



# Laparoscopic management of hydatid cysts with biliary communication: Clips may rescue when suture fails-report of 3 cases

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## ABSTRACT

Hydatid disease is a parasitic zoonosis caused by the larval form of the Echinococcus worm. Hepatic hydatidosis is the most common form of disease in humans. Centrally located, large hydatid cysts have the tendency to rupture into the adjoining bile duct and form a fistulous communication. Suture closure of the cysto-biliary communication detected during surgery is recommended to avoid postoperative complications related to bile leak. In the era of minimally invasive surgery, laparoscopic management of the cysto-biliary communication can be challenging, and laparoscopic suturing may not always be feasible. Postoperative endoscopic biliary decompression is necessary in such situations, but it has its own set of potential risk and complications. In this case report, we present a simple and easy technique for laparoscopic closure of the cysto-biliary communication when suture ligation is technically not possible.

**Keywords:** Hydatid cyst, laparoscopic, cysto-biliary communication, clipping, bile leak

## INTRODUCTION

Echinococcal hydatid disease is a parasitic zoonosis that is endemic in the Indian subcontinent. The liver is the most commonly affected organ (50%-70%), but other organs such as the lungs, spleen, and brain can also be involved (1, 2). Cysto-biliary communication (CBC) is the most common complication of hepatic hydatid cyst, and its management may pose a challenge during minimally invasive surgery (3). Suture ligation of any detectable CBC is advised; however, it may not always be possible (4).

We report three cases of hepatic hydatid cyst in whom CBC was detected intraoperatively, but laparoscopic suture ligation was not feasible. Laparoscopic clip application was performed to occlude the CBC, thus avoiding the need for conversion (to open surgery) or any postoperative intervention.

## CASE 1

A 62-year-old man presented with complaints of discomfort in the right hypochondrium for 1 month. There was no associated nausea, vomiting, jaundice, or weight loss. General examination of the patient was unremarkable. On abdominal examination, a globular, non-tender lump was palpable in the right hypochondrium. Blood investigations including liver function tests were normal. Abdominal computed tomography (CT) revealed a hydatid cyst size of 12x11x16 cm involving the left lobe of the liver extending up to the perihilar region (Figure 1).

Laparoscopic hydatid cyst deroofing was performed, and daughter cysts and hydatid sand were evacuated. A small (5 mm) CBC with ongoing bile leak was discovered in the cyst cavity. Laparoscopic suturing of the CBC was attempted; however, it was unsuccessful due to the difficult fistula site. Metallic clips were applied to occlude the CBC (Figure 2). Postoperative course was uneventful with no bile leak. The patient remained symptom-free at 3 months follow-up.

## CASE 2

A 65-year-old woman presented with complaints of upper abdominal pain for 2 years with no other relevant history. General examination of the patient was unremarkable. On abdominal palpation, a tender hepatomegaly was found. Hemogram and bilirubin level were normal; however, serum alkaline phosphatase level (440 IU/L) was elevated. CT scan revealed two hydatid cysts in segments VI and VIII (sizes 7x6x6 cm and 4x4x6 cm, respectively) of the liver lying in close proximity to the right biliary system (Figure 3). Magnetic resonance cholangiopancreatogram showed a dilated common bile duct (14 mm) with intraluminal filling defects and a 9 mm focal defect in the posterior cyst wall, suggesting CBC (Figure 4). Endoscopic retrograde cholangiopancreatogram (ERCP) was planned for biliary decompression in view of a possible CBC, followed by laparoscopic hydatid cyst management. At ERCP, cholangiogram revealed few filling defects in the CBC. On balloon sweep, few membranes were cleared from the CBC, and a 10 Fr plastic stent was placed in the right biliary system. Cyst contents were bile stained intraoperatively (Figure 5), and a CBC was present in the segment VI cyst. Laparoscopic suturing was not possible due to the limited intracavitary space. Finally, clips were applied laparoscopically, and the

