of 10-70 years, with obstructive jaundice (benign or malignant).

Exclusion criteria

Age less than 10 years and more than 70 years, associated co-morbidities like COPD, IHD etc, patients not fit for any form of biliary decompression, hepatitis B antigen and anti HCV antibody positive status, psychiatric disorder and advanced pregnancy.

Ethical clearance

The study was approved by the Institutional Ethics Committee.

Statistical analysis

The data was entered into a spreadsheet (Excel, Microsoft corp.) and then transferred to statistical software, Statistical package for social sciences (SPSS) version 21 for data analysis. We used chi square test to compare continuous variables and Mann Whitney test to compare medians. P value <0.05 was considered statistically significant and p<0.01 was considered highly significant.

Study size

The sample size for the study was 50.

Sample size

Assumptions

Precision=5.00%, prevalence=3.30%, population size=infinite 95% Confidence interval specified limits [0%-8.3%] (these limits equal prevalence plus or minus precision), Estimated sample size=n = 50, 95% Binomial Exact Confidence Interval with n=50 and n * prevalence=2 observed events: [0.488143% - 13.7138%].

RESULTS

As it is evident from Table 1, majority of patient in present study was productive adult with the mean age of 51.04±12.40 years.

Table 1: Demography- age and sex distributionwith obstructive jaundice.

Group	Number of patients (N=50)	Frequency (%)	Mean±SD	X^2	P value
Male	24	48	52.96±15.20		
Female	26	52	49.27±9.05	0.08	0.78

Table 2: Demography-age group distribution with obstructive jaundice.

Group (years)	Number of patients (N=50)	Frequency (%)	X^2	P value
10-20	1	2		
20-30	2	4	22.7	0.00
30-40	3	6		
40-50	14	28		

Continued.

Group (years)	Number of patients (N=50)	Frequency (%)	X^2	P value
50-60	18	36		
60-70	12	24		
Total (50)	50	100		

Table 3: Etiology of patients with obstructive jaundice.

Group	Number of patients (N=50)	Frequency (%)	X^2	P value
Malignant	19	38	2.88	0.09
Non malignant	31	62		

Table 4: Pathology of patients with obstructive jaundice.

Group	Number of patients (N=50)	Frequency (%)	X^2	P value
Choledocholithiasis	23	46	78.4	0.00
Periampulary carcinoma	4	8		
Cholangiocarcinoma	3	6		
Carcinoma head of pancreas	4	8		
Worm	2	4		
Hydatid cyst	1	2		
Secondries in liver	8	16		
Benign CBD Stricture	1	2		
Carcinoma Gall bladder with liver secondaries	6	12		
Choledochal cyst	2	4		
Iatrogenic	2	4		
Total	50	100		

The male to female ratio was 1:1.08 and female patients were predominent with younger age group (52%, mean age 49.27±9.05) then male (48%, mean age 52.96±15.20years) although the difference was not found to be significant. (X2=0.08, p=0.78)

Considering age distribution of patients having obstructive jaundice, the age range was 12-70 years and majority of patients (64%) were observed in age group of 40-60 years followed by (24%) in age group of 60-70 years. Only (6%) of patients were below 30 years of age and the difference in pattern of age distribution was found to be highly significant. (X2=22.7, p value=0.00)

Table 5: USG abdomen-pathology detected (N=50).

Group	Number of patients	Frequency (%)
USG	50	100
CECT	20	40
MRCP	30	60
ERCP	35	70

As evident from table 3, majority of the patients were having benign pathology (62%) as compared to malignant obstructive jaundice (38%) and the difference was not found to be very significant. (X2=2.88, p=0.09)

As evident by table 4, choledocholithiasis (46%) significantly proved to be the overall predominant cause of obstructive jaundice in our study population (X2=78.4, p=0.00). Among malignant causes, secondaries in liver with lymph node at porta hepatis (16%) obstructing common hepatic duct turned out to be a more significant and common etiology than carcinoma head of pancreas and periampullary carcinoma (8% each). Worm (4%) and benign CBD stricture (2%) were rare benign causes of lower CBD obstruction. 4% of cases had iatrogenic CBD injury following laparoscopic cholecystectomy, as a cause of obstructive jaundice, indicating the role of vigilance and proper precautions while performing such procedures. Even tense hydatid cyst, can compress mid CBD, to cause obstructive jaundice (one case, 2%).

