Hepatic Lobectomy and Segmental Resection of Liver for Hepatolithiasis
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ABSTRACT

This study aimed to evaluate the role of hepatectomy in the treatment of hepatolithiasis. One hundred and forty-seven patients with hepatolithiasis were subjected to hepatectomy and preoperative evaluation for hepatolithiasis typing. In 108 cases, the hepatectomy was left hepatic lobectomy and in 30 cases, it was right hepatic lobectomy. There were 17 cases of multiple segmental resections. The stone clearance was 85% (125/147). Residual stones were removed through the T-tube sinus postoperatively, and the final stone clearance was 95.9% (141/147). There were 28 cases (19.1%) of postoperative complications, including temporary biliary fistula, resectional surface and subphrenic infection and haematobilia. Hepatic lobectomy was an effective method in the treatment of hepatolithiasis.

Keywords: Gallstones, hepatectomy, hepatolithiasis

INTRODUCTION

Hepatolithiasis refers to hepatic duct stones located in the upper confluence of the hepatic ducts, an important part for primary bile duct stones. The important factors that influenced treatment effect and prognosis were postoperative residual stones, stone recurrence and an attack of acute cholangitis (1, 2).

Hepatectomy was one of the important means in the treatment of hepatolithiasis. It could remove the stones, the diseased bile ducts as well as the damaged hepatic parenchyma lesions, with an obviously better efficacy than the simple choledocholithotomy or biliary-enteric drainage (3–6). In recent years, hepatic lobectomy or segmental hepatectomy has gained attention in the treatment of hepatolithiasis and has become one of the main treatment means for hepatolithiasis (7–10).

In this paper, the clinical data of 147 patients with hepatectomy for hepatolithiasis in our hospital in the past four years were analysed retrospectively to evaluate the role of hepatectomy for hepatolithiasis typing and to assess preoperative evaluation for hepatolithiasis typing.

SUBJECTS AND METHODS

From March 2006 to September 2010, 147 patients who had hepatectomy for hepatolithiasis in our department were sub-
jects of the study. There were 42 males and 105 females, aged 24–69 years old, median age of 43 years. Their case histories showed 147 patients with histories of upper abdominal pain, 21 with fever and 14 with histories of jaundice. All 147 patients were given computed tomography (CT) and magnetic resonance cholangiopancreatography (MRCP) examination. This study was conducted in accordance with the Declaration of Helsinki. The Ethics Committee of Kunhua Hospital affiliated to Kunming Medical College gave approval. Written informed consent was obtained from all participants.

**Stones typing**

The hepatolithiasis was typed according to the typing put forward by the Biliary Surgery Group, Surgery Branch of Chinese Medical Association in 2003, by the preoperative CT and MRCP image examination. The typing was of three types. In the topical Type I, the stones were limited to certain hepatic segmental or hepatic sub-segmental bile ducts. The involved liver and bile ducts had slight lesions (cylindrical, beaded and cystic dilatations) without atrophy, which was mostly clinically manifested as static type. In the domain Type II, the stones were regionally distributed along the intrahepatic biliary tree in one or more hepatic segments. They were often associated with stenosis of the diseased hepatic ducts and atrophy of involved hepatic segments, which was manifested as obstructive type or cholangitis type clinically. In the diffuse Type III, the stones were distributed throughout the bile duct of both hepatic lobes.

**Surgical methods**

Type I cases with stones only in segments II and III received right hepatectomy; those with stones in segments II, III and IV were given left hepatectomy; cases with stones in segments II, III and VII received left external lobectomy and (VII) segmental resection; and those with hepatic segmental stones were given corresponding hepatic segmental resection. In the Type 2 cases, only the stones in segments II and III were given left hepatic lobectomy; those with stones in segments II, III and IV received left hepatectomy; the hepatic segmental stones were given corresponding hepatic segmental resection.

**RESULTS**

**Stones distribution**

There were 97 cases of Type I and 50 cases of Type 2. Type III was not included in the discussion of this paper. The 97 cases of Type I included 52 cases of stones in segments II and III, 15 cases of stones in segments II, III and IV, nine cases of stones in segments II, III and VII, 12 cases of stones in segments VI and VII and nine cases of stones in segments VII and VIII. In the 50 cases of Type 2, there were 29 cases of stones in segments II and III and 12 cases of stones in segments II, III and IV, among which there were 17 cases associated with stenosis in the left hepatic duct; there were seven cases of stones in segments VI and VII and two cases of stones in segment VIII, among which there were five cases associated with stenosis in the right hepatic duct and three cases associated with stenosis in the hilar bile duct.
still be easily removed with the help of a choledochoscope to improve the stone clearance. In Type 2 cases, the stenosis in the diseased hepatic ducts should be treated intra-operatively to facilitate postoperative removal of stones, otherwise, there would be a high residual stone rate. Therefore, during the operation process, the atrophied liver was resected and there was gradual dilatation of the stenosis to allow exploration by the choledochoscope. Plastic surgery in the hilar bile duct would be useful for hepatic portal stenosis. The residual stone rate was still 4.1%. Stones were found in the distal end of the stenosis by postoperative choledochoscopic examination, where the choledochoscope could not enter. Due to the difficulties in removing the stones and the patients’ non-tolerance, removal of stones was terminated.

The disease was complicated when it involved hepatolithiasis of two lobes or more and its processing was also relatively difficult. Sometimes two or more segmental hepatectomy were required (14, 15). Multiple segmental hepatectomy could clear multiple lesions in the hepatic tree, but there would be more surgical trauma, more intra-operative bleeding, more resection of hepatic tissues and longer hepatic portal occlusion time. The incidence of complications is higher, with a larger surgical risk (16–18).

The incidence of the complications in this group was 19.1%. The postoperative complications included five cases of postoperative abdominal infection: three cases of subphrenic abscess and two cases of resectional surface infections, three cases of biliary fistula in the wound surface of the liver (50–200 mL), 15 cases of hepatic dysfunction and five cases of pleural effusion.

The following measures could effectively reduce the occurrence of complications: repeated rinsing of the wound surface of the liver and the incision after hepatectomy as well as subdiaphragmatic placement of the double casing for negative pressure suction. Bile was the conventional specimen for bacterial culture and the sensitive antibiotics were used to prevent postoperative infection. If there happens to be a subphrenic infection, catheter drainage should be applied, which should be opened for drainage if incision infection happens. At the same time, there should be T-tube drainage of the common bile duct. The incidence of biliary fistula to the wound surface of the liver should not be high. During hepatectomy, clipping of large pieces of hepatic tissue should be avoided. The main broken ends of bile ducts should be sutured securely after removing stones. The wound surface of the liver should be aligned as much as possible to prevent the occurrence of biliary fistula. Drainage of the abdominal cavity should be kept unobstructed to prevent bile accumulation and secondary infection, so that the biliary fistula would be able to heal quickly. Due to the large amount of bleeding and effusion after hepatectomy, the double casing for negative pressure suction should be conventionally placed under the diaphragm. When necessary, the drainage parts and drainage tubes should be increased. The drainage tubes should be gradually pulled out or their drainage directions changed depending on the drainage situation. Once a subphrenic effusion is found, there should be timely drainage under ultrasound guidance. When necessary, catheter drainage should be given. Moderate amount of effusion could cause respiratory distress and shortness of breath; in such a case, the patient should be given pleurocetesis. Therefore, the key problem of multiple segmental hepatectomy for hepatolithiasis is to prevent and control the postoperative complications and improve surgical safety.

REFERENCES