

Acute Intraperitoneal Rupture of Hydatid Cysts

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Abstract

Background: Rupture into the abdominal cavity is a rare but serious complication of hydatid disease. The cysts may be ruptured after a trauma, or spontaneously as a result of increased intracystic pressure. Rupture of the hydatid cyst requires emergency surgical intervention.

Methods: Seventeen patients received surgical treatment for intraperitoneal rupture of the cysts over a period of 18 years. Age, gender, time to surgery from the onset of the symptoms, laboratory findings, diagnostic procedures, surgical treatment modalities, in-hospital stay, morbidity, mortality and recurrence were evaluated retrospectively.

Results: Five cases (29.4%) had a history of blunt abdominal trauma. Ultrasonography scans revealed intra-abdominal fluid in all cases. Intraperitoneal multiple cysts with heterogeneous cavity or cystic structures in the liver were shown in 14 cases. Computed tomography and magnetic resonance imaging showed multiple cystic lesions in the liver and peritoneum with intra-abdominal free fluid. Procedures to fill the cystic cavities were applied after removal of the intraperitoneal fluid. Four patients (23.5%) died in the early postoperative period. A total of nine morbidities developed in six patients (35.3%). Median hospital stay was 18 days and median follow-up was 78 months. Intra-abdominal recurrence occurred in one case (7.7%).

Conclusions: Rupture of hydatid cysts into the peritoneal cavity, although rare, presents a challenge for surgeons. This pathology should be included in the differential diagnosis of acute abdomen in endemic areas. Computed tomography scan, in addition to clinical presentation, is essential for diagnosis. Emergency surgery is the main treatment for acute ruptured hydatid cysts. The morbidity and mortality rates of surgical interventions for ruptured hydatid cysts are higher than the rates for elective uncomplicated cases.

Human hydatid disease usually occurs by infestation with *Echinococcus granulosus* and less frequently with *Echinococcus multilocularis*.^{1–3} Although reported from several countries, the disease is endemic in South America, in the Mediterranean region, Far East, and Middle East.^{3,4} In Turkey it is still an important public health issue, with prevalence rates of 585 and 291 per 100,000 population in 1991 and in 1999, respectively.⁵ Fifty to seventy percent of the cysts caused by *E. granulosus* are in the liver.^{1–4} Complications of hepatic

hydatid cysts are rupture and secondary bacterial infection.^{2,3,6} The cyst may be ruptured after a trauma, or spontaneously as a result of increased intracystic pressure. Superficially located cysts, large cysts, and viable cysts with high pressure are especially prone to rupture into body cavities such as the pleural space and peritoneal cavity, or they may drain into the biliary tract or the gastrointestinal system.⁷ Anaphylaxis may result from drainage of the hydatid fluid including the daughter cysts and scolices into the peritoneal cavity.⁸ Rupture of a hydatid cyst requires emergency surgical intervention.^{7,8} In this study we evaluated 17 hydatid disease cases with rupture into the peritoneum with regard to surgical

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treatment modalities and postoperative morbidity and mortality rates.

MATERIALS AND METHODS

Between January 1988 and September 2005, 306 patients with hydatid disease underwent surgery in our clinic. Seventeen of those patients received surgical treatment for intraperitoneal rupture of the cysts. Age, gender, time to surgery from the onset of the symptoms, laboratory findings, diagnostic procedures, surgical treatment modalities, in-hospital stay, morbidity, mortality, and recurrence were the parameters that were investigated.

Abdominal ultrasound (US) scans, abdominal computed tomography (CT) scans, and magnetic resonance imaging (MRI) were the preoperative diagnostic methods. All of the patients received epinephrine and/or steroids to prevent allergic reactions preoperatively. Laparotomy through a wide median incision was performed. Besides managing peritoneal dissemination, definitive treatment of intact cysts, if present, was applied. The cystic cavities were irrigated with hypertonic saline (20%), povidone-iodine, or hydrogen peroxide, and the peritoneum was lavaged with povidone-iodine solutions followed by isotonic saline. Multiple drains were placed before the abdomen was closed in each case.

Albendazole treatment (10 mg/kg per day) was given to all of the patients for 3 months postoperatively to prevent recurrence. The patients were seen periodically in the postoperative period, every 4 months during the first postoperative year, every 6 months during the second year, and annually thereafter. Ultrasonography, CT, and indirect hemagglutination tests were performed to detect any recurrence.

RESULTS

Eleven of the patients were men and six were women. Mean age was 49.5 years (range: 32–72 years). All of the patients had signs of peritoneal irritation such as extensive tenderness and guarding. Five cases had urticaria. Five patients had a history of blunt abdominal trauma (minor abdominal trauma, traffic accident or fall) but 12 patients did not describe any trauma. Nine patients did not have any complaints prior to the rupture of the cysts, whereas seven had nonspecific abdominal pain. Only one patient had previous diagnosis of hydatid disease.

