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Subadventitial cystectomy in the management of biliary fistula with liver hydatid disease

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ABSTRACT

Biliary fistulas are the most common morbidity (8.2–26%) following hydatid liver surgery. The aim of this study was to evaluate the results of subadventitial cystectomy in the treatment of liver hydatid cyst associated with a biliocystic fistula. The medical records of 153 patients who underwent subadventitial cystectomy for a liver hydatid cyst between January 2006 and December 2010 were retrospectively reviewed. Cysts were located in the right lobe anterior segment 37 (24.2%) patients, right lobe posterior segment 59 (38.6%) patients, the left lobe in 26 (17.0%) patients, and both lobes in 6 (3.9%) patients. The surgical procedures performed were closed (non-incised) subadventitial total cystectomy in 74 patients (48.4%), open (incised) subadventitial total cystectomy in 30 patients (19.6%), and subadventitial subtotal cystectomy in 49 patients (32.0%). Biliocystic communication was found in 52 patients (34.0%), and 21 patients (13.7%) were treated with T-tube drainage. Two patients had performed biliodigestive anastomosis. Biliary fistula was detected in 9 patients after subtotal subadventitial cystectomy. Biliary fistulas closed spontaneously within 10 days and 61 days respectively and the amount of drainage varying between 50 and 400 ml after the procedure. Postoperative complication and recurrence rates were 19.0% and 0.7%, respectively. The mortality rate was 0%. Subadventitial cystectomy should be the surgical treatment of choice for this disease because of its feasibility and low rates of recurrence, complications of the residual cavity, and incidence of associated biliary fistula.

1. Introduction

Echinococcosis is endemic to many parts of the world and is the most frequent cause of hepatic cysts, which are major health problem in the areas where echinococcosis is found despite increased awareness and preventive measures. In China, the most common species is *Echinococcus granulosus*, which is found in Xinjiang, Gansu, Ningxia, Qinghai, Inner Mongolia, Sichuan, and Tibet. Although hydatid disease can develop anywhere in the human body, the liver is the most frequently involved organ (60–70%), followed by the lungs (20–30%) (Da Silva, 2003). Medical treatment has proven to be effective at the larval stage, but its success as a sole measure is limited. As a definitive treatment, surgery is the gold standard for achievement of complete cure of liver hydatid disease (LHD), but preoperative and postoperative chemotherapy have been used to reduce the risk of recurrence (Arif et al., 2008).

Postoperatively, biliary complications of liver hydatid cysts (LHCs) are common and serious and are associated with increased risk of morbidity and mortality. Conservative surgery, or cyst evacuation and partial pericystectomy, is considered simple and safe, but because of invisible bile duct orifices in the hydatid cyst cavity, postoperative transient biliary leakage or persistent fistulas occur in 8.2–26% of cases (Kayaalp et al., 2002; Balik et al., 1999). Early local recurrence and cavity-related complications continue to be the main challenges in the surgical management of LHD (Demircan et al., 2006; Sielaff et al., 2001). Although the rate of recurrence is lower with radical surgery, which involves cystoperi-cystectomy and anatomical hepatic resection, this usually requires a surgeon experienced in liver resection, may also require special

Abbreviations: CT, computed tomography; LHC, liver hydatid cyst; LHD, liver hydatid disease; PBF, postoperative biliary fistula; PMOD, Peng multifunction operative dissector; SC, subadventitial cystectomy; US, ultrasonography; ERCP, endoscopic retrograde cholangiopancreatography; WHO-IWGE, World Health Organization Informal Working Group on Echinococcosis.

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surgical equipment, and is not suitable for every cyst (Aydin et al., 2008; Ezer et al., 2006). Specific tools for identification of biliocystic communication in LHC patients have been developed, but the process is not standardized and can complicate perioperative management (Ormeci et al., 2007; El Malki et al., 2010; Akcan et al., 2010). Each therapeutic modality has limitations depending on the individual case.

It is generally accepted that the adventitia, which is produced from the host tissues, is an integral part of the liver and parasite and is difficult to remove from the liver. However, Peng et al. (2006) reported the existence of a fibrous membrane between the cyst and the liver parenchyma in LHC patients. The fibrous capsule around a hepatic hydatid cyst is a granuloma-like structure covered by the compressed Glisson and hepatic vein systems, with a small gap between them, and the fibrous membrane and the fibrous capsule have been shown to have different mechanisms of formation (Peng et al., 2004a) (Fig. 1). Along this space, hydatid cysts can be completely separated from the liver with less hepatic injury and without spillage of their contents. To distinguish pericystectomy conceptually, the authors called the operation subadventitial cystectomy (SC). The procedure has been accepted by many in the medical community and applied successfully in epidemic areas of China (Da Silva, 2010). Clinical observation has indicated that the new operation prevents relapse, closes the biliary fistula permanently, and reduces the complication rates of the cyst cavities as well as morbidity and lengths of hospitalizations (Peng et al., 2004b). In this study, we report the clinical results of SC performed for the management of perioperative biliary fistula in LHD patients.

