



# Managements and Outcome of Complicated Liver Hydatid Cysts

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## Abstract

**Background:** Hydatid Disease (HD) still remains an important health problem in developing countries. In this study we evaluated the clinical features, management and outcome of patients with complicated liver (HD).

**Methods:** In a retrospective study, we reviewed the records of patients with liver (HD) operated in our department from January 2004 to January 2015. Number of cysts, location, signs and symptoms, operative procedures, postoperative complications, and hospital stay were collected.

**Results:** A total of 352 patients were operated for liver (HD). 73 (20%) of the Patients were complicated. 41 patients were male and 32 were women. The most common preoperative complications were intrabiliary rupture (33%) and suppuration (22%). The most common presentations were chest and abdominal pain (72.5%) and fever (56%). Surgical procedures were unroofing and drainage in (22%), peri cystectomy, drainage, choledochotomy, choledochoduodenostomy, tube placement and sphincterplasty in (46.5%) of patients with in intrabiliary rupture were. In interapleural rupture were Thoracotomy, pherenotomy, liver cystotomy, drainage (7%) and pulmonary parenchymal rupture were Thoracotomy, decortication, liver cystotomy and drainage (5.5%). Intraperitoneal rupture cases underwent laparotomy, evacuation, irrigation and drainage (5.5%). One patient (1.36%) died. postoperative morbidity rate was 55%.

**Conclusion:** Complicated liver hydatid cysts show different manifestations and surgical management is difficult. Although postoperative complications are high, they can be managed successfully with favorable results.

**Keywords:** Hydatid disease; Complications; Surgery; Pherenotomy

## Introduction

Hydatid cyst is a parasitic disease with worldwide distribution. Human hydatid cyst is still a serious health problem in some countries and remains endemic in many parts of the world, such as Iran [1,2]. Liver is the most common organ frequently involved (70% to 85%), followed by the lungs (25% to 15%) and various other organs (5-10%) [3-6]. Most individuals who contaminated with this parasite are young and the majority of them are younger than 40 years old [1,2-7]. Liver hydatid cysts usually remain asymptomatic until the time of complication, and the clinical presentations in these patients depend on cyst status (intact or ruptured). Patients may be asymptomatic for a long times and usually present with non-specific symptoms [8]. Hydatid cyst can develop any of the complications which can be life threatening unless treated early [2,3]. Rupture may occur during antihelminthic therapy or percutaneous aspiration and trauma, can lead to severe complications, such as intrabiliary rupture and jaundice, intraperitoneal rupture and anaphylactic reaction, liver abscess, intera pleural and parenchymal rupture [9]. Echinococcal cysts always carry the risk of rupture with anaphylactic potential and the risk of spillage to healthy viscera [7]. Many factors may be accounted for the rupture, such as trauma or coughing, increase intra abdominal pressure or expansion of the cyst size. The clinical picture of complicated cysts is variable and depends on the location of the perforation [10,11]. The cysts remain asymptomatic for many years, but as their size increases, symptoms and complications arise. Adjacent structures and organs can be involved

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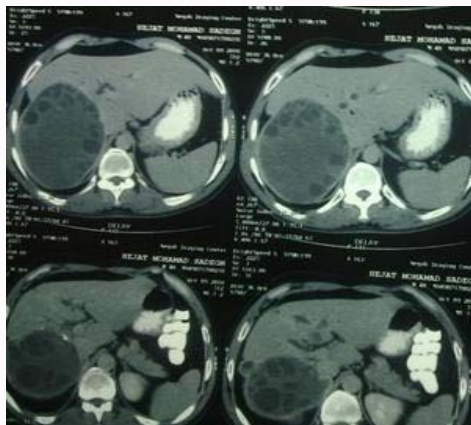


Figure 1: Intrabiliary rupture.



Figure 2 and 3: Bile stain of laminated membrane.

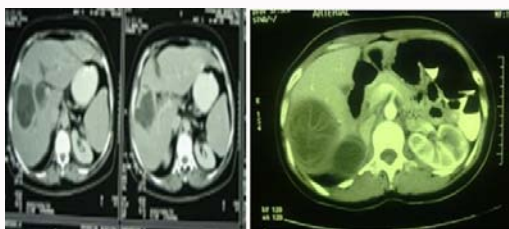


Figure 4 and 5: liver abscess.

