

OBSTRUCTIVE JAUNDICE IN BASRAH

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Abstract

Obstructive Jaundice is a common surgical problem presenting to hospitals as it resulted from many etiological factors like choledocholithiasis or periampullary tumors especially CA head of pancreas. According to the difference in these etiological factors and their progress, symptoms and signs vary in different patients. Diagnostic tools like U\S, CT scan, MRCP, ERCP and others vary in their ability in diagnosing the main etiology and the operative procedures also differs according to the etiologies, ranging from least invasive like ERCP to very sophisticated procedures like Whipple's procedure for CA head of pancreas. Many factors may affect the morbidity and mortality like the age of patients, presenting etiology and the presence of associated comorbid diseases.

This study aimed to demonstrate the main etiological factors of obstructive jaundice in Basrah and the commonest presenting symptoms and signs. Also to study the most applicable investigations and compare their results according to their accuracy in diagnosing the etiology, and to study the most common surgical intervention applied to relieve the obstruction in obstructive jaundice and hospital morbidity and mortality.

Both retrospective and prospective study was done in Basrah between January 2006 and December 2009, 243 patients with obstructive jaundice were included in this study from the main general hospitals and private hospitals in Basrah. Data were collected about the presenting clinical features, the diagnostic techniques, operative procedures and the causes of in hospital mortality and morbidity and were analyzed so that a complete picture of these details can be assessed for obstructive jaundice in Basrah.

The study shows no significant difference between male and female in obstructive jaundice. The majority of cases found in the age group 50-59 years. Most common etiology was choledocholithiasis.

The most frequent applied investigation was the liver function test which was done to all patients. Imaging techniques were applied variably with the U\S was the most applied while MRCP and ERCP were the least; however, the accuracy was higher with the latter two techniques.

Intervention depends on the main etiology: for the choledocholithiasis, most common operation was CBD exploration, for CA head of pancreas the most common operation done was bypass procedure and for complicated hepato-biliary hydatid disease the CBD exploration with T-tube was the common.

The post operative morbidity was 20.07% mostly due to respiratory complications, while mortality was 9.86 % mostly due to sepsis.

In conclusion, the most common cause of obstructive jaundice in Basrah is choledocholithiasis and CA head of pancreas comes second.

ERCP and MRCP are the least applied imaging techniques in diagnosis of obstructive jaundice. The threshold for their application was very high. The least applied intervention to treat obstructive jaundice was the therapeutic ERCP, while the most common was open surgical procedures.

Introduction

Jaundice is the yellowish discoloration of sclera, skin and mucus membranes in the body due to the elevation in the level of bilirubin in the blood. Jaundice

usually becomes clinically detectable when plasma bilirubin exceeds 3mg/dl (50µmol/l)¹.

Obstructive Jaundice results from failure

of passage of bile to the intestine resulted from any pathology obstructing the biliary tree¹.

Obstructive jaundice is concerning usually with the surgical attention as it's due to many conditions most of them can be relieved by surgical intervention. Of these conditions are²: Choledocholithiasis. Tumors (CA head pancreas, cholangiocarcinoma). Parasitic Infections (Hepato-biliary complicated hydatid disease, Ascariasis). Benign Stricture (e.g. previous surgery). Acute inflammation (cholangitis, Mirizzi syndrome). Congenital disease (Choledochal cyst).

Management of obstructive jaundice should start with a careful history and examination. Symptoms and signs that may accompany the obstructive jaundice are: pain, nausea and vomiting, darkening of urine, itching, fever and weight loss. Nature of these clinical manifestations usually depends on the original etiology and the progress of the disease process³. Painful jaundice in which pain and even jaundice come intermittently usually associated with choledocholithiasis. Pain and jaundice may wane and wax as the stone disimpact and re-impact again acting as a ball-valve. Malignancy usually associated with mild pain and progressive jaundice and sometimes associated with non specific symptoms like malaise and weight loss^{3,4}.

