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Original Research Article

Clinicopathological study and management of benign biliary stricture

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ABSTRACT

Background: A stricture of the biliary tract can be one of the most difficult challenges that a surgeon can face. If unrecognized or managed improperly life threatening complications may develop. The goal of this study is to describe the most appropriate management for benign biliary stricture.
Methods: This was a prospective study done on 29 patients diagnosed with benign biliary stricture. Complete biochemical profile, USG-whole abdomen, and other radiological investigations were done to evaluate the detailed etiological condition of the patient. Appropriate surgical intervention was implemented in the patients. Related complications and clinical outcome was observed during the follow up period of 2 years.
Results: Mean age of the study population was 45 years (ranging from 22-62 years). Female preponderance was seen in the study. USG of abdomen was done in all the patients (100%). Overall complications were observed in 15 patients.
Conclusions: Benign biliary strictures occur more often in women. Complications and clinical outcome depends on the time of diagnosis, matured clinical judgment and appropriate surgical intervention. Hepaticojejunostomy (HJJ) was the common surgical procedure adopted in in 23 patients.

Keywords: Benign biliary stricture, Diagnosis, Complications

INTRODUCTION

Benign biliary stricture includes several diverse clinical entities that share the common characteristics of biliary obstruction. Many of these strictures result from iatrogenic injuries during cholecystectomy, bile duct exploration, pancreatic, gastric or hepatic surgery and liver transplantation.[1] It occurs often in young patients in the most productive years of life. Improper management may result in disastrous complications, such as recurrent cholangitis, biliary cirrhosis portal hypertension. Repeated interventions greatly reduce the likelihood of a successful outcome. It is therefore imperative that any attempt at repair be carried out in a precise and expert manner in the setting of a specialist center, as biliary stricture require durable repair because most patients are in otherwise good health and are expected to live for years.[2]

The best results for management of biliary stricture are achieved through early diagnosis, mature clinical judgment and technical expertise at the first attempt of repair. Benign biliary stricture may affect the intrahepatic or extrahepatic bile ducts or both and may be solitary or multiple.[3]

The present study was done with the aim to evaluate the influence of several factors on the outcome of the repair of benign biliary strictures in order to identify the optimal technique for different grade of biliary strictures, with best possible technique and good long term result and lowest possible recurrence rates.

METHODS

This was a prospective study done at KPC Medical College and Hospital, West Bengal for a period of two years (March 2011 to February 2013). Twenty nine patients diagnosed with benign biliary stricture attending to the surgical and gastroenterology department were included in the study. Patients with malignancy and congenital strictures (biliary atresia) were excluded from the study. Detailed demographic and clinical history data were taken from all the patients in a predesigned proforma. All the patients were thoroughly examined as per the hospital protocols. A complete biochemical profile, USG-whole abdomen, and other radiological investigations (endoscopic retrograde cholangio-pancreatography (ERCP), Magnetic resonance cholangio-pancreatography (MRCP), hepatobiliaryiminodiacetic acid (HIDA) scintigraphy) were done to evaluate the detailed etiological condition of the patient.

Preoperative preparation

Surgical reconstruction was performed as an elective procedure, if there is evidence of ongoing bile leakage or sepsis, a period of 6 weeks was generally allowed to pass with the aim of reducing the inflammation to make the extrahepatic bile duct to dilate, to correct the abnormality encountered due to obstructive jaundice or leakage.

Correction of malnutrition and hypoproteinemia by increasing dietary protein, transfusion of fresh frozenplasma or albumin. Prevention and control of infection by broad spectrum antibiotics, was started 24 hours before surgery with combination of antibiotics like cefuroxime, amikacin and metronidazole.

Control of bleeding tendency was treated by injecting vitamin K (intramuscularly once daily for 5-7 days before surgery. The renal condition of the patients should be maintained by keeping the patients well hydrated. Intravenous fluids was started before the day of surgery and 1, 1/2 litres of fluid given overnight to prevent renal failure.

