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EVALUATION OF PRE-OPERATIVE ENDOSCOPIC BILIARY DRAINGE IN OBSTRUCTIVE JAUNDICE

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Patients with obstructive jaundice are prone to recurrent cholangitis, sepsis, bacterial translocation, impaired mononuclear phagocytic as well as intestinal barrier and renal functions. Pre-operative biliary drainage can lower serum endotoxins and improve mononuclear phagocytic functions.

A retrospective evaluation of the results of surgery after endoscopic biliary drainage was made for 86 patients with surgical obstructive jaundice seen in the last five years at Theodor Bilharz Research Institute. Median follow up was 30 months.

Endoscopic retrograde cholangiopancreatography (ERCP) and stent insertion were successful with a progressive relief of jaundice and cholestasis in 65 (75.6%) and could not be achieved in 21 (24.4%) patients because of complete interruption of the biliary tree in 12 (13.9%) or failed stenting in 9 (10.5%) patients. Complications following ERCP and stent insertion had occurred in 5 (6%) patients including one fatal cholangitis with Charcot's pentad.

Unsettling calcular and malignant obstructive jaundice were seen in 43 (50%) and 21 (24.4%) patients respectively. Iatrogenic biliary injuries, resulting in complete bile ducts interruption or stricture, and benign biliary stricture, due to chronic pancreatitis were found in 12 (14%), 4 (4.65%) and 2 (2.3%) patients respectively. In addition, 4 (4.65%) patients had rare causes of obstructive jaundice.

Postoperative relief of jaundice was achieved in all patients (80 patients), early and late morbidities due to wound infection (8 patients, 10%), stomal stenosis after the first year (one patient, 1.25%) and recurrent cholangitis (2 patients, 2.5%) were respectively observed. There was no operative death.

In conclusion, endoscopic stenting followed by timed surgery is believed to be the optimum treatment for surgical obstructive jaundice.

INTRODUCTION

The diagnosis of obstructive jaundice has been revolutionized since the introduction of ERCP and the recent imaging procedures. Invariably, these patients come to the care of the endoscopist, before going to surgeons [(1)]. Still, sometimes the identification of the obstructing agent is controversial until surgical exploration. Ultrasonography alone is neither sensitive nor specific enough to detect bile duct stones [(2)] and it is a common practice to perform operative cholangiography during open cholecystectomy[(3)]. With ERCP the dilemma can now be clarified with an accuracy of 95%[(4)].

Jaundiced patients, due to biliary obstruction, are prone to recurrent cholangitis and sepsis [5,6,7,8], bacterial translocation [9,10], impaired mononuclear phagocytic function [11, 12], renal impairment [13, 14] and the risk of long-term complications as secondary biliary cirrhosis[15], which contribute to the post-operative mortality rates varying from 9 to 27% [16]. Also, intestinal barrier function is impaired in obstructive jaundice and impairment is reversed by return of bile to the gastrointestinal tract[17]. Internal biliary drainage was effective in lowering bile and serum endotoxin levels and endotoxaemia [18] and has also been considered to be important in the recovery of mono-nuclear phagocyte function [10,11,17]

ERCP and stenting are invasive procedures that imply the risk of cholangitis, sludge formation, pancreatitis in 5% of patients and a global mortality rate of 0.08 % [19,20].

AIM OF THE WORK:

It is a common practice in our center to attempt stenting of the biliary tree for patients with obstructive jaundice before going to surgery. The aim of this study is to review these cases seen during the last five years. The diagnosis, causes of stent insertion failure, as verified by exploration, treatment, and outcome are reviewed.

MATERIAL AND METHODS

Clinical material: This database has been collected for all cases of obstructive jaundice in which stenting of the common bile duct (CBD) was attempted before going to surgery from January 1995 to December 2000. A total of 86 patients were identified. Data examined included: (1) demographics (including age and sex); (2) presentation; (3) pathology; (4) details of endoscopic and surgical procedures; (5) hospital course including complications; and (6) outcome.

Methodology: The diagnosis of obstructive jaundice was based on clinical examinations, the conventional laboratory tests, and ultrasonography. ERCP, percutaneous transhepatic cholangiography and occasionally computerized tomography and MR cholangiography were interpreted with close collaboration by the endoscopist, radiologist and surgeon.