Laboratory investigations started with liver function test which would show an increase in the serum bilirubin specially the direct bilirubin as well as an increase of alkaline phosphatase enzyme which indicates a biliary problem, beside that Gamma glutamyl transferase should be checked to ascertain the biliary source of alkaline phosphatase. ALP is a sensitive enzyme to biliary obstruction but not specific as any biliary disease may elevate the level of serum alkaline phosphates⁵. Ultrasound (U/S) is the initial imaging technique used for any

patient suspected to have a biliary tree disease. Stones in the distal CBD are difficult to be seen as they lie behind the duodenum, but one can assume them when CBD is dilated with small stones in the gall bladder^{6,7}.

CT scan is inferior to U/S in diagnosing gall stones, but it is so effective in evaluating patients with malignancy of gall bladder, extra-hepatic biliary system and nearby organs specially the pancreas⁸.

Magnetic resonance cholangio-pancreaticography (MRCP) gives the best non invasive test to diagnose obstructive jaundice due to biliary and pancreatic diseases.

Endoscopic Retrograde Cholangiography (ERC) is the diagnostic and often therapeutic procedure of choice in case of choledocholithiasis. The development of small fibro-optic cameras has facilitated the development of Intraductal Endoscopy⁹.

Percutaneous Transhepatic Cholangiography (PTC) is useful in patients with bile duct strictures and tumors, and can also be applied as a therapeutic technique through inserting stents for drainage of biliary tree¹⁰.

Endoscopic Ultrasound is so sensitive in diagnosing duct stones; also it is of particular value in evaluation of tumors and their resectability. Laparoscopic U/S also can be applied in same manner to diagnose stones and tumors but has no superior value than the endoscopic U/S¹¹. Serum markers are of importance in confirming the presence of some tumors. CA19-9 rises in 75% of pancreatic adenocarcinoma and in cholangiocarcinoma. But can also rises in some benign conditions like cholangitis¹².

Treatment of obstructive jaundice depends on the original etiology of the obstruction. Many procedures starting from the least invasive such as Endoscopic Retrograde technique specially after the development of

intraductal endoscopy both as diagnostic and therapeutic in case of chole-docholithiasis.

The obstruction can be relieved by sphincterotomy and stone extraction, lithotripsy, or just stenting in high risk surgical patients¹³.

When endoscopic technique is not available or failed then more sophisticated procedures are required. Open surgical technique like choledochotomy with primary repair or with T-tube or sometimes Transduodenal sphincterotomy may be applicable¹⁴.

Bypass procedures are applicable when the above techniques are not applicable, or in case of biliary stricture and tumors or periampullary tumors especially CA head of pancreas. These procedures either applied as part of definitive treatment or sometimes as palliative procedure mainly in advanced tumors. Procedures are: cholecystojejunostomy, choledochojejunostomy, choledochoduodenostomy, hepato-cojejunostomy and the most sophisticated procedure "Whipple's procedure" in which in addition to bypass operations, the pancreatic head and 2nd part duodenum to be removed¹⁴.

Morbidity and mortality depends on many factors: age of the patient, etiology of obstruction, time of presentation, associated illnesses and the operative procedures done for the patient¹⁵.

Patients and methods

Both retrospective and prospective clinical study has been done between January 2006 and December 2009. The retrospective study done between January 2006 through December 2008 and the prospective study done between January 2009 through December 2009. 243 patients (192 patients in the retrospective and 51 patients in the prospective) with diagnosis of obstructive jaundice who were admitted in the hospitals of Basrah were assessed either through the records found about their condition in the hospital

(in the retrospective study) or through a special questionnaire forms which were distributed to the hospitals to assess and follow up the patients (in the prospective study). The hospitals included in this study were: Basrah General Hospital, Al-Sadr Teaching Hospital, Al-Mawane General Hospital, Al-Fayhaa General Hospital, Al-Shifaa General Hospital, Basrah private hospitals.