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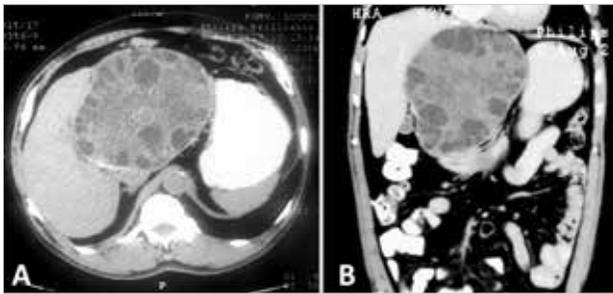


Figure 1. Computed tomography scan of the abdomen showing a large hepatic hydatid cyst in close relation to the hilum

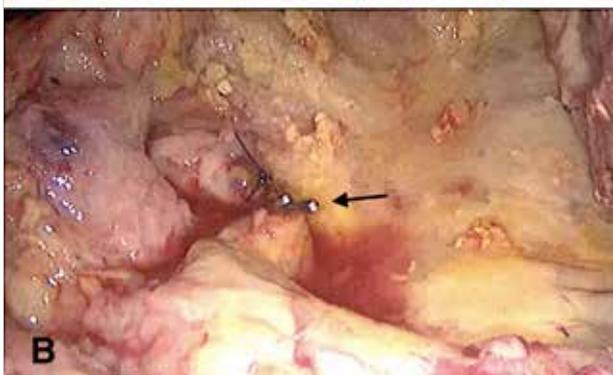


Figure 2. a, b. Laparoscopic image showing bile leak from a cysto-biliary fistula. Suture ligation is being attempted (a). Application of metallic clips successfully occluded the fistula (b)

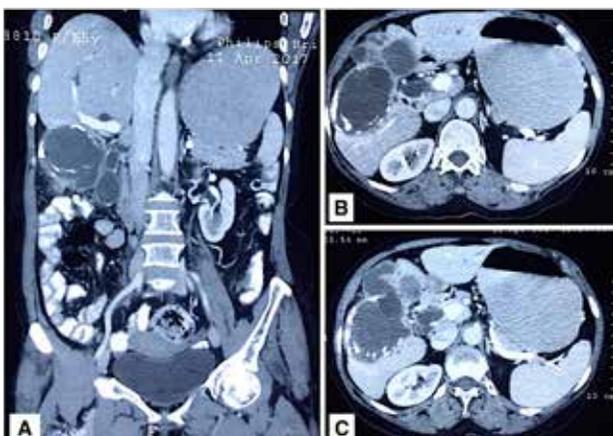


Figure 3. a-c. Computed tomography scan showing two hydatid cysts in segments VI and VIII of the liver lying in close proximity to the right biliary system (a). Coronal section view. Transverse section view (b, c)

CBC was occluded. The patient recovered well and remained symptom-free 6 months post-surgery. An informed consent for publication was obtained from all three patients discussed in this study.

### CASE 3

A 35-year-old woman was admitted for pain in the right hypochondrium and nausea for 3 months. General examination and per abdominal findings were normal except for a small paraumbilical hernia. Blood investigations (including liver function tests) were within normal limits. Abdominal CT demonstrated a hydatid cyst size of 9.5×7.4×7 cm in relation to segment VI of the liver. Laparoscopic hydatid cyst surgery and paraumbilical hernia repair were performed in a single setting. A small (5 mm) CBC was noted along the medial wall of the cyst cavity intraoperatively. Laparoscopic suturing of the CBC was attempted but could not be performed due to the difficult location of the CBC. Laparoscopic endoclipping of the CBC was performed with metallic clips. She had an uneventful postoperative course and remained symptom-free at 8 months follow-up.

### Technique

Between 2009 and 2017, 54 cases of laparoscopic hydatid cyst deroofing were performed at our center out of which intraoperative CBC was detected in 20 patients. Laparoscopic suturing was performed in 12 cases, open surgery in three cases, and postoperative biliary stenting in two patients. Laparoscopic clip occlusion was performed in the above three cases.