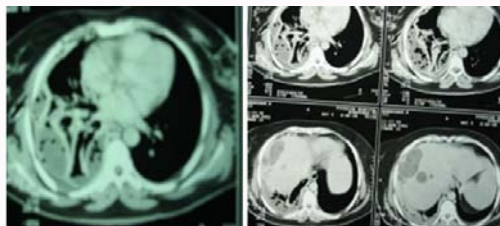


Figure 6 and 7: Intrapleural rupture and empyema.



Figure 8 and 9: Partially or complete calcified pericyst layer.



Figure 10: Compression on the extra hepatic biliary duct and jaundice.

with the formation of fistulous tracts. Daughter cysts, which develop inside the primary cysts, can be disseminated into the biliary tree, pleura, bronchi or the peritoneal cavity [7]. In most cases, solid remnants of the collapsed parasitic membrane are left in the cavity as a source of recurrent infection [1]. The most Common symptoms, if present, are upper abdominal discomfort and pain, poor appetite and abdominal mass. If cysts rupture into the bronchi system, severe cough may develop, followed by expectorant of hydatid fluid and membranes of cystic [12]. Complications may include the following: Hepatomegaly, Jaundice, Biliary colic-like symptoms, Cholangitis, Pancreatitis, Liver abscess, Portal hypertension, Ascites, Cyst rupture, peritoneal spread, peritonitis, Hemophilia, Biliary fistula to skin, bronchial system, or gastrointestinal tract [7]. Surgery is traditional and established treatment for liver hydatid cysts [7-13]. In this study we retrospectively assessed a series of patients with liver hydatid cyst who had been treated in Razi hospital in Rasht and reviewed their clinical presentation, diagnosis, surgical treatment and postoperative outcome. The aim was to review the problems encountered in treating complicated liver hydatid cysts.

### Methods

In this study we evaluated retrospectively all Patients with complicated hepatic hydatid cysts who were treated surgically between January 2004 and January 2015 in Razi hospital, Rasht,

North of Iran. Preoperative diagnosis was based on history, clinical examination, abdominal Ultra Sound (US) and Computerized Tomography (CT). Liver function tests, immunologic, serologic tests and blood eosinophils have very low sensitivity and therefore were not used in routine practice [2]. The definition of Complicated Liver Cyst patients are, if presented with the following symptoms: (a) preoperative diagnosis of intrabiliary rupture with jaundice and possibly Cholangitis (Figure 1), (b) preoperative diagnosis of intrabronchial rupture, (c) intraoperative diagnosis of peritoneal perforation (Figure 2 and 3) and (d) intraoperative cyst aspiration demonstrating bile-stained or purulent content, (e) liver abscess (Figure 4 and 5), intrapleural rupture (pleural effusion or empyema) (Figure 6 and 7), (f) bile-stained sputum and daughter cysts in the sputum content (g) Partially or complete calcified pericyst layer of cysts (Figure 8 and 9), (h) Compression on extra biliary duct and jaundice (Figures 10-12). All Patients with liver hydatid disease with jaundice and biliary tree obstruction were subjected to Endoscopic Retrograde Cholangio Pancreatography (ERCP) for identification of the cystobiliary tree communication and bile duct drainage or even sphincterectomy. Magnetic Resonance Cholangio Pancreatography (MRCP), another diagnostic tool which is available during the recent years, was not used in our patients. In cases with acute abdomen, at first laparotomy was performed and during exploration definitive diagnosis was identified, in cases with intrapleural rupture and with tension hydropneumothorax at first a tube thoracotomy was inserted and definitive surgery was performed in stable time. In cases with



Figure 11: T-tube cholangiography.