The study included only the new cases that have been diagnosed during the period of the study. Cases which were diagnosed before this period were excluded from the study. Patients who live outside Basrah and presented in Basrah also were excluded from this study.

All the patients were assessed by the data collected for their age, sex, living place, main presenting symptoms and signs, the investigations done for the patients, the operative findings & procedures done for the patient and morbidity & mortality occurred during post operative in-hospital stay.

Nearly all patients had done laboratory tests in form of liver function test. Most of patients had done U/S examination. CT-scan and MRCP were done for some of the patients. ERCP done for only a very little number of cases as it's not available in Basrah "actually as a therapeutic rather than diagnostic technique". PTC, endoscopic U/S and Laparoscopic U/S were not done as they are not available at all neither in Basrah nor in the nearby cities.

There was a difficulty in obtaining data about imaging results in the retrospective study as not all patients have imaging reports in their case records. Here we depend on the notes written in their case records.

Operative findings and operative procedures for patients had been gotten from the operative notes in the case records. All patients operated on for obstructive jaundice in this study found to have operative notes, but there were some

patients whose operative findings didn't match the imaging reports.

Data were analyzed and categorized in tables in order to compare the data collected in this study. Results were reported as percentages for categorical variables. The variables were compared using the Chi-square test and SPSS

protocol for categorical variables.

Results

Among the 243 patients, 125 patients (51.44%) were male and 118 patients (48.56%) were female. Male to female ratio was 1.05 which was not found to be significant (figure 1).

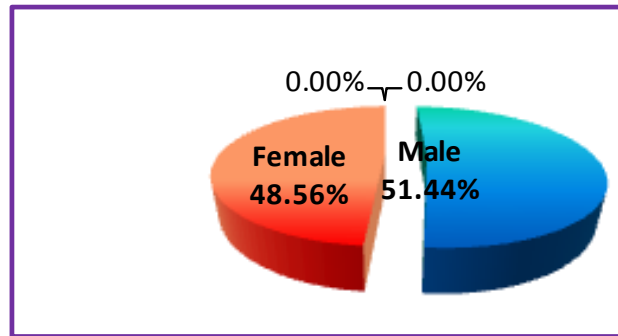


Figure (1): sex distribution in patients with obstructive jaundice

The majority of patients with obstructive jaundice were in the range of 50-59 years old both in male and female patients (figure 2). In all age groups the male patients were more than female except for the age group 50-59 years where the female patients were more than male patients. Figure (2): Age Distribution Of Male And Female Patients With Obstructive Jaundice

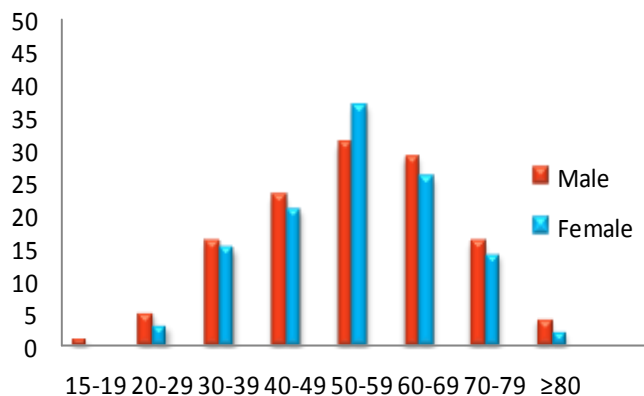


Figure (2): Age Distribution Of Male And Female Patients With Obstructive Jaundice

Table I shows the etiological factors of obstructive jaundice found in this study. The most common cause found to be choledocholithiasis which was seen in 138 patients (56.97%). Second common cause was CA head of pancreas seen in 60 patients

(24.69%). In 20 patients (8.23%) intrabiliary ruptured hydatid disease while benign stricture found in 17 patients (6.99%). Other neoplasm found are cholangiocarcinoma in 6 patients (2.46%) and rarely duodenal adenocarcinoma seen in only a single case (0.41%). A single case of Choledochal cyst had been found (0.41%).