ERCP (Olympus IT-10) was performed for all patients. A biliary stricture was defined as (1) segmental narrowing, with (2) proximal dilatation, and (3) delayed runoff of contrast. Stenting was attempted for biliary decompression, to improve the hyperbilirubinaemia or malnutrition, to give time for a better preoperative preparation, retained dye, septic cholangitis or palliation of high risk and inoperable patients. A Cotton-Leung biliary stent (10 Fr) (Wilson-Cook Medical Inc., USA) was inserted through the stricture after sphincterotomy had been done. Occasionally biliary stones were removed endoscopically by means of balloon or basket.

Surgery was performed three to four weeks after the ERCP, when serum bilirubin has settled, with full documentation of the findings and procedure. Operative mortality included all deaths within 30 days of surgery. A catheter cholangiography was done on the tenth day before removing a T tube or a catheter stent after biliary enteric anastomosis. Liver functions tests and ultrasound examinations done monthly for three months and six monthly for 24 months. Tc99 HIDA scan was done for selected patients to document the patency of a biliary enteric anastomosis. Follow-up was by personal contact with the patient or patient's family.

RESULTS

Data of eighty-six patients were studied. Their ages ranged between 9 and 65 years. They were 36 males and 50 females. Clinical and operative data of patients subjected to surgery are presented in (Table 1.)

Table 1: ***The patient's clinical and operative data.***

Diagnosis	*Age (Ys)*	*No*	*Sex*		*Number and Type of Operation*
			♂	♀	
Calcular obstructive jaundice	30-55	42	11	31	Cholecystectomy + exploration of the CBD (n=32) Endoscopic removal of CBD stone + cholecystectomy (n=7) Cholecystectomy + choledocho-dudenostomy (n=3)
Iatrogenic injury	28-55	16	9	7	Hepatico- jejunostomy end to side (n=6) Jejunal anastomosis to the carina extending to the left hepatic duct (n=4) Hepatico-jejunostomy side to side (n=4) Right and left hepaticojejunostomy by the mucosal graft pull through technique (n=1) Left duct cholangiojejunostomy (n=1)
Malignant obstructive jaundice	45-65	16	11	5	Whipple resection (n=8) Local excision for pre-invasive ampullary carcinoma (n=1) Wide local resection of gall bladder carcinoma with choledocho-jujenostomy (n=1) Left hepatico-jujenostomy for Klatskine tumor (n=1) Hepatico- jejunostomy side to side for unresectable carcinoma of the head of the pancreas (n=5)
Stricture associating chronic pancreatitis	34-57	2	0	2	Side to side hepaticojejunostomy (n=2)
Schistosomal cholecystitis and lymphadenitis	50	1	1	0	Cholecystectomy, T tube drainage and praziquantel
Duodenal diverticulum	36	1	0	1	Roux-in-Y choledocho-jujenostmy
Hydatid cyst	45	1	0	1	Drainage of the cyst and T tube drainage
Choledochal cyst	9	1	0	1	Subtotal cystectomy and cysto-jejunostomy

The cholangiogram showed a biliary obstruction with proximal dilatation in 65 patients (75.6%) and a stent was inserted in all patients. Concomitant bile duct stones were present in 43 (50%) and were removed endoscopically in 7 (8.1%) patients. Relief of jaundice and cholestasis within two weeks of biliary stent insertion was achieved in 63 patients (73.3%). ERCP and CBD stent insertion could not be achieved in 21 patients (24.5%). Data and cause of failure are depicted in (Table 2)..

Table 2: ***Cause of ERCP and/or CBD stent insertion failure***

Diagnosis	*No.*	*Causes of failure to visualize or stent the biliary tree*
Calcular obstructive jaundice.	1	Failure to canulate the CBD because of impacted stone
Iatrogenic injury:	14	12 Complete interruption of biliary tree
		2 Stenosis and angulations
Malignant obstructive jaundice	1	Duodenal distortion
Stricture secondary to pancreatitis	1	Stenosis and angulations
Schistosomal cholecystitis and lymphadenitis	1	Stenosis, compression and angulations
Hydatid cyst	1	Stenosis, compression and angulations
Choledochal cyst	1	Compression and displacement of CBD
Duodenal diverticulum	1	Duodenal distortion and failure to canulate the CBD

Complication following early stent-related complications occurred in 5 patients (6%) namely duodenal perforation (n=1), failure to relieve jaundice (n=2), retained basket (n=1) which were managed surgically, and recurrent cholangitis (n=1). One patient died preoperatively because of cholangitis with Charcot's pentad (1.2%). The reasons for continuing stent treatment were inoperable malignancy (n=4) and medical unfitness for surgical interference (n=1).