Figure 12: Intrapleural rupture and effusion.

liver abscess, laparotomy and evacuation and drainage were done. The choice of operative approaches depended on the location of the cyst and the preference of the surgeon. Intraoperatively, the operative field was carefully isolated by sponge with saline solution (5% to 7%). All Patients with liver hydatid disease with jaundice and biliary tree obstruction were subjected to Endoscopic Retrograde Cholangio Pancreatography (ERCP) for identification of the cystobiliary tree communication and bile duct drainage or even sphincterectomy. Magnetic Resonance Cholangio Pancreatography (MRCP), another diagnostic tool which is available during the recent years, but we didn't used in our patients. In cases with acute abdomen, at first laparotomy was performed and during exploration, definitive diagnosis was identified, in cases with intrapleural rupture and with tension hydropneumothorax at first, a tube thoracotomy was inserted and definitive surgery was performed in stable time. In cases with liver abscess, laparotomy and evacuation and drainage were done. The choice of operative approaches depended on the location of the cyst and the preference of the surgeon experience. Intraoperatively, the operative field was carefully isolated by gauze packs soaked with scolicidal agent (10% hypertonic solution) in order to prevent any inadvertent spillage to the peritoneal cavity during the procedure. Our approach included, aspiration of the cyst contents, if bile-stained or purulent content was found, the cystectomy and evacuation of cavity was next step. The cavity was carefully examined for sites of bile leakage. Management of the residual cavity in our study was external drainage that performed with foley catheter or captonage and in intrabiliary rupture were partial peri cystectomy, drainage, Choledochotomy, choledochoduodenostomy, Choledochotomy, T-tube placement [11], and Choledochotomy and sphincterplasty. In Interapleural rupture, Thoracotomy, pherenotomy, liver cystotomy and drainage. Medical treatment with albendazole for hydatidosis was administered for a seven day preoperative in elective cases and was followed postoperatively to all patients undergoing surgery generally for those with suspected residual disease or peritoneal spillage in order

Table 1: Demographic profile and topographic distribution of patients with complicated liver hydatid cyst.

variables	No. of patients
Male	41
Female	32
Rural	49
Urban	24
Solitary cysts	21
Multiple cysts	34
Bi-lobar cysts	18
(R) Lobe cysts	45
(L) Lobe cysts	28

Table 2: Demographic profile and topographic distribution of patients with complicated liver hydatid cyst.

variables	No. of patients
Male	41
Female	32
Rural	49
Urban	24
Solitary cysts	21
Multiple cysts	34
Bi-lobar cysts	18
(R) Lobe cysts	45
(L) Lobe cysts	28
Chest wall pain	6
Dyspnea	9
Cough	12
Sputum	8
Bill stain sputum	6
Doughter cyst in sputum	3
Hemoptysis	3

to prevent postoperative recurrence. Albendazole was administered postoperatively for those patients with suspected residual disease or peritoneal spillage in order to prevent postoperative recurrence. Albendazole 10 mg/kg/day was administered postoperatively in three cycles of 28 days followed by a 14-day free interval for a total of 3 cycles. CBC, Liver and kidney function tests were scheduled regularly.

## Results

A total of 352 patients were operated for liver hydatid cysts. 73 (20%) of the Patients were complicated and included in our study. 41 patients were male and the rest were women. Most of patients (n=49) were living in rural places (Table 1). The most common presentations were chest and abdominal pain (72.5%) and fever (56%) (Table 2). The most common preoperative complications were intrabiliary rupture (33%) and suppuration (22%) (Table 3). Conservative procedures were performed in cysts with pericyst calcification with albendazole (13.5%). Surgical procedures were unroofing and drainage in suppuration (22%), in intrabiliary rupture was partial peri cystectomy, drainage, choledochotomy, choledochoduodenostomy, choledochotomy, T-tube placement and choledochotomy, sphincterplasty (46.5%). In Interapleural rupture were thoracotomy, pherenotomy, liver cystotomy and drainage (7%) and pulmonary

**Table 3:** preoperative complicated forms of liver hydatid cysts.

Type of complications	NO
Minor Intrahepatic duct rupture	18
Major Intrahepatic duct rupture	6
Suppuration	16
Intrahepatic Peritoneal perforation	4
Intrahepatic rupture + suppuration	10
Interpleural rupture + suppuration	5