Table I: Etiological Factors of obstructive Jaundice (n = 243)

Causes	Number of patients	Percentage
Choledocholithiasis	138	56.97%
CA head of pancreas	60	24.69%
Hydatid disease	20	8.23%
Benign Stricture	17	6.99%
Cholangiocarcinoma	6	2.46% %
Duodenal adenocarcinoma	1	0.41%
Choledochal cyst	1	0.41%
Total	243	100%

Table II shows the etiological factors distribution between the 2 genders. p value of < 0.05 considered significant. Although there was different sex distribution of etiological factors of obstructive jaundice, this difference not found to be significant.

Table II: Distribution of etiological Factors of obstructive Jaundice in male and female

Causes	Male (n=125)		Female (n=118)		p value
	Number of patients	Percentage	Number of patients	Percentage	
Choledocholithiasis	64	52.0%	74	61.86%	0.395
CA head of pancreas	37	29.6%	23	19.49%	0.071
Hydatid disease	13	10.07%	7	5.93%	0.180
Stricture	6	4.80%	11	9.32%	0.225
Cholangiocarcinoma					
Duodenal adenocarcinoma					
Choledochal cyst	1	0.80%	0	0.00%	>0.05
Total	125	100%	118	100%	

The patients' clinical manifestations are shown in (Table III) and found to be as following: The most frequent clinical feature was jaundice which found in 243 patients (100%), second most common complaint is the abdominal pain

especially right upper abdominal pain found in 159 patients (65.43%). Next was nausea and vomiting in 140 patients (57.6%). Dark color urine found in 129 patients (53.08%) and Pruritis in 99 patients (40.74%). Less common feature

is fever which was found in 38 patients (15.63%), then weight loss in 28 patients (11.52%) and palpable mass in 14 patients (5.76%). Pale color stool also was seen in 14 patients (5.76%). The least common clinical feature was abdominal tenderness which was seen in 10 patients (4.11%).

Table III: Clinical manifestations of obstructive jaundice (n=243)

Clinical Manifestation	Number of patients	Percentage
Jaundice	243	100%
Abdominal pain	159	65.43%
Nausea and vomiting	140	57.6%
Dark color urine	129	53.08%
Pruritis	99	40.74%
Fever	38	15.63%
Weight loss	28	11.52%
Palpable abdominal mass	14	5.76%
Pale color stool	14	5.76%
Abdominal Tenderness	10	4.11%

Table IV: Results of diagnostic techniques used for patients with obstructive Jaundice (n=243)

+ve cases		Application		Investigation	
Percentage	Number of patients	Percentage	Number of patients		
100%	243	100%	243	Total Serum Bilirubin	Liver Function Test
20.57%	50	100%	243	ALT &AST	
97.51%	237	100%	243	Alkaline phosphatase	
79.42%	166	86.0%	209	Ultrasound	
66.32%	65	40.32%	98	CT- scan	
96.73%	89	37.86%	92	MRCP	
100%	4	1.64%	4	ERCP	

Of the 243 patients, 223 patients (91.76%) were operated on. Depending on the etiological factors, many modalities were used in the treatment of obstructive jaundice. These modalities are shown in tables V, VI & VII which show the therapeutic procedures for the most common etiological factors found in this study. For the choledocholithiasis, intervention was done for 134 patients and the follow up lost for 4 patients, the

most common procedure was CBD exploration with T-tube. It was done in 83 patients (60.14%). Choledochoduodenostomy was done in 27 patients (19.56%), while Choledocho-jejunostomy was done only in 5 patients (3.62%). Transduodenal sphincterotomy was done for 15 patients (10.86%). In 3 patients (2.17%), ERCP was applied and a single case underwent Cholecystosomy (0.72%). These results are shown in table V.

