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

Lobectomía Hepática y Resección Segmentaria del Hígado por Hepatolitiasis

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RESUMEN

Este estudio tuvo por objeto evaluar el papel de la hepatectomía en el tratamiento de la hepatolitiasis. Ciento cuarenta y siete pacientes con hepatolitiasis fueron sometidos a hepatectomía y evaluación preoperatoria para determinar la hepatolitiasis. En 108 casos, la hepatectomía quedó como lobectomía hepática izquierda, y en 30 casos como lobectomía hepática derecha. Hubo 17 casos de resecciones segmentarias múltiples. La extracción de cálculos fue de un 85% (125/147). Los cálculos residuales fueron eliminados a través del seno de un tubo en T después de la operación, y la extracción final de cálculos fue de un 95.9% (141/147). Hubo 28 casos (19.1%) de complicaciones postoperatorias, incluyendo fístula biliar temporal, superficie del resección, infección subfrénica y hematobilia. La lobectomía hepática resultó un método eficaz en el tratamiento de la hepatolitiasis.

Palabras claves: Cálculos biliares, hepatectomía, hepatolitiasis

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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-

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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 2, 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 left 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.

Surgical treatment

There were 108 cases of left hepatic lobectomy, as well as 30 cases of right hepatic lobectomy and 17 cases of multiple segmental resections. The patients with stenosis in the biliary tract in Type 2 received left hepatectomy, including 12 patients with stenosis in the left hepatic duct and 10 patients with stenosis in bilateral hepatic ducts. Intra-operatively, the biliary probe, controlled from small to large, was used to gently and continuously expand the stenosis. All surgeries included bile duct exploration and T-tube drainage.

Stone clearance

The biliary 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).

Surgical complications

There were five cases of postoperative abdominal infection, including three cases of subphrenic abscess and two cases with resectional surface infections, three cases with biliary fistula on the wound surface of the liver (50−200 mL), 15 cases of hepatic dysfunction and five cases of pleural effusion.

DISCUSSION

Hepatectomy could remove stones, diseased bile ducts as well as damaged hepatic parenchyma lesions, with an obviously better efficacy than simple choledocholithotomy or biliary-enteric drainage. Hepatectomy has become the optimal treatment modality for hepatolithiasis and it was relatively safe in the treatment of a single lobe or unilateral hepatolithiasis (11, 12). The hepatectomy in this group was related to single lobe hepatectomy (81 cases), hemihepatectomy (27 cases), lobe hepatectomy and segmental hepatectomy (nine cases) and liver segmental hepatectomy (30 cases). The clearance of hepatolithiasis reached 85%. There was a small amount of residual stones in a small number of cases, whose final stone clearance reached 95.9% after postoperative cholangioscopy.

Preoperative assessment of the typing of hepatolithiasis allowed important decision on the surgical scheme. According to the typing, the distribution of stones could be cleared and the stenosis of diseased hepatic ducts and atrophy of diseased hepatic segments could be understood. Surgery is better when planned; non-planned surgery should be avoided as far as possible. A single surgery procedure to solve the problem could avoid repeated biliary tract surgery (13). In the Type I cases, the involved liver and bile ducts had mild lesions (cylindrical, beaded and cystic dilatations). After hepatectomy to remove the stones, the residual stones could

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 pleurocentesis. Therefore, the key problem of multiple segmental hepatectomy for hepatolithiasis is to prevent and control the postoperative complications and improve surgical safety.

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