

Review Article

Surgical management of hepatic hydatid disease

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ABSTRACT

Hydatidosis is strictly a zoonosis. Humans are an accidental host. The disease is endemic in rural agricultural areas. However if acquired by humans, it can cause extensive spread affecting a wide range of organs with predilection for the liver. Managing such cases requires a sound fundamental knowledge of the parasite and its pathogenicity. It is essential that surgeons who deal with such cases have a good working knowledge of the disease. The approaches to hepatic hydatids with respect to the principles of surgical treatment are presented in this article.

Keywords: Hydatid echinococcus granulosus, Liver diagnosis treatment

INTRODUCTION

Hydatidosis is a zoonotic infection caused by the tapeworm *Echinococcus* (E). Of the various species, *E. granulosus* and *E. multilocularis* cause disease in humans. Man is an accidental intermediate host for this parasite. Infection is acquired by ingestion of parasitic eggs released in the feces of the definitive host containing the adult worm in its intestines. On accidental ingestion by the intermediate host, the eggs hatch and migrate to a variety of tissues to form a multilayered cyst which is termed as primary echinococcosis. The commonest site is the liver followed by the spleen.^{1,2} Rupture can cause disseminated hydatid disease with cysts at various locations within the peritoneal cavity and thorax as well.¹

Structure of the cyst

The typical hydatid cyst consists of three layers: the outermost layer is the pericyst formed by the compressed liver tissue and fibrous tissue reaction mounted by the host organ. The middle layer is the endocyst to which is attached the innermost layer or the germinal layer.³ The

scolices are attached to the germinal layer. Within the cyst, multiple daughter cysts are formed. The cyst contains fluid which increases the intracavitary tension thereby allowing it to increase in size and making it prone to rupture. The hydatid fluid contains hydatid sand, brood capsules, scolices and daughter cysts.^{3,4} The fluid is highly antigenic and can precipitate an anaphylactic reaction.

Diagnosis

The clinical features of hepatic hydatidosis range from symptoms of feeling of heaviness and occasional pain in the right hypochondrium to massive hepatomegaly. In majority of cases the cysts are asymptomatic until they attain a very large size. Serological tests may be reliable. However, the incidence of false positives is high. Immunoelectrophoresis typically exhibiting the 'arc 5' phenomenon and ELISA for IgG against antigen 5 are highly suggestive of hydatid disease.^{5,6} Plain chest X-ray shows elevated dome of diaphragm on the right side (Figure 1). In cases of rupture into the pleural space, the pulmonary hydatid exhibits the typical 'water-lily'

appearance. Ultrasound (USG) has high sensitivity and specificity in the diagnosis of hydatidosis.⁵ The site, size and contents of the cyst can be easily ascertained. However, the cyst-biliary communication cannot be documented.

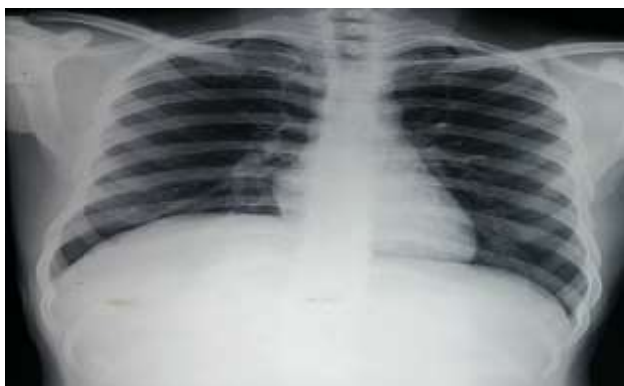


Figure 1: Chest x-ray showing elevated right dome of the diaphragm in a patient with a large hepatic hydatid cyst.