Table V: procedures done for the treatment of obstructive jaundice due to choledocholithiasis (n=138)

Procedure	No. of patients	%
CBD Exploration +T tube	83	60.14%
Choledochoduodenostomy	27	19.56%
Transduodenal sphincterotomy	15	10.86%
Roux-en-Y Choledochojejunostomy	5	3.62%
Endoscopic sphincterotomy	3	2.17%
Cholecystosomy	1	0.72%
Lost follow up	4	2.89%
100%	138	Total

Table VI shows the procedures done for treatment of CA head of pancreas. Of the 60 patients found to have CA head of pancreas, intervention done for 53 patients. Bypass surgery (biliary-enteric

anastomosis with or without gastro-jejunostomy) was done for 36 patients (60%); Whipple's procedure was done in 16 patients (26.66%). A single case was sent for stenting by ERCP (1.66%).

Table VI: procedures done for the treatment of obstructive jaundice due to CA head of pancreas (n=60).

%	No. of patients	Procedure
60.0%	36	27
		9
26.66%	16	Whipple's procedure
11.66%	7	Not Operated On
1.66%	1	ERCP with stenting
100%	60	Total

In 20 patients with obstructive jaundice due to intrabiliary ruptured Hydatid disease, CBD exploration with T-tube was the commonest operative procedure done in 13 patients (65%),

choledochoduodenostomy was done in 4 patients (20%), cystojejunostomy was done in 2 (10%) while transduodenal sphincterotomy was done in 1 patient (5%) as shown in table VII.

Table VII: Procedures done for the treatment of obstructive jaundice due to Hydatid Disease (n=20)

%	No. of patients	Procedure
65%	13	CBD Exploration +T tube
20%	4	Choledochoduodenostomy
10%	2	Cystojejunostomy
5%	1	Transduodenal sphincterotomy
100%	20	Total

The post operative morbidity occurred in 47 patients (21.07%), the causes of morbidity are shown in table VIII, most common cause was respiratory complication (atelectasis and pneumonia) which was found in 18 patients (38.29%). Anastomotic leak was found in 12

patients (25.53%) mostly in those with whipple's procedure while intraperitoneal abscess found in 8 patients (17.02%). Abdominal dehiscence found in 7 patients (14.89%), DVT in 4 patients (8.51%) and the least is myocardial infarction which was found in 2 patients (4.25%).

Table VIII: causes of in hospital morbidity (n=47)

%	No. of patients	Cause Of Morbidity	
38.29%	18	Respiratory complication	
25.53%	12	6	Whipple's procedure
		3	Bypass (hepaticojuenostomy)
		2	Choledochoduodenostomy
		1	Transduodenal sphincterotomy
17.02%	8	Intraperitoneal abscess	
14.89%	7	Wound Dehiscence	
8.51%	4	DVT	
4.25%	2	Myocardial infarction	

In hospital mortality was seen in 19 patients (7.81%) as shown in table IX. The most common cause of death was sepsis in 12 patients (63.15%),

hepatorenal syndrome in 5 patients (26.31%) and cardiac arrest in 2 patients (10.52%).

Table IX: Causes of in hospital mortality (n=19).

%	No. of patients	Cause Of Mortality
63.15%	12	Sepsis
26.31%	5	hepatorenal syndrome
10.52%	2	Cardiac arrest
100%	20	Total

Discussion

Obstructive jaundice occurred almost similarly in the two genders; however, the age distribution of the disease differs between male and female and the ratio of male to female also differs. In our study the male to female ratio was 1.05 (which is not considered to be

significant. This is not so different from a study done by Han in USA¹⁶ which showed a male to female ratio of 1.08, while in another study done by Moghimi in Tehran-Iran¹⁷ the male to female ratio was 0.79 which is quite different from our study and showed a significant male to female ratio. This

belongs to the difference in the etiological factors and how common are these factors between the 2 genders in the variant societies.