The condition of anaemiawas corrected by blood transfusion. Building up of hepatic glycogen stores was done by plenty of oral glucose and carbohydrate and intravenous dextrose infusion.

Operative procedure

In majority of patients reconstruction was carried out by hepaticojejunostomy. This was the operation of choice in Bismith II, III & IV benign biliary stricture. Operation done through chevron or bilateral subcostal incision, liver is mobilized by dissection of falciform, coronary and triangular ligament. Dissection of the stricture commence in the right sub hepatic area and hepatic flexure of colon mobilized completely starting from below andworking upwards, anteriorly and medially. The duodenum exposed and very often adhesions noted due to previous surgery. A search for bile duct,proximal to the stricture is done. For Bismuth type I stricture, the area neighbouring hilum is explored and bile duct is found lateral to the hepatic artery. But in high strictures, exposure was done by incision of the base of the quadrate lobe and lowering of the hilar plate. This maneuver delivers the bile duct and their confluence from the undersurface of liver, making identification of the stricture area much easier. Once the duct is prepared, anastomosis to Roux-ex-Y loop of jejunum usually carried out. The suture technique employed as described by Voyles and Bumgartiand by Blumgart and Kelley by tension free intemrpted suture by absorbable suture (e.g. vicryl) in single layer.

Choledochojejunostomy and choledochoduodenostomy was done by same approach as described above in some cases of bismuth type I stricture.

Follow up

The patients were kept in follow-up for up to 2 years. During this period the patients were assessed clinically, biochemically and radiologically.

Statistical analysis

All the data was collected and analysed by using Microsft Excel. The findings are expressed in number and percentages.

RESULTS

The present study included 29 patients with benign biliary stricture. Demographic and clinical characteristics of the study participants were given in Table 1. Majority of them were under the age group of 41-50 years (37.9%). Females outnumbered (62%) the males (38%). The most frequent cause of benign biliary stricture was noticed in patients with previous cholecystectomy procedure (76%). At the time of presentation raised bilirubin and cholangitis was seen in 2l cases (72.4%). Bilioma was present in 8 (27.5%) patients, whereas fistula was seen in 9 (31%) patients and 4 (13.7%) patients had malnutrition. Maximum (62%) of patients had a bilirubin between 2-5 mg%, and only 2 patients having bilirubin >10 mg%. Of the 29 patients 25 patients had >3.5 g% of albumin at the time of reconstructive operation. Increased alkaline phosphatase (>600 u/L) was observed in 21 of the patients. Among 29 patients, Bismuth-Corlettetype II strictures was noticed in majority of the patients (37.9%) followed by type III (27.5%), type I (24.1%) and type IV (10.3%).Most of the patients (41.3%) were diagnosed after 1 month of the initial injury (during cholecystectomy). Eight of the patients were diagnosed within 1st week after cholecystectomy presenting as biliary leakage or bilioma.

Diagnostic imaging of USG of abdomen was done in all the patients (n=29, 100%). MRCP was performed in 27

of cases, which completely deliniated the biliary ductal anatomy preoperatively. ERCP was done in 10 cases. HIDA scan was done in 3 cases to see the anastomotic stoma in patients who developed re-stricture. Fistulogram was done in 4 patients where a biliary tract was formed after initial injury (Table 2).

Table 1: Demographic and clinical characteristics of study participants (n=29).