USG abdomen was the common and base line radiological modality performed in all selected cases (100%) in our study. Contrast CT was reserved for suspected malignant etiology of obstructive jaundice so could be performed in as many as 40% of cases only. Similarly, MRCP was planned and performed in 60% of cases having stone or benign causes of obstructive jaundice to non-invasively confirmation of diagnosis. Majority of patients underwent ERCP (70%), who had probability of either diagnostic or therapeutic intervention.

Table 7: CECT abdomen- pathology detected.

Group	Number of patients (N=20)	Frequency (%)	X^2	P value
Periampullary carcinoma	4	20	6.14	0.29
Carcinoma head of pancreas	4	20		
Cholangiocarcinoma	3	15		
Carcinoma gall bladder with secondaries in liver	6	30		
Hydatid cyst	1	5		
Secondaries in liver with primary unknown	2	10		

Table 8: MRCP abdomen- pathology detected.

Group	Number of patients (N=30)	Frequency (%)	X^2	P value
Choledocholithiasis	23	76.67	60.3	0.00
Worm	2	6.67		
Choledochal cyst	2	6.67		
Iatrogenic	2	6.67		
Cbd stricture	1	3.33		

Table 9: Patients selected for ERCP.

Group	Number of patients (N=35)	Frequency (%)	X^2	P value
Choledocholithiasis	13	37.1	20.8	0.00
Periampullary carcinoma	4	11.4		
CA head pancreas	4	11.4		
Cholangiocarcinoma/	3	8.5		
Worm	2	5.7		
Extrinsic compression	8	22.8		
CBD stricture	1	2.8		
Total	35	100		

Table 10: Intervention done in various patients of obstructive jaundice.

Group		Number of patients (N=50)	Frequency (%)	X^2	P value
Palliative procedure	USG guided cholecystostomy/ PTBD	1	2	3	0.22
	Open cholecystostomy/ PTBD	1	2		
	Palliative bypass	4	8		
Definative surgery	Whipples procedure	4	8	27.5	0.00
	Choledocholithotomy	20	40		
	Hepaticojejunostomy	6	12		
	Cysto-pericystectomy	1	2		
ERCP(N=35)	Total ERCP	35	70	62.3	0.00
	Failed/conversion to surgery	8	22.86		
	Biopsy taken	11	31.43		
	ERCP with papillotomy with stenting	9	25.71		

Continued.

Group		Number of patients (N=50)	Frequency (%)	X^2	P value
	ERCP with dormia basket stone extraction	3	8.57		
	ERCP with worm extraction	2	5.71		

As evident from table 6, choledocholithiasis (46%) was found to be the predominant single cause of obstructive jaundice in association with cholelithiasis in 58%. Surprisingly, among patient with malignant obstructive jaundice (38%), the Carcinoma gall bladder with secondaries at porta was detected as the cause of obstruction and jaundice in as many as 12% of cases as compared to cholangiocarcinoma of distal CBD (6%). The obstructive jaundice due to cystic compression also could be demonstrated nicely in few cases (6%). In as many as 22% cases, ultrasound could not clearly delineate lower CBD pathology, may be obscured by bowel gases. This difference in pattern distribution of detected pathology on USG was found to be highly significant. (X2=104, p value=0.00) (X2=104, p value=0.00),

CECT abdomen could be performed only in 20 (40%) of those selected patients who were labeled as probable malignant obstructive jaundice. CECT clearly differentiated the unclear pathology of lower CBD on ultrasound as periampullary carcinoma (20%) or carcinoma head of pancreas (20%). Rest other findings of ultrasound abdomen in such cases were consistent on CECT.

As was the original plan, MRCP could be performed other than suspected benign i.e. 30 (60%) pathology of obstructive jaundice specially in cases where stones were the culprit. MRCP significantly detected choledocholithiasis in 76.67% patients (X2=60.3, p value=0.00). MRCP could also diagnose rare causes like worm (6.67%) and benign CBD stricture (3.33%), which were unclear on ultrasound. The difference in distribution of pathology in MRCP was highly significant (X2=60.3, p value=0.00).

As evident from table 9, among all study cases most of the patients 35 patients (70%) were selected for ERCP for either diagnostic confirmation or therapeutic purposes. Significant number of cases were detected as choledocholithiasis (37.1%) on ERCP (X2=20.8, p value=0.00) when compared to other benign causes. ERCP could also help in guiding dormia basket extraction and sphincterotomy in them and allowed biopsy in periampullary carcinoma and carcinoma head pancreas in 11.4% each. ERCP visualized and extracted worms in as many as 5.7% of cases. Extrinsic compression and CBD stricture was visualized via dye study during ERCP, with a significant difference (X2=20.8, p value=0.00).