Our study revealed the majority of patients with obstructive jaundice are in the age group 50-59 years old for both male and female. This is due to the large number of patients with obstructive jaundice caused by choledocholithiasis who fell in this age group. The most common cause of obstructive jaundice found to be choledocholithiasis which was found in 138 patients (56.97%). Despite the fact that Women are three times more likely to develop gallstones than men¹⁸. There was no significant difference between male and female regarding the choledocholithiasis as an etiology for obstructive jaundice.

The 2nd most common cause was CA head of pancreas which was found in 60 patients (24.69%). These results are different from the study done by Moghimi which revealed the CA head of pancreas as the most common cause of obstructive jaundice while the choledocholithiasis came second. The study done by Moghimi done in one hospital and this didn't cover all the patients in the city and there might be some bias toward certain etiologies. In our study we included most of Basrah hospitals so we could cover almost all the patients in Basrah.

The 3rd common etiology was intrabiliary ruptured hydatid disease found in 20 patients (8.23%). Although hydatid disease is common in our society but most are either presented with abdominal pain or discovered accidentally rather than being presented as complicated intrabiliary rupture. A study done by Khalid .A. Salman in Kuwait, showed the intrabiliary rupture of hydatid disease as a cause of obstructive jaundice in 10.34% and it is found to be the 5th cause in sequence¹⁹, which is not so far from our results.

Stricture is the fourth common cause seen in 17 patients (6.99%). 12 of those patients had history of previous laparoscopic cholecystectomy, 3 has history of open cholecystectomy while 2 has no previous biliary surgery. In a study done by Khurram Siddique, The stricture as an etiology for obstructive jaundice was seen in 5% of patients²⁰.

Other forms of malignancy also detected in our study like cholangiocarcinoma in 6 patients (2.46%) and duodenal adenocarcinoma in a single case (0.41%). The study done by Moghimi showed other malignancies: a single case of adenocarcinoma and more frequent cases of cholangiocarcinoma (18.34%); other types of malignancies like CA gall bladder (which needs to be so advanced in order to cause obstructive jaundice), papillary adenocarcinoma and Carcinoma of the body of pancreas also detected in Moghimi's study. We haven't detected such types of malignancies between the cases operated on. Such types of malignancies might be present in the cases which were not operated on or the cases underwent bypass or stenting without obtaining tissue biopsy confirming them as CA head pancreas. The most common and frequent presentation was jaundice which was seen in 243 patients (100%) and right upper abdominal pain mainly right hypochondrial pain seen in 159 patients (65.43%), This is due to that the most common etiological factor is the choledocholithiasis which associated with painful jaundice and even the next common cause, the CA head of pancreas, also associated with pain in most of cases. Although it is often taught that CA head of pancreas¹⁹ presents with painless jaundice, this aphorism is not accurate. Most patients with CA head of pancreas do experience pain as a part of the symptom complex. But the pain

associated with CA head of pancreas is usually mild and vague abdominal pain not like the pain associated with choledocholithiasis which is severe and localized²¹.

Weight loss was found only in 28 patients (11.52%), it was found to be associated with the malignant etiology of obstructive jaundice. In a study done in Africa by Admassie, the most common cause for jaundice was CA head of pancreas and the commonest presentation was painless jaundice with weight loss²², actually this study was done on a small number of patients, while the study done by Moghimi showed the painful jaundice as the commonest presentation, although the 1st common etiology he found was CA head of pancreas.

Investigations done to our patients revealed that liver function test has been done to all patients and showed a direct hyperbilirubinaemia in all the patients. Also there was an increase in the alkaline phosphatase in 237 patients (97.51%), but the increase in the ALT and AST were not found in all patients. Actually only 50 patients (20.57%) showed increase in these enzymes and this is due to that the latter 2 enzymes associated only with abnormal hepatic paranchymal function, a condition not mandatory associated with obstructive jaundice.