Contrast enhanced CT scan (CECT) will confirm all the USG findings as well as show the presence of cyst-biliary communications.^{6,7} The typical multiloculated cyst with internal septations is seen (Figure 2). If there is intrabiliary rupture of the cyst evidenced by jaundice then MRCP or therapeutic ERCP can be done to improve the patient's condition preoperatively.⁸

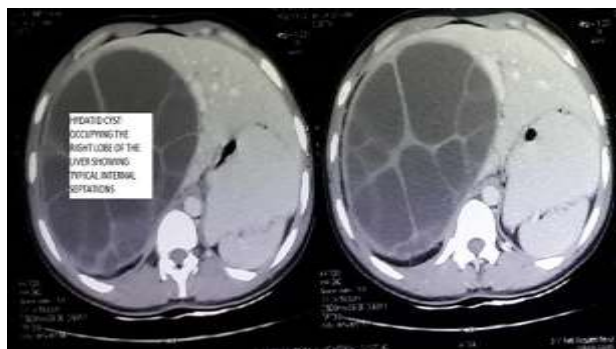


Figure 2: CECT showing a large hydatid cyst occupying almost the entire right lobe of the liver. Multiple internal septations are seen.

Preoperative preparation

Every patient with a confirmed diagnosis of a hepatic hydatid is administered anthelmintic therapy with a view to sterilize the cyst contents.⁸⁻¹⁰ Albendazole 400 mg twice a day is commenced 15 days prior to surgical intervention. The efficacy of preoperative anthelmintic therapy is questionable but still continues to be a promising approach to the management. Liver function also needs to be assessed. Vitamin K should be administered in cases where the PT/INR is altered. Assessment of the chest for pulmonary involvement is

essential as an elevated dome of diaphragm may cause basal atelectasis or infection.¹¹

Principles of surgery

The decision for surgical intervention depends upon two factors: patient's condition and the characteristics of the cyst.¹² Small deeply situated cysts can be left alone. Elderly patients with calcified cysts can also be treated conservatively. However large cysts occupying a significant portion of the liver volume have to be treated surgically.^{5,8,9} The principles of surgical management for hepatic hydatids are

- Neutralization and removal of the parasite.
- Prevention of intraoperative contamination.
- Management of the residual cavity.

The content and the fluid which is highly antigenic and infective is sterilized prior to the opening of the cyst. A variety of agents such as 3%-20% hypertonic saline, 0.5% silver nitrate (AgNO₃) or 0.5% cetrimide are used.⁹ However, utmost care needs to be exercised to prevent the entry of these agents into the biliary system as they may cause sclerosing cholangitis in patients with cyst-biliary communications. The pericyst is derived from the surrounding compressed liver tissue. There is an extensive vascular layer adjacent to the pericyst. Therefore, any attempt to excise the pericyst is accompanied with torrential bleeding and damage to the complex adjacent biliary radicals.

Two approaches have been described for managing hepatic hydatids. The radical approach involves an en-bloc resection of the cyst by partial hepatectomy which is usually a non-anatomic resection performed at a safe distance from the pericyst.^{11,12} The non-radical alternative is a cystectomy which consists of de-roofing of the cyst after aspiration of all the fluid. The fluid is first sterilized and then aspirated. The liver substance overlapping the cyst is incised between stay sutures to gain access to the cyst cavity. The glistening white membranes are immediately visible after complete incision of the pericyst (Figure 3).

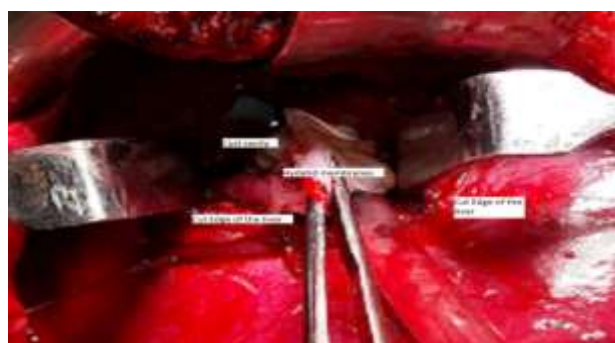


Figure 3: The pericyst has been incised and reveals white hydatid membranes after performing hepatectomy.