Characteristics		Number (N)	Percentages (%)
Age (in years)	21-30	5	17.2
	31-40	6	20.6
	41-50	11	37.9
	51-60	5	17.2
	61-70	2	6.8
Sex	Male	11	38.0
	Female	18	62.0
Aetiology	Cholecystectomy		
	A) Open	9	31.3
	B) Laparoscopic	13	44.8
	Pancreatitis	3	10.3
	CBD exploration	2	6.8
	Blaunt trauma	1	3.4
	Papillary stenosis	1	3.4
Clinical features	Rising bilirubin	21	72.4
	Cholangitis	21	72.4
	Bilioma	8	27.5
	Biliary fistula	9	31.0
	Malnutrition	4	13.7
Albumin	<2.5 g%	1	3.4
	2.5-3.4 g%	3	10.3
	≥3.5 g%	25	86.2
Bilirubin	<2 mg%	6	20.6
	2-5 mg%	18	62.06
	5-10 mg%	3	10.3
	>10 mg%	2	6.8
Alkaline phosphatase	140-200 u/L	2	6.8
	300 – 400 u/L	6	20.6
	>600 u/L	21	72.4
Type of stricture	Bismuth-Corlette type I	7	24.1
	Bismuth-Corlette type II	11	37.9
	Bismuth-Corlette type III	8	27.5
	Bismuth-Corlette type IV	3	10.3
Length of time between initial injury and presenting feature	Within 1 week	9	31
	1 week-1 month	6	20.7
	>1 month	14	48.3

Table 2: Radiological investigations employed for diagnosing the disease (n=29).

Radiological investigation	Number N (%)
USG	29 (100)
MRCP	27 (93.1)
ERCP	10 (34.4)
HIDA scan	3 (10.3)
PTBD	2 (6.8)
Fistulogram	4 (13.7)

Type of surgical intervention underwent by patients were presented in Table 3. Hepaticojejunostomy(HJJ) was done in 23 patients, HJJ with access loop in 3 patients. Choledochoduodenostomy (CDD), choledocho-jejunostomy (CDJ) and left lobectomy was done in one patient each.

As shown in Table 4, complication was observed in 15 patients. Wound infection was observed in 6 cases, development of pulmonary infection in 4 cases, bile leakage in 3 cases and sub hepatic collection in 2 cases. No deaths were reported in the study.

Table 3: Type of operative reconstruction (n=29).

Reconstruction method	Number N (%)
Hepaticojejunostomy(HJJ)	23 (79.3)
HJJ with access loop	3 (10.3)
Choledochoduodenostomy (CDD)	1 (3.4)
Choledochojejunostomy(CDJ)	1 (3.4)
Left lobectomy	1 (3.4)

Table 4: Complications observed in study population postoperatively (n=29).

Complications	Number N (%)
Wound infection	6 (20.6)
Bile leakage	3 (10.3)
Pulmonary infection	4 (13.7)
Subhepatic collection	2 (6.8)

DISCUSSION

In the present study a total of 29 patients with benign biliary stricture were included by excluding patients with congenital and malignant biliary strictures. Our study demonstrates that patients with benign biliary strictures are likely to be women. This was in consistent with the findings of Baskin-Beyet al.[4]

This study demonstrates that patients with benign biliary strictures are more likely to have Bismuth-Corlette type II, followed by type III, I and IV. In contrast to this, in a study done by Verbeek et al type III strictures were seen in most of the patients.[5] However our data were similar to those of Baskin-Bey et al and Hadjis et al.[4,6] In their study predominantly type I and II strictures were noticed. These findings suggest that strictures below the biliary confluence are likely to be benign rather than malignant.

From the last decades, many improvements were seen in imaging techniques. Even though distinguishing benign from malignant strictures is still remaining as a challenge.[7,8] ERCP and MRCP is helpful is identifying the site and extent of stricture but not the aetiology.[9,10] In the present study, MRCP was done in 27 patients, ERCP in 10 cases. Apart from these techniques, newer techniques such as digitalized image analysis and fluorescent *in situ* hybridization appears to be more efficient but need validation.[11,12]

In the current study, 23 of 29 patients underwent hepaticojejunostomy. Three patients underwent HJJ with pylorus ligation. Similarly, in a study done by Baskin-Bey et al, 8 of 12 patients underwent HJJ.[4]

The complication rate in revision surgeries ranges from 11-33%.[13,14] In our series, the overall complication rate was 51%. This increased percentage of complication rate may be due to existence of revision surgery in the current study population.