Eight patients had fever, 12 had elevated white blood cell count, and one had jaundice (serum bilirubin level 39 mg/dl). Ultrasound scans were obtained for all of the patients. Computed tomography scans was available for 7 and MRI for one of them. Ultrasound scans revealed intra-abdominal fluid in all cases. Intraperitoneal multiple cysts with heterogeneous cavity or cystic structures in the liver were visible in 14 cases (sensitivity = 82.3%). Hydatid cyst in the spleen was confirmed by CT scans. Both CT and MRI showed multiple cystic lesions in the liver and peritoneum with intra-abdominal free fluid. Extensively dilated biliary ducts due to intrabiliary rupture were seen in one case.

The ruptured cysts were located in the right lobe of the liver in nine patients, in the left lobe in five patients and in both lobes in three patients. There was also a cyst in the spleen in one patient who had multiple cysts in both lobes of the liver. Besides the ruptured cyst, intact hepatic hydatid cysts were present in five patients and were definitively treated during the surgery. Sixteen patients underwent surgery within the first 48 hours after presentation (mean 7 hours). One patient with intrabiliary ruptured cysts and septic shock underwent surgery 6 days after the diagnosis because medical treatment in the intensive care unit was necessary to improve his general condition.

One to nine liters of hydatid fluid with floating daughter cysts and purulent material was present in the abdomen. Procedures to fill the cystic cavities were applied after removal of the intraperitoneal fluid. Unroofing the cyst and external drainage in five patients, introflexion in four patients, omentoplasty in three patients, and capitonnage in one patient were the methods used to manage the cysts. Four patients had two or more of these procedures; one required a splenectomy because of a splenic hydatid cyst.

Four patients died in the early postoperative period. A total of nine complications developed in six patients. Abscess in the cystic cavity developed in three cases, and biliary fistula developed in two patients. Other complications were prolonged ileus, pulmonary infection, eventration, and wound infection, one each. Biliary fistula closed spontaneously in one of the fistula patients, and the other required endoscopic sphincterotomy to control the fistula because of high flow of bile (700 cc/day). Sites of the primary cysts, surgical procedures, and postoperative morbidities are shown in Table 1.

Median hospital stay was 18 days (range: 1–48 days) and median follow-up was 78 months (1–145 months). Intra-abdominal recurrence occurred in one patient in the 32nd month, and a total cystectomy was performed with a relaparotomy. There was not any hepatic recurrence.

Table 1.
Site of the primary cysts, surgical procedures, and postoperative morbidities

	Number of patients
Site	
Liver right lobe only	9
Liver left lobe only	5
Liver both lobes only	2
Liver both lobes and spleen	1
Surgery	
Unroofing and external drainage	5
Introflexion	4
Omentoplasty	3
Capittonage	1
Combined procedures	4
Morbidity	
Total complications	6 ^a
Cavitary abscess	3
Biliary fistula	2
Prolonged ileus	1
Pulmonary infection	1
Eventration	1
Wound infection	1

^aSome patients had more than one complication.

Ultrasound, CT scans, and MRI of one case are shown in Figure 1, and the intraoperative appearance of a cyst in the abdomen is shown in Figure 2.

DISCUSSION

Rupture of a hydatid cyst into the abdominal cavity is a rare complication of the hydatid disease and causes serious problems and severe, life-threatening complications, including anaphylaxis.^{6,9-11} However, healed cases without anaphylaxis have been reported in the literature as have fatal cases with rupture of the cyst into the peritoneum.^{6,9,10,12} The rate of rupture of hydatid cysts into the peritoneum has been reported between 1% and 8% in the literature.^{6,8,9,11,13} The rate in the present study was 5.5%; 12 were spontaneous ruptures and 5 were secondary to a trauma. Abdominal pain, nausea and vomiting, and urticaria are the most common symptoms.⁷ Allergic reactions may be seen in 25% of the cases.⁶ Jaundice may also occur after rupture of the cyst into the biliary system.^{11,13} All of our patients had abdominal pain, five had urticaria, and one patient with a rupture into the biliary ducts had jaundice.

Ultrasonography is a noninvasive, sensitive, and cost-effective imaging method in detecting the intra-abdominal fluid and locating the hydatid cysts; thus it is useful to diagnose rupture of hydatid cysts. Sensitivity of US has

been previously reported as 85% and 90%;^{2,6,13} however, it was 82.3% in our study. Computed tomography and MRI, on the other hand, provide more concrete information about spread in the abdominal and pelvic regions and about the walls of the ruptured cyst in the liver.¹⁴ Sensitivity of CT was 100% both in our study and in previous reports.^{6,13,15} Diagnostic laparoscopy may facilitate preoperative diagnosis.¹³

Immediate medical treatment against allergic reactions should be initiated, and emergency surgery should be performed after diagnosing rupture of hydatid cysts. The goal of the surgical treatment is to prevent complications, to eliminate local disease, and to minimize morbidity, mortality, and recurrence rates.^{9,13} Cystic content and germinative membranes should be discarded and the peritoneal cavity should be thoroughly lavaged to remove the scolices.^{9,11} Although several scolicedal agents have been used, there is no consensus on which is the best agent.¹³ Hypertonic saline is not appropriate because it may damage the peritoneal surfaces and may cause hypernatremia. Povidone-iodine and 10% hydrogen peroxide containing scolicedal agents have been found to be more effective than hypertonic saline in experimental studies.^{16,17} However, one should still consider possible toxic effects of povidone-iodine on the peritoneal surfaces.