The CBC site was clearly delineated after deroofing and evacuation of the cyst contents. The fistula site was grasped with a tip of a Maryland dissector and lifted slightly. Two metal clips (Ligaclip Extra, Ethicon Endo-surgery, LLC, Guaynabo, Puerto Rico, USA) were then applied over the fistula site. The cessation of bile leak indicated successful occlusion of the fistula (Supplementary video file 1). A surgical vacuum drain was placed in all three cases.

### DISCUSSION

Hepatic hydatid disease is a significant problem in endemic areas including India (1-3). The cyst gradually enlarges and compresses the surrounding hepatocytes and biliary radicles. Long standing bile duct compression by the hydatid cyst may result in intrabiliary cyst rupture, leading to the formation of the CBC (5). The incidence of the CBC has been reported in up to 25%-30% of cases (1-3). Diagnosis of the CBC is usually made preoperatively, but sometimes, it can get unmasked during surgery. Occult CBC remains undetected even during surgery and is manifested in the postoperative period as biloma or external biliary fistula (6). The postoperative management of such leaks is challenging and may require invasive procedures, such as endoscopic biliary stenting and percutaneous drain placement. A major laparotomy may rarely become necessary. Thus, intraoperative detection and management of the CBC are crucial.

Preoperative factors indicating the likelihood of the CBC include deranged liver function tests (increased bilirubin or alkaline phosphatase level), leukocytosis (>10,000 mm<sup>3</sup>), perihilar or central location, large size (>10 cm), and dilated biliary radicles on imaging (7, 8). Infrequently, it may be delineated on CT or magnetic resonance imaging (9).

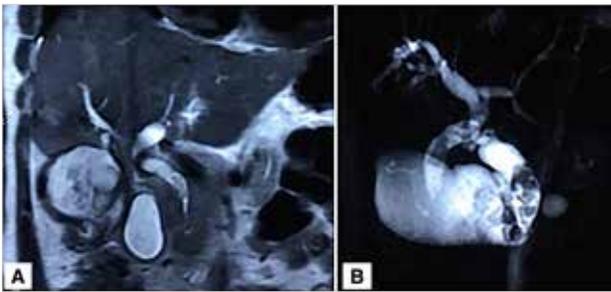


Figure 4. a, b. Magnetic resonance image of the abdomen showing hydatid cyst in segment VI of the liver lying in close proximity to the bile duct (a). Magnetic resonance cholangiopancreatogram showing dilated biliary system with filling defects (daughter cysts) in the common bile duct (b)



Figure 5. Bile stained hydatid cyst contents, suggesting a cysto-biliary fistula

All CBCs detected intraoperatively should be meticulously addressed. With the advent of minimally invasive approaches, laparoscopic hydatid cyst deroofing is increasingly performed offering several advantages (10). However, management of concomitant CBC can sometimes be challenging with this approach. Difficult fistula site, limited intracavitary space, and surgeon's inexperience may occasionally render laparoscopic CBC suturing unachievable. In all three of our cases, laparoscopic suture ligation was not possible due to the difficult location and limited access. Metal clips were applied, and bile leak stopped instantaneously, thus avoiding any postoperative morbidity and need of postoperative ERCP. Clip slippage is a potential drawback; however, no such complication was encountered in the present case series.

## CONCLUSION

Laparoscopic suturing of the CBC encountered during hydatid cyst surgery may be technically challenging. Laparoscopic clipping can successfully occlude the CBC in difficult cases. It is a cheap, reproducible and effective technique of CBC management.

**Informed Consent:** Written informed consent was obtained from patient who participated in this study.

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**Conflict of Interest:** The authors have no conflicts of interest to declare.

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**Supplementary video file 1.** Successful closure of the cysto-biliary communication with clip application

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