CONCLUSION

In conclusion benign biliary strictures were found to be very common in females. Surgical reconstruction with a biliary-enteric mucosa to mucosa anastomosis by means of Roux-en-Y hepaticojejunostomy is the procedure of choice to be done in patients with benign biliary strictures. The complications related to the disease depend on the severity and time of diagnosis of the disease. The best result can be achieved by early diagnosis and technical expertise in the surgical intervention. Related rate of complications can be reduced by early diagnosis and matured clinical judement.

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REFERENCES

1. Bhuiyan MJH, Khan MAW, Rabbi ANM, Akhter L. Bile duct injury complications and management. J Armed Forces Med Coll. 2008;4(2):21-6.
2. Campana JP, de Santibañes E. Recurrent Biliary Strictures After Initial Biliary Reconstruction. Chapter 38. Switzerland: Springer International Publishing; 2015: 407-422.
3. Corver CU, Alemi F, Jarnagin WR. Benign biliary strictures. In: Blumgarts surgery of the liver, pancreas and biliary tract. Jarnagin WR, editor. 5th edition. Volume 1. USA: Elseviers; 2012: 615-643.
4. Baskin-Bey ES, Devarbhavi HC, Nagorney DM, Farnell MB, Donohue JH, Sanderson SO, et al. Idiopathic benign biliary strictures in surgically resected patients with presumed cholangiocarcinoma. HPB (Oxford). 2005;7(4):283-8.
5. Verbeek PC, van Leeuwen DJ, de Wit LT, Reeders JW, Smits NJ, Bosma A, et al. Benign fibrosing disease at the hepatic confluence mimicking Klatskin tumors. Surgery. 1992;112:866–71.
6. Hadjis NS, Collier NA, Blumgart LH. Malignant masquerade at the hilum of the liver. Br J Surg. 1985;72:659–61.
7. Lillemoe KD, Pitt HA, Cameron JL. Current management of benign bile duct strictures. Adv Surg. 1992;25:119–74.
8. Gerhards MF, Vos P, van Gulik TM, Rauws EA, Bosma A, Gouma DJ. Incidence of benign lesions in patients resected for suspicious hilar obstruction. Br J Surg. 2001;88:48–51.
9. Farrell RJ, Agarwal B, Brandwein SL, Underhill J, Chuttani R, Pleskow DK. Intraductal US is a useful adjunct to ERCP for distinguishing malignant from

benign biliary strictures. Gastrointest Endosc. 2002;56:681–7.
10. Kim HJ, Lee KT, Kim SH, Lee JK, Lim JH, Paik SW, et al. Differential diagnosis of intrahepatic bile duct dilatation without demonstrable mass on ultrasonography or CT: benign versus malignancy. J GastroenterolHepatol. 2003;18:1287–92.
11. Khan SA, Davidson BR, Goldin R, Pereira SP, Rosenberg WM, Taylor-Robinson SD, et al. British Society of Gastroenterology. Guidelines for the diagnosis and treatment of cholangiocarcinoma: consensus document. Gut. 2002;51(6):7–9.
12. Rumalla A, Baron TH, Leontovich O, Burgart LJ, Yacavone RF, Therneau TM, et al. Improved diagnostic yield of endoscopic biliary brush cytology by digital image analysis. Mayo Clin Proc. 2001;76:29–33.
13. Pottakkat B, Sikora SS, Kumar A, Saxena R, Kapoor VK. Recurrent bile duct stricture: causes and long-term results of surgical management. J Hepatobiliary Pancreat Surg. 2007;14(2):171–6.
14. Benkabbou A, Castaing D, Salloum C, Adam R, Azoulay D, Vibert E. Treatment of failed Roux-en-Y hepaticojejunostomy after post-cholecystectomy bile ducts injuries. Surgery. 2013;153(1):95–102.

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