

*Research Article***Anatomical resection of hydatid liver cyst**

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Abstract

Background: Hydatid disease is a serious public health problem in endemic areas, and the management is controversial. Operative treatment is generally accepted especially in patients presenting complications. Our policy is to perform radical surgery and, whenever possible, anatomic hepatic resection. The purpose is to report our experience and results in the management of liver hydatid disease. **Materials and Methods:** Between January 2009 and December 2016 over a period of 8 years (2 years retrospective and 6 years prospective). Twenty patients with hepatic hydatid cysts who underwent segment-based (anatomical) liver resection were included in this study. **Results:** Median patient age was 41 years (range, 21–70 years). A total of 20 hydatid cysts were treated. Anatomical liver resection was done in all patient. There were one postoperative death, and the overall morbidity was 50%. **Conclusion:** The findings of this study suggest that anatomical resection is not associated with much more postoperative and cyst cavity-related complications. In addition, there was a low recurrence rate.

Key words: Hydatid cyst management - Radical surgery –Hepatic resection

Introduction

Hydatid disease is an endemic parasitic condition caused by the larval forms of *Echinococcus granulosus* and *Echinococcus multinodularis*. Worldwide, hydatid disease currently remains one major public health problem, especially in rural areas. (Eckert & Deplazes, 2004).

The main principles of hydatid cyst surgery, originally established more than half a century ago, included complete removal of the parasite and the treatment of the restant cavity, alongside with the preservation of healthy tissue and prevention of intraoperative spillage (Buttenschoen, 2007).

Radical surgery refers to pericystectomy and formal liver resection, whereas conservative surgery involves the removal of the cyst content and sterilization of the residual cavity, together with partial cyst resection (Gavara et al., 2012).

The main goal of the treatment should be parasite elimination, without recurrence and with minimal morbidity and mortality.

Although surgical procedures are considered the gold standard therapeutic option for hydatosis, controversy remains regarding the optimal surgical approach (Abdelraouf et al., 2012).

Patients and methods:

The study was done in Hepatobiliary Surgery Unit in El Minia University Hospital Between January 2009 and December 2016 over a period of 8 years (2 years retrospective and 6 years prospective). Twenty patients with hepatic hydatid cysts who underwent segment-based (anatomical) liver resection were included in this study.

Patient inclusion criteria:

- Child-Pugh class A and early B will be included.
- Isolated hepatic hydatid cyst proved by radiological diagnosis.
- Cyst size > 5cm diameter

Patient exclusion criteria:

- Child-Pugh class C.
- Localized extrahepatic hydatidcysts.
- Cysts < 5cm diameter.

- Patients with congestive heart failure or chronic renal failure.

Surgical steps

A- Basis of surgical technique

For the purposes of this study the operation was divided into 3 phases:

- (1) The hepatic mobilization phase, including laparotomy and liver mobilization.
- (2) The parenchyma transection phase with preliminary inflow vascular control (Pringle's maneuver).
- (3) The hemostasis phase: including hemostasis of the liver cut surface, and abdominal closure.

B- Anesthesia

- General anesthesia and hepatotoxic agents were avoided.
- Central venous catheter was inserted.
- A muscle relaxant was also administered.

C- Position and draping

The same patient position was used for all cases: recumbent, arms spread apart accessible to the anesthesiologists or the right arm tucked alongside the patient.

D- Type of incisions

There were four types of incisions usually used: J-shaped incision, upper median incision, inverted T-shaped incision (Mercedes star shaped) and bilateral subcostal incision.

- **For right lobe lesion**

Makuuchi's incision or J incision, (a "J" incision described by Makuuchi in 1993) was used for hepatectomy of right lobe lesions,

- **For left lobe lesion**

An upper midline incision was done.

E- Mobilization of the liver

The falciform ligament was divided halfway between the abdominal wall and liver until visualization of suprahepatic IVC, then the right triangular, right anterior, and right posterior coronary ligaments were divided medially to the level of IVC. For the left lobe lesion segment II or III, the falciform ligament was divided, and left triangular ligament was divided to the level of left hepatic vein.

F- Intraoperative vascular control

The Pringle maneuver was applied at the time of parenchymal transection and

consisted of cross-clamping the hepatoduodenal ligament (and the aberrant left hepatic artery if present).