U\S examination was done for 209 patients (86%) in this study. No U/S reports or notes found in the case records of 34 patients although it is an important step in the evaluation of obstructive jaundice. This was due to the improper medical registration.

U/S detected the etiology of obstructive jaundice in 166 patients (79.42%). Unfortunately the stones in the distal CBD (where it usually causes the obstructive jaundice) can't be detected by U\S as they are hidden by Duodenum. That's why the diagnosis of choledocholithiasis by U\S in this study

was assumed by the presence of CBD dilatation and gall stones in many cases, which is not an absolute rule. Those patients need further investigation by other imaging techniques; a step had not been done in many patients in this study.

CT scan was applied in 98 patients (40.32%) and detect the etiology in 65 patients (66.32%). CT scan is inferior to U\S in detection of gall stones as most of stones are radiolucent, but it is the next step in evaluation after U\S if tumor is suspected or found. CT-scan is an imaging test of choice in gall bladder, bile ducts and pancreatic tumors. The drawback is it lacks sensitivity for tumors ≤ 1 cm in size⁸.

MRCP done for 92 patients (37.86%), and was able to detect the etiology in 89 patients (96.73%). MRCP is not superior to CT-scan in detection of neoplasm, but it is able to detect lesions ≤ 1 cm, and is so sensitive to detect choledocholithiasis which would appear as filling defect, so it should be the next step after U\S if choledocholithiasis is expected.

ERCP was done for 4 patients (1.64%) and it detected the etiology in 4 patients (100%). Actually this high accuracy is due to small number of patients in this study, but still it has a high accuracy in diagnosing choledocholithiasis and strictures.

In our study, there was a low application of MRCP and ERCP due to the high threshold for our surgeon to request these techniques. This might be due to the frequent unavailability of MRCP in the general hospitals and its expensive cost in private clinics. ERCP is not available at all in Basrah. In the study done by Moghimi, ERCP and PTC were used so widely with higher accuracy than U\S, CT, and MRCP. This might be due to high diagnostic and therapeutic capabilities of ERCP in diagnosing the choledocholithiasis or strictures beside the ability to detect

any periampullary tumor even if its size $\leq 1\text{cm}$ if combined with Endoscopic Ultrasound (EUS), which is unfortunately also not available in Basrah.

All the operative procedures in obstructive jaundice aim to decompress the biliary tree and retain the bile flow to the intestine. They vary according to the etiology.

For patients with choledocholithiasis, the most common procedure done was the CBD exploration with T-tube in 83 patients (60.14%) aiming for evacuation of the stones from the CBD. A procedure which actually becomes less applicable in the era of minimally invasive techniques like ERCP which is the least procedure applied in our study. Choledochotomy with primary closure has not been found as a therapeutic option between the cases included in this study. This might be due to the surgeon's fear of any missed stones distally or sphincter edema results from manipulation of stone removal. The study done by Gurusamy revealed the primary closure is as safe as the choledochotomy with T-tube. This might be due to that nearly all the cases included in his study were managed laparoscopically where; the surgery would be more delicate²³.

In the study done by Soetikno, 35 patients with choledocholithiasis were managed by ERCP. It succeeded in 32 patients while only 3 patients needed surgical intervention²⁴. ERCP stone extraction is successful in 80-90% of the time using the techniques of sphincterotomy and balloon catheter or Dormia basket stone retrieval. The addition of mechanical, electrohydraulic, laser or extracorporeal shockwave lithotripsy for large stones increases the success rate to over 95%²⁵.

Surgical drainage procedure was applied for 47 patients (34.05%) Some of them had had failed CBD

exploration due to impacted stones (this would add more to the surgery time and the post operative complication). These surgical drainage procedures include transduodenal sphincterotomy and choledochenterostomy (choledochoduodenostomy and Choledochojejunostomy). A study which was done by Nicolas. J. Warter revealed that transduodenal sphincterotomy and choledochenterostomy were done for (74.71%) of patients while CBD exploration with T-tube done for (25.29%) of patients who has failed intervention by ERCP²⁶. This shows a big difference from our results which might be due to that CBD stones which failed to be extracted by ERCP are difficult to be managed by CBD exploration with T-tube alone. In our study most tried to remove the stones by CBD exploration first.