When definitive procedures performed for obstructive jaundice, choledocholithotomy was performed in majority 40% of patients of choledocholithiasis. In four (8%) cases of periampullary carcinoma and carcinoma head pancreas, Whipple's procedure was performed. Hepaticojejunostomy could be offered in 6 patients (12%), which included 2 patients of resectable cholangiocarcinoma, 2 patients of choledochal cyst and 2 patients of CBD injury. Cysto-pericystectomy could be done in one (2%) case of hydatid cyst. The management protocols were guided according to the etiology and showed significant difference in their distribution pattern (X2 =27.5, p value=0.00).

ERCP with sphincterotomy and stenting was performed in 25.71% patients which included 8 patients with liver secondaries and lymph node at porta hepatis and 1 case of benign stricture. ERCP with dormia basket extraction of CBD stones, especially multiple and lower CBD stone, was performed in 9 patients of whom only three (8.57%) had successful outcome and remaining six (17.14%) were planned for open surgery. ERCP allowed diagnostic biopsy in all 11 patients (31.43%), which included 4 cases each of carcinoma head of pancreas and periampullary carcinoma and three cases of cholangiocarcinoma with significant distribution pattern (X2=62.3, p value=0.00). USG guided cholecystostomy was performed in one case of cholangiocarcinoma, to relieve severe jaundice.

DISCUSSION

Majority of patients in present study were productive adult with the mean age of 51.04±12.40 years. 38 % patients were in age group of 20-50 years. 36% were in age group of 50-60 years. Shetty et al studied 50 patients and found that 22% patients were in age group of 20-50 years while Obaidi et al in 2007 performed a study on 80 patients and found 31% patients were in age group of 20-50 years. Irabor et al 2012 and Jabur et al 2014 also found similar mean age of presentation 52.8 years and 49.3 years respectively in their studies. Thus, it is evident, that obstructive jaundice affects younger age group, which have an eventual impact on the financial and social burden of the family, as they constitute the main earning members. The study is in concordance with the above series. On the other hand, Iqbal et al 2008 reported 72% patients in age group of 50-70 years with a mean age of presentation of 62 years. The disparity in the age distribution may depend on the etiology of obstructive jaundice, with malignancy more common in the upper extremes of ages.[9-13]

Male to female ratio in present study was 1:1.08. Females were slightly higher in numbers than males (52% versus 48%) with younger mean age (49.27±9.05 versus

52.96±15.20 years). In a study conducted by Distler et al in 2010, there were 151 males and 191 females with a male to female ratio of 1:1.27. Jabur et al and Chalya et al also conducted their study on 111 and 116 patients and found a male to female ratio of 1:1.4 (46 males and 65 females) and 1:1.3 (50 males and 66 females) respectively. Iqbal et al in 2006 also performed a study on 50 patients and found a male to female ratio of 1:1. Thus, relative predominance of female patients with obstructive jaundice could be because gall stones are more common in fat, fertile, flatulent, and female of forty thereby leading to obstructive jaundice secondary to choledocholithiasis. Whereas Ling et al 2014 and Umeshchandra et al 2015 showed slightly more predominance of males in their study that could be justified by the diverse geographical distribution and may low sample size.[6,9,13-16]

In the present study, majority of the patients were having benign pathology (62%) as compared to malignant obstructive jaundice (38%). (p=0.09). Suthar et al and Rishi et al also found the predominance of benign pathology (72% and 56% respectively). Dixon et al in 1983, noted in their study that 75% patients with obstructive jaundice were having benign cause. The present study is in agreement with the above series. On the other hand, Garcea et al and Saddique et al concluded malignant cause of obstructive jaundice to be more common. As evident from present study, choledocholithiasis (46%) significantly proved to be the overall predominant cause of obstructive jaundice in our study population (X2=78.4, p=0.00). Ling et al 2014 performed his study in 360 patients and reported incidence of choledocholithiasis as 56.4%. Garcea et al 2011 and Iqbal et al 2008 also concluded in their study the incidence of choledocholithiasis as 41.7% and 40% respectively. The difference in the geographical location and the sample size of the different studies constitute the difference in the etiological cause but it is quite clear that choledocholithisis is more common benign etiological cause in younger age group, while malignant biliary tract obstruction is more common in older age group.[15,17-21]