G- Identification of the segment to be resected

Segmental resections were undertaken after portal pedicle anatomy was defined by using topographical landmarks as described by Couinaud (1956).

H- Parenchymal transection

Dissection of liver parenchyma was done by crush-clamp, LigaSure or harmonic scalpel. No drugs for protecting the liver from ischemic injury were used during resection.

I- Abdominal closure

Anatomical closure of the abdomen with application of two tubal drains one subhepatic and one pelvic drain. Tubal drain preferred because allow for actual measurement of discharge.

Post-operative follow-up

- **ICU admission:** first operative day
- **Drain care:** At first, blood discharge from the drain, was carefully monitored. If it exceeded 100 ml/h, an emergency laparotomy was performed.
 - If bile was detected in the drain discharge, the tube was left until the fistula closed spontaneously.

Results

This study was conducted in El-Minia University Hospital after being approved by the faculty ethical committee. This study included 20 patients presented to outpatient clinics or admitted in the hospital with radiological evidence of hepatic hydatid cyst. All cysts were initially detected with ultrasound and were further investigated with computed tomography (CT scan), As detected by imaging studies in abdominal U/S The hydatid cyst size range from 6 to 14 cm with mean (SD) of 10.6, (2.3) and The involved segments as detected by preoperative imaging studies, include one segment in 3 patients (15%), 2 segments in 14 patients (70%), and three segments in 3 patients (15%).

Discussion

In our study we reported 3 cases presenting with jaundice, ERCP was done and reveal

Cystobiliary communication that is managed with sphincterotomy and stent insertion for drainage. In the study of Birnbaum et al., (2017) Biliocystic fistula was suspected preoperatively in 17 patients but confirmed in only 9 (52%), while 4 unsuspected Biliocystic fistulas were found during surgery.

In the present study the operative time ranged from 70 to 100 minutes, with mean of 107 minutes, which is comparable with other studies in literature. In the study by Chouillard et al., (2007), the mean operative time was 120 minutes (range, 110–130 min) which was higher than our operative time as those authors performed only anatomic bi- and trisegmentectomy.

In the present study the operative blood loss ranged from 100 to 400 mL with mean of 210 ml. The perioperative required units of blood transfusion are one unit for 7 patients (10%).

In the study by Kammula et al., (2001), the mean blood loss of 407 mL (range 50–2200 mL) that was more than our blood loss. Blood transfusion was required in only 3/24 (12%) patients. In the present study, the mean postoperative hospital stay after surgery for all patients was 2.2 days with a range from 3 to 14 days. This finding is comparable with other studies in literature. The extent of resections and selection criteria of patients might affect the postoperative hospital stay.

Similar to our findings, Kammula et al., (2001) reported mean length of stay was 7.4 days (range 3–14 days), in patients underwent anatomically based resections for benign liver cysts. In the present study, postoperative mortality was reported in one case (0%) during the prospective part of the study. The hydatid cyst aroused from segment VII, VIII (dome of the liver), the tight adhesions between the cyst and the diaphragm made the dissection difficult and hence the diaphragmatic injury occurs, it was repaired and the patient stayed ten days at ICU and death occurred due to chest infection, So that site of the lesion is a critical point in the feasibility of the technique.

In the study of Yagci et al. (2000), Reported postoperative mortality rates range from 0 to 3%. In the present study, there was one patient (7.7%) with specific liver resection complication (bile leak) post-operative from the transection surface of the liver. One patient had Intraoperative cyst rupture (7.7%) due to adhesion of the cyst with the abdominal wall, one patient developed diaphragmatic injury (7.7%).

Recurrence is a major issue, with rates ranging from 1 to 20% (Stoot et al., 2010). In our study, we observed no recurrences in the follow up period over 12–14 months postoperatively likely explanation for the no recurrence after of HR is complete removal of cyst content, pericystic membrane, and daughter cysts located outside the pericyst. Cyst recurrence appears to be the best end point by which to evaluate the results of different therapeutic options for liver hydatid cysts (El Malki et al., 2014).

Conclusion

These findings indicate that anatomical liver resection is a safe procedure in selected patients, and it is comparable with other studies in literature. This confirms several previous reports suggesting that HR could be used safely and effectively for liver hydatid disease.

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