Utmost care needs to be exercised to prevent contamination of the surrounding area from spillage of the cyst contents, achieved by packing the surrounding area with towels soaked in hypertonic saline, preferably of a dark color in order to identify even the slightest of spillage. The contents of the cyst are completely evacuated (Figure 4). A scolicedal agent is then left inside the empty cyst cavity for 15 minutes followed by aspiration.



Figure 4: Contents of the hydatid cyst removed.

Obliteration of cavity is the next priority. This can be achieved by capitonnage, introflexion or omentoplasty.¹¹ Capitonnage involves obliteration of the cavity by taking internal sutures within the cavity to obliterate it. However, there is likelihood of damage to the adjacent biliary structures. Introflexion method involves suturing the outer surface layers of the cyst to the bottom of the cavity. Omentoplasty is the safest and the best method. It absorbs the residual fluid as well as allows the macrophages to invade the cyst cavity and prevent recurrence of the cyst. The omentoplasty has to be fixed with absorbable suture materials in order to prevent slippage of the omentum. Intracavitary drainage can also help to prevent re-accumulation of fluid within the cyst. Minimally invasive techniques have also been in practice for managing the hepatic hydatids. A partial or total cystectomy can be done laparoscopically using an umbrella trocar. However, obliteration of the cavity is difficult in cases of laparoscopically managed cysts.

A clean mob is packed within the cyst cavity and removed. The mob is examined for any bile staining suggestive of a cyst biliary communication. However the exact location of the bile leak can best be identified by inserting a laparoscope into the cyst cavity (Figure 5). In the event of a leak, under-running sutures with an absorbable material can be used to close the leak. Despite meticulous measures being taken, yet a biliary fistula may develop in a few cases postoperatively. Such cases can be managed conservatively. Endoscopic sphincterotomy can be done to enhance the drainage, which can decrease the volume of the bile leak.

Incidental cholecystectomy may be required in a select few cases wherein the gallbladder is stretched over the

enlarged cyst.¹² This will enable better access to the cyst. In case of a cyst biliary communications, wherein the common bile duct (CBD) contains daughter cysts, a formal open CBD exploration is indicated. All the daughter cysts within the common bile duct need to be evacuated. An intraoperative choledochoscopy is essential to ensure complete clearance of the CBD. A T-tube is left behind to enhance decompression and ensure the healing of the CBD.



Figure 5: Laparoscope introduced through the hepatotomy into the cleared cyst to confirm completed evacuation of the contents and to look for any bile leaks.

Adequate drainage is pivotal after surgery for hepatic hydatids. A subphrenic drain is of utmost importance as this prevents a subphrenic collection in a suddenly developed dead space caused by collapse of the cyst. A subhepatic drain should be placed to prevent any collection resulting from posterolateral trickle of fluid from the subphrenic space. If omentoplasty is deferred then a third drain placed in the cyst cavity is helpful in preventing re-accumulation of fluid in the cyst cavity. Passing a laparoscope through a hepatotomy incision after the complete evacuation and sterilization of the cyst cavity helps to prevent any residual daughter cysts or any fluid.

Pair therapy which comprises of percutaneous puncture of cyst under USG guidance, aspiration of the contents, infusion of a scolicedal agent and re-aspiration has been described.¹³ However this method is more commonly practiced in areas where the hydatid cyst is uncommon. The recurrence rate of this method is extremely high and therefore is not advocated for hepatic hydatids.

In endemic areas, de-roofing of the cyst with omentoplasty is the best option. It ensures complete evacuation of the cyst contents, sterilization of the cyst cavity and avoids damage to the residual hepatic parenchyma.^{14,15}

Chemotherapy is essential postoperatively for a period of three months. Albendazole in the dose of 10 mg/kg daily is useful in preventing recurrences. However, liver

enzymes need to be monitored while the patient is on chemotherapy.¹⁰

CONCLUSION

USG and CECT are diagnostic investigations for hepatic hydatids. Preoperative chemotherapy for at least 15 days followed by open surgery continues to be the gold standard for managing hepatic hydatids. Intra-operative identification of cyst biliary communication is essential to prevent biliary fistulas.

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