Among malignant causes, secondaries in liver with lymph node at porta hepatis (16%) obstructing common hepatic duct turned out to be a more significant and common etiology than carcinoma head of pancreas and periampullary carcinoma (8% each). However, if the ampulla and lower CBD are taken together, maliganant ampullary pathology is equal to the incidence of secondaries in node at porta hepatis. Umeshchandra et al 2015 and Saddique et al concluded in their study an incidence of 10% and 8.3% respectively. Umesh et al and Ling et al performed their study in 30 and 360 patients and found the incidence of periampullary carcinoma to be 6.67% and 6.6% respectively, which in nearly equal to the present study (8%). Ling et al also concluded the incidence of carcinoma head of pancreas as a malignant cause of obstructive jaundice in 12.2% which is nearly similar to the present study (8%). However, Umeshchandra et al 2015, Chalya et al 2011 and Iqbal et al 2008 reported a higher incidence of carcinoma head of pancreas as 40%, 37.9% and 32% respectively, which is the most common cause of obstructive jaundice if older age group population is taken into account, which was done on the above series. Nearly all series reported an equal incidence of choloangiocarcinoma viz Ling et al 2014 (8.3%), Chalya et al 2011 (6.8%) and Iqbal et al (4.0%) as the present study (6%). Carcinoma gall bladder was seen in 12 % cases in the present study. Garcea et al 2011 and Saddique et al 2007 also reported the incidence of carcinoma gall bladder as 14.2% and 12.5%. It is only when 80% of the liver is damaged by secondaries in the liver, that produces hepatocellular jaundice and it is only when metastsis to node at porta hepatis compresses CHD that produces obstructive jaundice, even when there is not much of metastasis to the liver.[6,9,15,16,18,19]

Worm is a very rare cause of obstructive jaundice and should be taken into consideration in endemic areas. Only one study conducted by Ling et al 2014 reported the incidence of worms as 1.6%. Even tense hydatid cyst, can compress mid CBD, to cause obstructive jaundice and was seen in one case (2%) in the present study. Benign CBD stricture (2%) is also a rare cause of lower CBD obstruction. Umeshchandra et al 2015 also reported the incidnece of CBD stricture as 3.33%.[15,16]

Choledochal cyst, due to anomalous pancreato-biliary duct junction (APBDJ) affected 4% patients in the present study. Umeshchandra et al 2015 performed a study in 30 patients and reported the incidnece of choledochal cyst as 3.33% and Iqbal et al 2008 reported similar incidence of 4%. A study by Suthar et al 2015 reported higher incidence of choledochal cyst (14.7%).[9,16,20]

Iatrogenic CBD injury following surgery leading to obstructive jaundice seen in 4% of cases in our study that alarms us to be vigilant while performing such procedures. Garcea et al 2011, in his study of 1026 patients, also reported slightly lower incidence of iatrogenic injury (1.6%).[19]

As evident from present study, most patients with obstructive jaundice had stable vital parameters on presentation to hospital with mean pulse rate of 97.84±18.80 and mean systolic BP 106.84±17.94. The extremes in values, correspond to cholangitis or secondary pancreatitis. 18% of the patients hadhypotension. Mairiang et al studied 130 patients and reported a nearly similar incidence of hypotension.[22]

Evaluation of obstructive jaundice

The mean hemoglobin of present study was slightly lower than normal (10.86±2.05 gm%,) while mean INR was 1.61±0.42 and mean PCV found to be 32.57±6.13 reflecting poor nutrition and coagulation profile, in such patients, secondary to liver insult. Deranged values of Hb (6.90gm %), PCV (21%) and INR (3) could be correlated with acute renal failure seen in one case at the time of

hospitalization also. In our study we reported that 72% of the patients had PCV >30 and 28% of our patients had PCV <30.