Calcular Obstructive Jaundice.:

Unsettling calcular obstructive jaundice was seen in 43 patients (50 %). Cholecystectomy following endoscopic retrieval of CBD stone (n=7) or combined with exploration of the CBD (n=32) was performed. Choledocho-duodenostomy, following cholecystectomy, was performed due to the presence of multiple small stones (n= 2) or a greatly dilated and static CBD (n= 1) (Fig..1&2). One patient died preoperatively because of cholangitis with Charcot's pentad (1.2%).

Fig. (1): ERCP reveals multiple Filling defects in CBD (CBD stones)

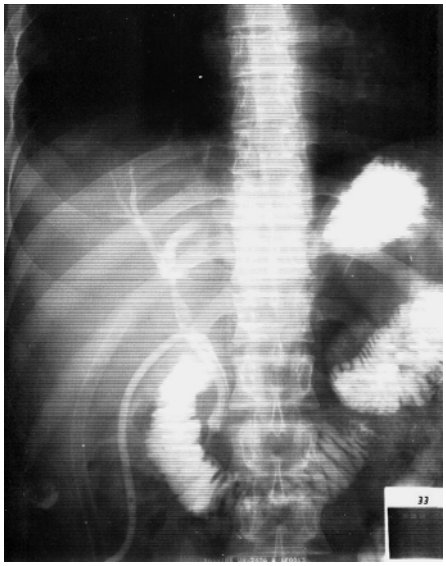

Fig.(2): T-tube cholangiography following stones extraction & CBD exploration

Iatrogenic biliary injury:

Twelve patients with obstructive jaundice within one month after cholecystectomy (2 of them had an external biliary fistula) were referred to our center. As confirmed by surgical exploration, complete interruption of the biliary tree at the level of the common hepatic duct (n= 7), the confluence of both right and left hepatic ducts (n= 4) and the porta-hepatis (n= 1) were found. A right and left hepaticojejunostomy by the mucosal graft pull-through technique (n=1) (Fig.3), a jejunal anastomosis to the carina extending to the left hepatic duct (n=4), an end to side hepaticojejunostomy (n=6) and a left duct cholangiojejunostomy (n= 1) were performed.

Patients referred within 9 to 48 months (n= 4) had biliary stricture with gross dilatation of the upper segment (Fig.4), and stone formation in one of them, were relieved by a side to side hepaticojujenstomy

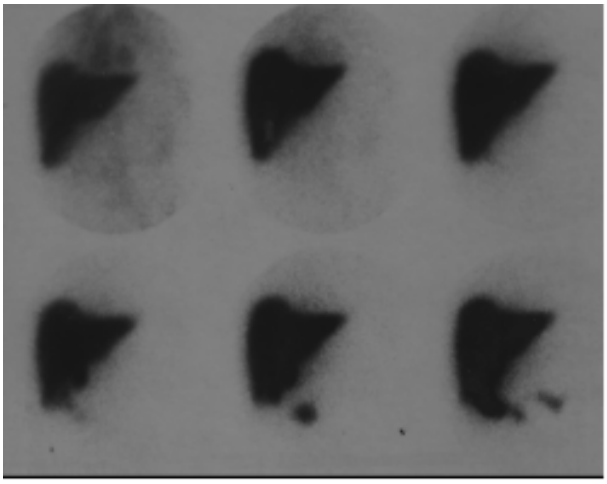

Fig.(3):HIDA scan revealed right and left hepaticojejunostomy by the mucosal graft pull-through technique

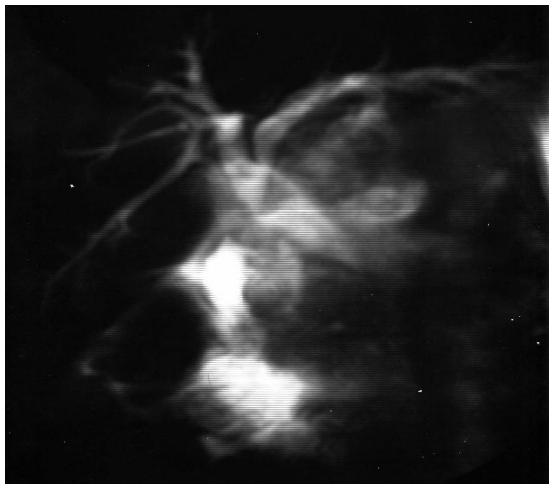

Fig. (4): MRCP showed biliary stricture with proximal duct dilatation at the level cystic duct.

