Subparietal hepaticojejunial access loop for the long-term management of intrahepatic stones

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Background The subparietal hepaticojejunial biliary access loop is a recognized technique for the long-term management of primary intrahepatic stone disease. This paper assesses the results of this approach in a series of South African patients.

Methods Between 1985 and 1997, 21 patients, of mean age 34 (range 24–66) years, underwent surgical extraction of intrahepatic stones and formation of an hepaticojejunal access loop. The access loop was subsequently used for further stone removal and stricture dilatation. Patients were followed prospectively (median 47 months) and details of the number and type of procedures performed, stone clearance rates, morbidity and subsequent outcome were recorded.

Results The distribution of intrahepatic stones was left lobe in 13 of 21 patients, right lobe in one and bilateral in seven. Six patients underwent additional left lobectomy at the initial operation because of associated atrophy of the left lobe. Following operation, stone removal and/or stricture dilatation was performed on 97 occasions (median 4 (range 0–24) procedures per patient). Complete stone clearance was achieved in 17 of 21 patients with partial clearance in the remaining four. There were no major complications and no deaths associated with the procedures.

Conclusion The subparietal access loop permits long-term access to the intrahepatic ducts allowing removal of stones and dilatation of strictures with minimal patient discomfort and low morbidity.

Primary intrahepatic stone disease (IHSD) is common in South East Asia with the highest incidence in Taiwan (30 per cent of all patients with gallstone disease), Hong Kong and Southern China, followed by Japan, Korea and Singapore. Parasitic infestation with Clonorchis sinensis or Ascaris lumbricoides, and Escherichia coli bacterial infection, have been implicated in the pathogenesis. Outside of South East Asia regions of high prevalence have been reported in Kashmir, Columbia and the Western Cape province of South Africa. The common features in each of these areas are poverty, social deprivation and endemic A. lumbricoides infestation. In the Western Cape province the disease is most commonly seen in fertile women with a previous history of Ascaris infestation.

Primary intrahepatic stones are associated with strictures in up to 85 per cent of cases and the natural history is characterized by progression with recurrent attacks of biliary sepsis. Surgical removal of stones with an extrahaepatic drainage procedure has been the standard management but residual stones and stone recurrence occur frequently whatever the technique. Because of the need for repeated biliary instrumentation, long-term access routes involving percutaneous transhepatic access tubes, or hepaticocutaneous jejunostomy (HCJ) to permit stone retrieval or stricture dilatation have been developed. These provide good access to the biliary system but patients are left with the unpleasant side-effects of a biliary stoma. Experience with a subparietal hepaticojejunial access loop without a stoma, in the management of IHSD is presented.

Patients and methods

Twenty-one patients (ten men) with IHSD underwent surgery between 1985 and 1997, with creation of a hepaticojejunial access loop. Nine patients had a total of 13 previous biliary tract operations (open cholecystectomy, seven; laparoscopic...
cholecystectomy, one; common bile duct exploration and sphincterotomy, two; choledochojjunostomy, two; laparotomy for unexplained abdominal pain, one). The mean age at operation was 34 (range 24–66) years. All patients have been followed up prospectively for a median of 47 (interquartile range 32–80) months.

Surgical technique

A bilateral subcostal incision was used to provide exposure of the porta hepatitis. The common hepatic duct was opened at the confluence into the left and right ducts, and stones were retrieved. Intraoperative choledochoscopy was performed to identify intrahepatic calculi which were removed. Occasionally, stricture dilatation using a Gruntzig balloon was used in an effort to remove all stones. When atrophy or multiple cholangitic abscesses were present, a lobectomy was performed.

A biliary-enteric anastomosis was performed using a side-to-side anastomosis between the hepatic duct confluence and a jejunal Roux-en-Y loop. If the left or right duct was narrowed, the hepatic duct incision was extended beyond the stricture to provide a wide anastomosis. A site 12 cm proximal to the end of the jejunal loop was selected for anastomosis to the hepatic duct, which was performed using a single layer of interrupted 3/0 Maxon (Davis and Geck, Gosport, UK)⁷. Two Ligacips (Ethicon, Edinburgh, UK) were used to mark the anastomosis for later radiological identification⁸. The closed proximal limb was attached to the anterior abdominal wall using 3/0 polypropylene sutures to fix it in a subparietal position (Fig. 1)⁹. Further Ligacips were used to mark the width of the jejunal loop by clipping the sutures holding the access loop in place (Fig. 2). An umbilical feeding tube was passed through the skin and abdominal wall into the access loop to permit postoperative cholangiography.

Radiological technique

If obstructive jaundice, biliary pain or ascending cholangitis developed subsequently, biliary access was gained using radiological screening. Antibiotic prophylaxis using intravenous ampicillin 1 g and gentamicin 160 mg (or cefuroxime 1 g) was given 30 min before the procedure. Local anaesthetic was injected at the puncture site and the afferent loop was identified fluoroscopically by determining the position of the ‘Ligacip runway’. The loop was entered percutaneously between the ‘runway’ clips using a 21-G fine-bore needle with intermittent contrast injections and a guidewire. A converting dilator allowed percutaneous introduction of larger guidewire catheter combinations directed by fluoroscopy into the jejunal lumen and a combination of Dormia baskets, angioplasty balloons and snare wires was used to fragment and extract calculi. Biliary stenoses were dilated using 4–8-mm standard angioplasty balloons. On completion, the ducts were flushed with saline. After clearing stones in larger ducts, cholangiography often revealed additional stones in upstream segmental or side ducts which required further procedures. Neuroleptic analgesia was used as needed (midazolam). Patients were admitted overnight for observation and two further doses of antibiotics were administered following the procedure.