For CA head of pancreas, Bypass procedures aiming for biliary or biliary and gastric drainage were done in 36 patients (60%) and a single case was sent for ERCP for biliary decompression. The bypass procedure & endoscopic stenting usually considered a palliative relieve for patient with unresectable tumors who suffers biliary or duodenal obstruction. Most cases of biliary bypass in this study done as Cholecystojejunostomy. Hepaticojejunostomy provides more durable relief of obstructive jaundice than does Cholecystojejunostomy because of the proximity of the cystic duct to most periampullary cancers²⁷. Seven patients (11.66 %) were not operated on, this indicated either the unfitness of patient due to associated comorbid disease (especially that most of them are ≥ 50 years old) or the advanced stage of malignancy or both. Pancreaticoduodenectomy (Whipple's procedure) which assumed to be a curative procedure for periampullary neoplasm was done in 16 patients

(26.66%). This means that 76.66% of patients presented with CA head pancreas were presented in advanced and non-resectable. In a study done by Vanhooser²⁸, The bypass procedure were applied for 57%, 18% were underwent endoscopic stenting. 7% were not operated on , 4% underwent laparotomy without palliation or curative procedures. Whipple's procedure was applied for 14% of patients.

Thirteen patients (65%) with obstructive jaundice due to intrabiliary ruptured Hydatid cyst in this study were managed mainly by CBD exploration and T-tube while choledochoduodenostomy were done only in 4 patients (20%). There is a study done by Sayek showed that T-tube drainage, cystojejunostomy, and choledocho-duodenostomy are the main operations performed for this pathologic condition²⁹, which is not so far from our study results. In another study done by Vignote, 15 patients were all managed successfully by ERCP. Vignote concluded that Endoscopic sphincterotomy is the treatment of choice for surgical complications of hepatic hydatid disease open to the biliary tree³⁰. This is quite different from our results were ERCP had not been applied for the management of intrabiliary rupture hydatid disease.

The in hospital morbidity rate shown in our study was seen in 47 patients (21.07%) most of them were due to respiratory complications which seen in 18 patients. Anastomotic leak which was found in 12 patients, was seen mostly with Whipple's and bypass procedure.

In hospital mortality was seen in 19 patients (9.86%). Most common cause of death was sepsis found in 12 patients.

Most of morbidity and mortality occurred in patients where malignancy

(especially CA head of pancreas) was an etiology for obstructive jaundice.

Age, associated comorbid diseases and malignant disease (as an etiological factor) found to be associated with the high mortality and morbidity rate for patients in this study. Other studies³¹ showed higher morbidity and mortality rates than our study.

Conclusion

Obstructive jaundice occurred similarly in both sexes.

Obstructive jaundice in Basrah is most commonly due to choledocholithiasis.

The threshold for application of ERCP and MRCP were very high.

More than half of cases of CA head of pancreas were unresectable.

Age, malignant etiology and associated comorbid diseases were the most common factors associated with morbidity and mortality.

Recommendations

In the era of minimally invasive surgery, ERCP Should be applied more frequently to treat the obstructive jaundice, especially that the most common etiology found to be choledocholithiasis , a condition which can be managed successfully in most patients by ERCP and eliminate the risk of operation.

Establishing an ERCP center in Basrah for diagnostic and therapeutic purposes.

The threshold for using MRCP should be lower than usual in the diagnosis of etiologies of obstructive jaundice .it's the best and most accurate in diagnosing most of these etiologies. Better to increase the threshold for CT scan application if choledocholithiasis is expected.

The attachment of imaging reports and all the investigation results with the patient's case sheet to ensure a perfect medical registration.

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