**Table 4:** Postoperative morbidity.

Morbidity	NO %
Fever	10
Respiratory infection	4
Wound infection	10
Biliary fistula Recurrence	6
Persistent air leak	2
Hemoperitoneum	2
Atelectasis	6
Atelectasis	6

parenchymal rupture were thoracotomy, decortication, pherenotomy, liver cystotomy and drainage (5.5%). Intrahepatic rupture cases underwent laparotomy, evacuation, irrigation and drainage (5.5%). There was only one mortality (1.36%) in patient with common bile duct rupture. The postoperative morbidity rate was 55%. The types of complications are demonstrated in (Table 4). Rupture was thoracotomy, pherenotomy, liver cystotomy and drainage (7%) and pulmonary parenchymal rupture were thoracotomy, decortication, pherenotomy, liver cystotomy and drainage (5.5%). Intrahepatic rupture cases underwent laparotomy, evacuation, irrigation and drainage (5.5%). There was only one mortality (1.36%) in patient with common bile duct rupture. The postoperative morbidity rate was 55%. The types of complications are demonstrated in Table 4. Right subcostal incision was the most prevalent incision performed (86%). The most common surgical procedures were aspiration, cystostomy and evacuation of cavity, peri cystectomy with external drainage in 83 cysts. Additionally, 15 of the patients underwent choledochotomy due to intrahepatic rupture involving the common bile duct, followed by subsequent management of the duct with choledochoduodenostomy. Other surgical complications were biliary fistula, intra-abdominal abscess, residual cavity abscess, wound infection, and hemorrhage. Respiratory infection, persistence air leaks, hemoperitoneum and atelectasis treated conservatively. Two patients with persistent biliary fistula treated with ERCP and pherenotomy. Mean hospital stay was 21.6 days. Mortality was seen in one patient (1.36%) due to cholangitis and sepsis (Table 4).

**Discussion**

In this study we evaluated retrospectively all Patients with complicated hepatic hydatid cysts in Razi hospital in Rasht, North of Iran. The incidence of complicated liver hydatid cyst in various studies ranges between one-third to as high as 60% [6-14]. In our series, 73 of the patients treated for echinococcal cysts had Complicated Liver Cyst. This finding is lower than other reports [7]. The majority (23%) of these were detected preoperatively, representing a low rate compared with other series (30.3% to 34.7%) [15,16]. But in some report CLC (complicated liver cyst) are high [7,8-14]. The most

frequent complications were intrahepatic rupture and suppuration of the cyst, which is also a repeated finding in literature [4-7]. The most common tools for diagnosis in this study were Ultra Sound, CXR, CT-scan and ERCP that is compatible with other studies [1,4,5]. Three of our patients underwent ERCP and sphincterectomy but failed, because of impacted cyst element in the CBD. For Complicated Liver Cyst, Open surgery was the preferred treatment modality in this study, because inter operation may need additional procedures. We used Conservative surgical procedures more frequently in our study (aspiration, cystostomy, evacuation and external drainage). Cyst location and size, presence and type of complications and surgeons experience also influenced the choice of operative approach. Our approach for cysts of posterior segment of liver are posterolateral thoracotomy, this approach is very simple to access to the cysts [1-7]. Recently, many surgeons are favor total peri cystectomy and liver resections for Complicated Liver Cyst, because they demonstrated this approach has lower recurrence rates [8]. We didn't use these radical surgical because mortality and morbidity is higher than conservative surgical procedures [1-8]. For Complicated Liver Cyst, Open surgery was the preferred treatment modality in this study, because inter operation necessity for additional procedures technical. We used Conservative surgical procedures more frequently in our study (aspiration, cystostomy, evacuation and external drainage). Cyst location and size, presence and type of complications and surgeons experience also influenced the choice of operative approach. Recently, many surgeons are favoring total peri cystectomy and liver resections for Complicated Liver Cyst and no complicated cyst because they demonstrated this approach has lower recurrence rates [8]. We didn't use these radical surgical because mortality and morbidity is higher than conservative surgical procedures [1-7,8]. Infection or abscess formation of liver hydatid cysts was encountered in 16 of cysts in our series. These are very common complications [7,8-17]. The cystobiliary communication is the more frequent cause of infection [15-19]. Clinical manifestations in acute cyst infection are fever, chills, sepsis, and increased pain [7], as our patients. Although intrahepatic perforation of liver hydatid cysts is rare, but it is dangerous (4 patients in our series). Abdominal traumas along with large, superficial cysts in the anterior and inferior part of liver are predisposing factors in cyst perforation [9,13,20]. Clinical presentation in this condition includes acute abdomen, skin rash and anaphylactic shock. Peritoneal perforation is sometimes silent, and causes dissemination and secondary abdominal echinococcosis [7-9]. Laparotomy and removal all of the cysts and profuse peritoneal irrigation with scolicedal agents (providing- idon 10%) to prevent recurrence were our approach. Hypertonic sodium chloride is used in some study [7]. Intrahepatic perforation of hepatic hydatid cysts are the most frequent complication with an incidence rate of 1% to 25% [8-12,14,16,21-23]. Cystobiliary communication may diagnose preoperatively or intraoperatively when the cyst content is bile-stained [7-13,24]. Intrahepatic rupture may be either silent or symptomatic [12,25,26]. 62 of our cases were symptomatic and 11 were silent. In our series intrahepatic rupture in small bile ducts usually are Silent preoperatively. While perforation involved larger ducts, daughter cyst or particle of laminated membrane migrate into CBD or probably intrahepatic bile tree and can obstruct the biliary tree and cause jaundice, biliary colic, cholangitis [7-25,26], in our study 4 cases was presented with obstructive jaundice. The management of cystobiliary communication depends on the preoperative or intraoperative condition [13,24]. Our approach for orifice of biliary system in evacuated cavity is obliteration of the small