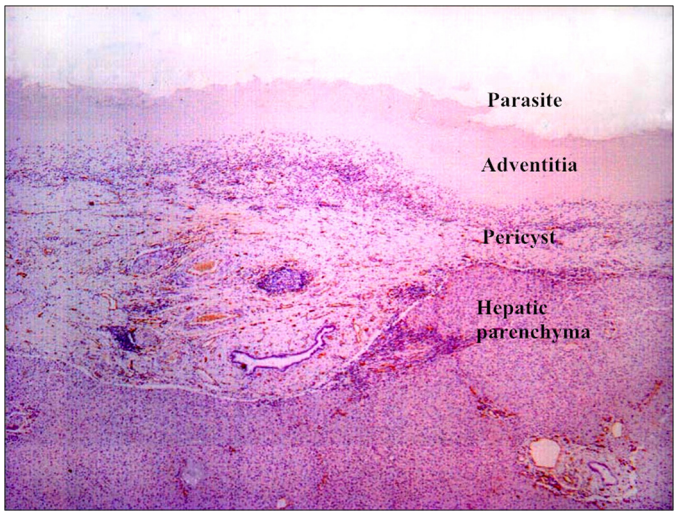

Fig. 1. Hematoxylin and eosin staining, magnification 40×. Pericyst and adventitia were clear respectively. The Glisson system was in succession to pericyst.

2. Materials and methods

2.1. Patient selection and analysis

We retrospectively analyzed the medical records of 153 patients who underwent surgery for LHC at the First Affiliated Hospital, School of Medicine Shihezi University during the period from January 2006 to December 2010. Patients who had percutaneous, laparoscopic management or emergency surgery were excluded. Age sex, main symptoms, preoperative radiological investigations, location of the cysts, surgical procedure performed, postoperative complications, mortality, and mean duration of hospitalization after surgery were recorded for all patients. Surgical procedures were subadventitial total or subtotal cystectomy. In subadventitial total cystectomy, the hydatid cysts can be completely separated from the liver along the subadventitia without damaging the surrounding parenchyma. Large-sized polymorphic cysts affecting extensive areas of hepatic parenchyma or surrounding vital vascular elements are treated with incision and total cystectomy after evacuation-aspiration of contents. Subadventitial subtotal cystectomy, which leaves a small portion of cyst wall remaining in the liver parenchyma, is indicated when the cyst is adherent to large vessels, thereby avoiding the risk of massive hemorrhage.

Patients were selected for treatment according to their condition and the characteristics of the cyst. The cyst contents were evacuated intraoperatively in all patients. Preoperative evaluation of the patients included blood tests (complete blood count, liver function tests, and anti-*Echinococcus* antibody testing) and preoperative abdominal ultrasonography (US) and computed tomography (CT). The cysts were classified according to World Health Organization Informal Working Group on Echinococcosis (WHO-IWGE) guidelines (Eckert et al., 2001). The cysts were measured using US and CT. The number of cysts was determined radiologically and confirmed visually during surgery.

2.2. Surgical procedure

All patients diagnosed with LHD underwent laparotomy, which was performed through an incision created in the midline and extended to the right. The abdomen was opened and the abdominal viscera examined, paying attention to potential sites of cyst dissemination. Sectioning of the liver parenchyma began at the border between the liver parenchyma and the cyst surface. During dissection, careful identification of the potential space between the pericyst and adventitia, the most important aspect of this procedure, was performed. Hydatid cysts can be completely

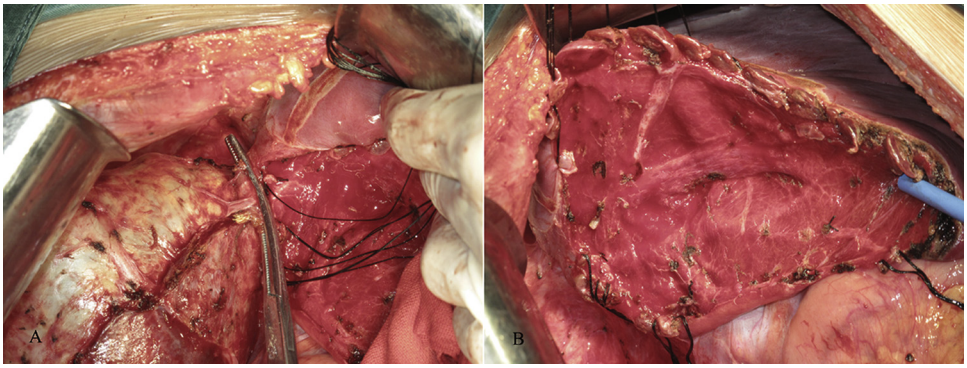

Fig. 2. Closed subadventitial total cystectomy. (A) The duct is dealt with outside the hydatid cyst. (B) Postoperative hepatic parenchyma and intrahepatic vasculobiliary trees after the hydatid cyst was complete resection.