Results

Distribution of intrahepatic stones

Stones were most commonly found in the left lobe of the liver; stones were confined to the left lobe in 13 of 21 patients, the right lobe in one and bilateral disease was present in seven. In patients with right lobe involvement, stones were seen predominantly in segments 6 and 7. Coexistent extrahepatic stones were found in four patients. Six patients had associated intrahepatic duct strictures although focal narrowings in dilated ducts were more common. Atrophy of segments 2 and 3 was identified before operation by computed tomography in six patients, all of whom underwent left lobectomy at the time of access loop formation.

Operative complications

Mean postoperative stay was 10 days. One patient who underwent left lobectomy developed a bile leak which settled without further intervention. There were two chest infections and one wound infection.

Use of the access loop

The subparietal access loop was used to gain access to the biliary tree in 19 of the 21 patients. A total of 97 procedures was attempted with successful access achieved in 95 (98 per cent). There was no significant complication.
of these procedures. The median number of procedures was 4 (range 0–24). Successful stone clearance was achieved in 17 patients with partial clearance in the remaining four. One patient, operated on early in the series, had an access loop length in excess of 12 cm which made radiological manipulation difficult because of loop redundancy. The remaining three patients had bilateral disease with multiple segmental duct involvement.

Discussion

Intrahepatic stones are frequently associated with intrahepatic strictures which may cause bile stasis, cholangitis and recurrent stone formation. These may be true strictures or may be simply normal sized proximal ducts which are narrow compared with the dilated diseased distal duct (1). Surgery is rarely curative and the natural history is one of progression with recurrent attacks of biliary sepsis (1). The incidence of retained stones after operation is 48–77 per cent (15,18) and a number of strategies have been developed to enable removal of both retained and recurrent intrahepatic stones. After removal of as many of the intrahepatic stones as possible, reconstruction of the biliary tree by choledochoduodenostomy has not proved a reliable method for the management of subsequent intrahepatic stones (22,23). Although direct endoscopic access is still possible, the incidence of strictures, peripheral stone impaction and ductal angulation make endoscopic extraction difficult (22,23).

Roux-en-Y HJC has been used in Asia to permit endoscopic access for the removal of intrahepatic stones (12,24,25). This technique provides good access to the biliary tree and stone removal is successful in around 85 per cent of patients (25). However, the necessity of a stoma is unsatisfactory because of the unpleasant side-effects of mucus and bile leakage with associated cutaneous irritation and excoriation, which is independent of the anastomosis (11,14). Routine early closure of the stoma has been recommended to avoid these side-effects after removal of retained stones following surgery (27).

Stoma closure is associated with significant complications of persistent wound infection, fistula formation and parastomal hernia in 17 per cent (26). Furthermore, 29 per cent of patients required reopening of the stoma for removal of recurrent stones after only 2 years of follow-up (26). Closure of an access loop defeats its purpose since the natural history of IHSD is one of recurrences requiring further procedures, particularly when strictures remain.

An alternative access to the biliary tree for intervention is the percutaneous transhepatic approach although the standard radiological techniques are hampered by the extensive stone load present. The transhepatic route requires development of a working tract which necessitates sequential dilatation over a period of up to 3 weeks (29), following which choledochoscopy can be performed for stone removal or stricture dilatation. The procedure is not without complications, with severe pain (14 per cent) and bleeding (24 per cent) resulting in treatment failure in up to 22 per cent of cases (20). Stone clearance rates of 80–83 per cent (31,32) have been achieved with repeated procedures. The transhepatic catheter has been a major source of patient complaint (11) and access is only temporary as the fistula closes after removal of the catheter (29). This is particularly important since recurrent stones occurred in 33 per cent (22) and 40 per cent (31) of patients within 5 years following transhepatic choledochoscopy, requiring further transhepatic cannulation and tract formation.

The subparietal access loop used in this series has allowed reliable access to the biliary tree in 98 per cent of attempted cannulations. The stone clearance rate of 81 per cent (17 of 21 patients) is comparable to that of HCJ and transhepatic choledochoscopy. The median number of procedures performed per patient was 4 with one patient requiring 24 procedures over a 6-year period, emphasizing the need for a permanent access route. There was no complication attributable to the formation of the access loop and bacterial overgrowth of the Roux-en-Y loop (14) has not been observed. Segmental resection is appropriate when there is atrophy of segments 2 and 3 which occurs in around 20 per cent of patients (27). Chronic inflammation may also be associated with the development of cholangiocarcinoma, reported in 2–9 per cent of patients with portal hypertension (23,34,35), although none has occurred in the present series.

Percutaneous transhepatic choledochoscopy, choledochoscopy via HCJ, and interventional radiological procedures via a subparietal access loop each provide adequate stone removal and stricture dilatation in IHSD. The subparietal access loop offers the advantage of permanent access for stone removal with minimal discomfort and morbidity, without the additional morbidity of a biliary–cutaneous fistula or transhepatic access.

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References