communicating fistula with stitch. Other methods are capitonage for obliteration of the remnant cavity and partial peri cystectomy and a fully Cather was placed in cyst cavity. The mean time for remove of fully Cather was 15 to 30 day. All cases with preoperative cholangitis, jaundice with dilatation of common bile duct, evacuation and cleaning cavity of the cyst is the first and Choledochotomy with irrigation and cleaning of the common bile duct and common hepatic duct from hydatid cysts and parasitic debris second step as other studies [8]. Other approaches are choledochoduodenostomy or T-tube placement [8]. Intraoperative cholangiography usually used for remnant parasitic material inside the hepatic biliary tree or to detect the cystobiliary communication [21-23]. ERCP is a valuable adjunct tool in the management of complicated liver hydatid cyst [7,24,25]. Preoperatively indications of ERCP are acute cholangitis and when hydatid material is detected inside the common bile duct [24]. Postoperative Indications for ERCP and sphincterectomy are biliary fistula with persistent high output, remaining hydatid element in the common bile or hepatic duct, and obstructive jaundice [25]. Persistent fistulas usually close 5–7 days after sphincterectomy [26]. As three case of our patients, which biliary fistula closed in 8 to 10 days. Cysts located at the dome and posterior segment of the liver may penetrate into the diaphragm and extend to the pleural space and parenchyma of the lungs, as four cases of this study. Liver hydatid cysts can involve the pleural space and lung from 0.6% to 16% thorough diaphragm (as 0.9% of patients in our series) [2,4,18,27]. Diaphragm perforation could lead to intrapleural effusion or empyema, or penetration of lung parenchyma result in pneumonitis or lung abscess. Ruptures of hydatid cyst to the bronchial tree, daughter cysts or other elements may appear in the sputum with coughing [2,4,7,18,27]. If broncho biliary fistula occurred with cough and expectoration, bile and daughter cyst appear in the sputum [7,19,28]. Surgical treatment in such conditions are thoracotomy, decortication, closure of involved bronchial fistula, wedge resection, segmentectomy, or lobectomy, phrenotomy, management of the liver cyst, and abdominal and thoracic drainage [1,2,19]. In cases with effusion or empyema, thoracotomy is more appropriate approach [1,18,19,28]. Laparotomy approach is selected when hydatid cyst element ruptured in the common bile duct [18,19]. Four of our cases with broncho biliary fistula and Concomitant intact pulmonary and complicated liver hydatid disease were successfully treated by one stage postero-lateral thoracotomy and phrenotomy. Eight of our cases with biliary rupture of liver hydatid disease were successfully treated with laparotomy. In all complicated liver hydatid disease chemotherapy (albendazole) was used postoperatively as others [7]. In conclusion, complicated liver hydatid cysts represent a special condition and can be life threatening. Its management is surgery and procedures depend on the surgeon's experience. Intraperitoneal rupture is fulminant and fatal complication so needs immediate management. ERCP is a simple procedure in the cases with interbiliary rupture and obstructive jaundice. Endoscopic sphincterotomy either preoperatively or postoperatively are valuable procedure in order to avoid major surgery. Thoracotomy is a valuable procedure for cysts of dome and posterior segment liver [20,29,30].

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