Malignant obstructive jaundice :

Malignant obstructive jaundice was found in 21 (24.4%) patients, 5 of them had only endoscopic drainage as palliative treatment. Patients with unresectable carcinoma of the head of the pancreas (n= 5) had a palliative biliary bypass. A Klatskine tumor (n=1) was treated with left duct cholangiojejunostomy. Carcinoma of the ampulla (n=3), head of the pancreas (n=2) and lower choledocus (n=3) underwent Whipple resection (n= 8) after histopathological confirmation. A localized non-invasive ampullary adenocarcinoma (n= 1) was treated by local excision, with biliary and pancreatic ducts implantation, because of liver cirrhosis. One patient with carcinoma of the gallbladder involving the CBD was misdiagnosed by ERCP as a gallbladder stone with an inflammatory stricture of the CBD. The tumor was resected and a choledochojejunostomy performed

Fig. (5): ERCP showed cancer head Of pancreas with proximal duct dilatation

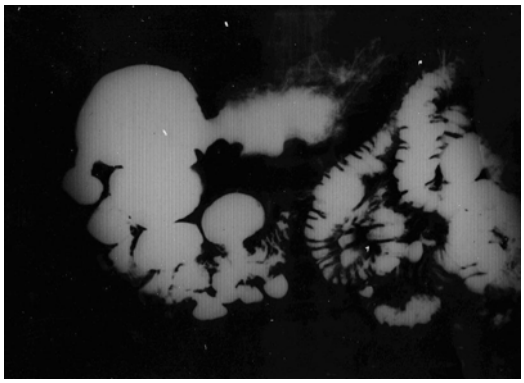

Fig. (7): Barium meal revealed multiple duodenal diverticulae

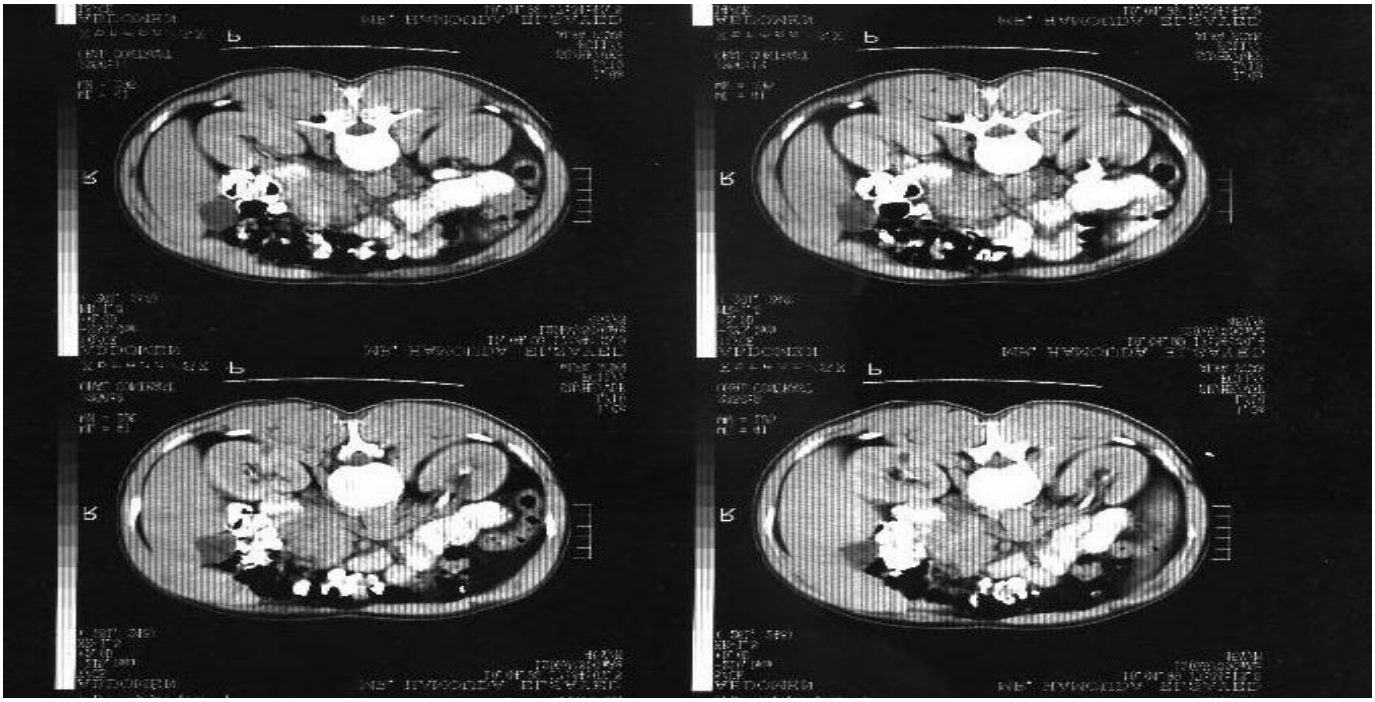

Fig. (6): ***CT demonstrates marked enlargement of the pancreatic head without dilated intrahepatic biliary radicals (chronic pancreatitis).***

Others:

Benign biliary stricture associated with chronic pancreatitis (n=2) (Fig.6), was relieved by a side-to-side hepaticojejunostomy. Extra-mural biliary obstruction by a choledochal cyst (n=1), hydatid cyst (n=1), schistosomal cholecystitis and lymphadenitis (n=1) and duodenal diverticulum (n=1) (Fig.7) were managed accordingly

After surgery (n= 80), early and late morbidities due to wound infection (n= 8, 10%), stomal stenosis after the first year (n= 1) and recurrent cholangitis (n= 2) were respectively observed. The last three patients needed a prophylactic continuous low dose antibiotic inspite of a good bile flow by HIDA scan (Fig.3). A sustained rise of serum alkaline phosphatase of 50% to 100% above normal levels, with a normal serum bilirubin, was seen in all patients after biliary enteric anastomosis.

There was no operative death and postoperative relief of jaundice was achieved in all patients.

DISCUSSION

Bacteriobilia in obstructive jaundice is usually present and the highest was found in traumatic strictures of the bile duct (80-100%) [21]. Postoperative septic complications are common in these patients[22] and biliary infection was demonstrated to be of critical importance in the duct stricture following biliary reconstruction [23]. Surgical biliary drainage has been associated with 15% –30% morbidity and 0–7 per cent mortality[24]. Endoscopic biliary stenting and drainage, as an alternative to surgery, had a low morbidity and mortality rates[25]. However, stent dysfunction necessitating regular replacements is a major disadvantage.