Malik et al 2007 studied 140 patients and found that the mean hemoglobin was 9.7±2.55 gm%, which is in concordance with the present study. Shetty et al 2016 studied 50 patients and found that 34% patients had hemoglobin <10 gm% which is comparable to the present study (28%). The low hemoglobin status may be secondary to the disease or may be in patients from rural background of a developing nation. Dixon et al in studied 373 patients and concluded that 82% of the patients had PCV >30 and only 18% of them had PCV<30. The study is comparable to the present study. Irabor et al in performed a study in 7 patients and found that 14.2% patients had PCV >30 and majority of them 85.7% had PCV <30. The reciprocal results as compared to the present study are because of the small sample size. Hemoglobin is one third of packed cell volume and hematocrit usually reflects the hemoglobin, unless the patient has hemoconcentration or hemodilution.[17,23-25]

In the present study, 74% of the patients had TLC >11000 cells/mm3whereas in study conducted by Shetty et al in 50 patients, 46% patients found to be with TLC >11000 cells/mm3. Dixon et al in studied 373 patients and reported 28% patients with TLC >11000 cells/mm3. The higher frequency of total leucocyte count in the present study is due to more cases of choledocholithiasis who presented late in our study. Malik et al 2007 studied 140 patients and reported the mean total leucocyte count as 14700±5650 cells/mm3, which is comparable to the present study (14070±4292.15 cells/mm3), as he also reported the most common cause of obstructive jaundice as choledocholithiasis. 48% of patients in present study had deranged INR >1.5. Irabor et al studied 30 patients and reported deranged INR >1.5 in 20%, while Weston et al in reported abnormal INR >1.5 in 24.3%. The deranged coagulation profile reflects the damaged synthetic function of liver for factors II, VII, IX, X due to back pressure changes and congestive hepatomegaly and biliary cirrhosis.[10,12,17,23,26]

Status of liver function

As evident from present study, as many as 32% patients had significant rise in total bilirubin between 10-20 mg% (X2=14.6, p value=0.00) whereas majority (68%) of patients presented with total bilirubin level <10 mg% which indirectly reflected the duration of disease and its extent and severity. On the other hand, significant rise in direct bilirubin was noted only in few cases (18% and X2=7.72, p value=0.02) as compared to (82%) patients who were having direct bilirubin level <5 mg% (50%) or between 5-10 mg% (32%). Similar results were observed in study done by Shetty et al in 2016 that 38% of his patients had total bilirubin levels between 10-20 mg/dl and 30% patients had even total bilirubin >20 mg%. Mansfield et al studied 111 patients and reported that 36% had total bilirubin between 10-20 mg percent while Weston et al found the total bilirubin levels between 10-20 mg percent in majority 62%. Rise in the total bilirubin level between 10-20 mg%, is a usual trend which satisfies the definition of obstructive jaundice. The mean total bilirubin was 9±4.04 mg% while mean alkaline phosphatase was 724.46±604.45 IU/L (range 198-2800 IU/L) in our study. The extremes of values corresponded to complete obstruction or mild partial initial obstruction. The mean serum albumin (2.11±0.77 gm %) of study population was below normal (3.5-5.0 mg %) and reflected the degree of derangement of liver synthesis. Umeshchandra et al, Irabor et al and Malik et al reported highermean total bilirubin and mean alkaline phosphatase 14.85 mg%, 14.2 mg%, 16.25 mg% and 266.78 IU/L, 900 IU/L, 809.5 IU/L respectively. thatcould bejustified as the late presentation and more rapid, progressive and complete obstruction in their series as compared to present study.[16,23,24,26,27,28]

As evident from present study, the mean creatinine in study population was 1.58±0.66 mg%, slightly above the normal range (04-1.4 mg%), indicating the nephrotoxic action of bilirubin on renal tubules, which is further aggravated by dehydration. 34% of our patients had creatinine between 1.4-2 mg% and 14% had creatinine >2 mg%. Weston et al in 2008 studied 156 patients and concluded that 5% patients had serum creatinine between 1.4-2.0 mg% and only 1% had creatinine >2 mg%. The degree of derangement of serum creatinine is dependent on the severity of jaundice, the associated sepsis and the dehydration and may vary with different series. The mean urea in the present study was 56.36±28.69 mg%, while Malik et al reported a mean serum urea of 75.5±23 mg% and creatinine1.45±0.7 mg%. The present study is in concordance with the above series. Urine urobilinogen and urine bile salts/pigments were found to be significantly absent in 32%, (X2=6.48, p value=0.01) of patients suggestive of complete obstruction in these patients in present study.[23,26]

We could also found that 66% patients suffered from hyponatremia, while 56% patients had hypokalemia. Mairiang et al in 1990 studied 130 patients and found hyponatraemia and hypokalemia in 56% and 63% respectively, which is comparable with the present study. The cause of hyponatraemia and hypokalemia is associated derangement of renal function and sepsis and its correction is an important predictor of successful outcome in treatment of obstructive jaundice.[22]