Whether either endoscopic treatment or surgical drainage should be preferred, as a long-term treatment remains a point of discussion in certain situation e.g. chronic pancreatitis. Inspite of the fact that internal biliary drainage was effective in lowering bile and serum endotoxin levels and endotoxaemia[18] and has also been considered to be important in the recovery of mono-nuclear phagocyte function [10,11,17], a stent for too long unnecessarily delay the definitive surgical treatment, introduce infection and prevent biliary dilatation which make operative repair more difficult[24, 26].

It was found that there is no strong evidence in the literature to support the view that routine pre-operative biliary drainage improves post-operative morbidity and mortality in patients with obstructive jaundice undergoing resection. Pre-operative biliary drainage has its own complications that cancel out its benefits, however it could be beneficial in patients presenting with sepsis, coagulation abnormalities or malnutrition.[27]

On the other hand, the experimental work on the recovery of hepatic function after relieve of obstructive jaundice, suggest that adequate recovery depends on the duration of biliary decompression and the duration of obstructive jaundice before decompression. When major surgery is required in patients with obstructive jaundice, biliary drainage should be carried out first 4 to 6 weeks before performing a definitive surgery[28]. A more recent study showed that preoperative decompression to reduce serum total bilirubin to below 5 mg/dl is necessary for at least 3 weeks before coagulation, hepatic, and reticuloendothelial functions improve [29].

The present data showed low morbidity (6%) and mortality (1.2%) rates of pre-operative endoscopic drainage. This is a proof of the safety of this technique provided it has been done in the proper way. Moreover, the benign post-operative course with absence of operative-related death clinically confirmed the results of Koyama[28] and Kawarada[29] and their colleagues.

It is worth mentioning that cases of schistosomiasis of the gallbladder and the lymph node related to the biliary ducts responded favorably to praziquantel treatment and T tube drainage.

From the present analysis, timed surgery, after endoscopic stenting, is believed to be the optimum treatment for surgical obstructive jaundice.

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