Radiological assessment

USG abdomen was the common and base line radiological modality performed in all selected cases (100%) in our study. Contrast CT was reserved for suspected malignant etiology of obstructive jaundice so could be performed in as many as 40% of cases only. Similarly, MRCP was planned and performed in 60% of cases having stone or benign causes of obstructive jaundice. Majority of patients underwent ERCP (70%), who had probablity of either

diagnostic or therapeutic intervention. Petrscu et al studied 63 patients and among them, CECT was done in 52.3% and MRCP was done in 47.6%. Khushwah et al and Goyani et al, in their study, performed USG and MRCP in all 100% patients, while Singh et al 2014 performed USG, CECT and MRCP in all 100% patients.[8,30,31,32]

Management of obstructive jaundice

The management protocols were guided according to the etiology and showed significant difference in their distribution pattern (X2=27.5, p value=0.00) in present study. Chalya et al and Saddique et al studied 116 and 24 patients and reported incidence of CBD excision and hepaticojejunostomy as 12.5% and 16.6% respectively. The present study is in agreement with the above series. Choledocholithotomy was performed in majority 40%of patients of CBD stones. Saddique et al studied 24 patients and reported incidence of choledocholithiotomy as 37.5%. Chalya et al and Keighley et al reported a lower incidence of choledocholithotomy (16.4% and 18.6% respectively) as they had more number of malignant obstructive jaundice, while Dixon et al reported a higher incidence of choledocholithotomy. In four (8%) cases in present study who were detected periampullary carcinoma and carcinoma head pancreas, Whipple's procedure was performed. Saddique et al also offered whipples procedure in 8.3% cases. Chalya et al, Dixon et al and Keighley et al reported a lower incidence of whipples procedure (5.5%, 1.6%, 4.2% respectively) probably due to more number of non-resectable cases in their study. On the other hand they reported higher incidence of palliative hepatobiliary bypass (58.2%, 22.2% and 37.2%) as compared to present study. Hepaticojejunostomy could be offered in 6 patients (12%), of resectable cholangiocarcinoma, choledochal cyst and in CBD injury. Cysto-pericystectomy cauld be done in one (2%) case of hydatid cyst.[6,17,29,18]

ERCP with sphincterotomy and stenting was performed in 25.71% patients which included 8 patients with liver secondaries and lymph node at porta hepatis and 1 case of benign stricture. ERCP with dormia basket extraction of CBD stones, especially multiple and lower CBD stone, was performed in 9 patients of whom only three (8.57%) had successful outcome and remaining six (17.14%) were planned for open surgery. When compared to other studies, ERCP with dormia basket extraction was performed in 90% in a study by Jabur et al. The successful removal of all stone via dormia basket depends on the size of stone and the experience ofendoscopist. ERCP allowed diagnostic biopsy in all 11 patients (31.43%) in our study, which included 4 cases each of carcinoma head of pancreas and periampullary carcinoma and three cases of cholangiocarcinoma with significant distribution pattern (X2=62.3, p value=0.00).[13]

Limitations

Our study was limited by the fact that it was non randomized and the relatively small number of patients were recruited for this clinic-radiological assessment and management of obstructive jaundice. As the morbidity of such cases was higher in this rural part of north India and studies have documented the impact of suffering was higher for the society as majority of patients were from productive age group, it was desirable and worthwhile to attempt a clinical study taking 50 cases of obstructive jaundice to find out the severity, etiology and various presentations along with prompt and correct management policy for better outcome of these cases. An attempt was also made to study some specific aspects of diagnosis, hospital stay i.e. deviation from work and time taken for recovery in those patients at our centre.

CONCLUSION

Jaundice due to choledocholithiasis is the commonest cause of obstructive jaundice and usually affects productive adults thereby constitutes a major health problem in North India. Most of patients with malignant obstructive jaundice present late with advanced disease. USG, CT scan, MRCP and ERCP are important diagnostic modalities for evaluation of patient with obstructive jaundice with ERCP having the additional advantage of being therapeutic as well. The result of this study suggests that early diagnosis and treatment plays a vital role in the prognosis of patients with obstructive jaundice.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Wilku KS, Gandhi H. A prospective study of clinico-radiological assesment and management of obstructive jaundice in Mmimsr, Mullana. Int Surg J 2021;8:2892-900.