Surgical treatment of the primary cyst should be the aim if the general condition of the patient allows. Pericystectomy and hepatectomy are rarely applied in cases of complicated hydatid cysts, but conservative surgical methods such as external drainage, unroofing, and cavity filling are frequently used.^{2,11,18} Although conservative surgery is beneficial because of its simplicity and the short operation time, cavity complications and recurrences may occur. Many authors suggest conservative methods in endemic regions.^{6,19,20} Pericystectomy can be performed for peripherally located cysts if the general condition of the patient is not poor. In our study, all of our patients received conservative surgical interventions. Laparoscopic methods and percutaneous drainage of the hydatid cysts has gained interest during the last decade;^{13,20,21} however, we could not find any reports on their use for ruptured cases.

Surgical mortality rates are as much as 3% even after surgery for uncomplicated hydatid cysts, and can be much higher for complicated cases.⁶ Beyrouti *et al.* reported four morbidities (23.5%) and two mortalities (11.8%) in a series of 17 patients, and Sozuer *et al.* reported two complications (10%) but no mortality in 21 patients.^{9,13} Morbidity and mortality rates were 35.3% and 23.5%, respectively, in the present series. Deaths were due to septic shock and multiorgan failure.

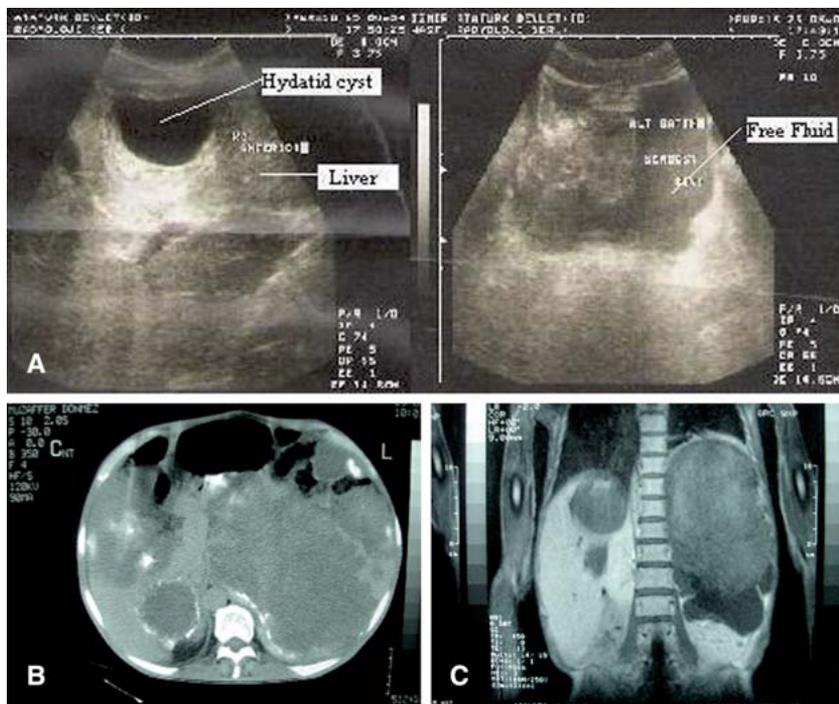


Figure 1. (A) US images showing ruptured hydatid cysts of the liver and free fluid in the abdomen. (B) CT image showing ruptured hydatid cysts of the liver and free fluid in the abdomen. (C) MR image showing hepatic cysts, and ruptured hydatid cyst that was located in the left hypocondrium.



Figure 2. Intraoperative appearance of a cyst in the abdomen.

Ruptured hydatid cysts require meticulous postoperative follow-up. Although the patients with uncomplicated hydatid cysts are followed with US examination and indirect hemagglutination tests starting 6 months after the operation and every 1 or 2 years thereafter, those with perforated cysts are followed with shorter intervals, and CT scans are included in the procedures to detect recurrence. Cysts that were overlooked during surgery may be interpreted as recurrences during long term follow-up. Recurrences may also occur due to insufficient surgery or medical treatment after rupture of a hydatid cyst.²² Recurrence rates vary greatly. It has been reported that recurrences can be prevented with appropriate

abdominal lavage followed by 2–3 months use of albendazole.^{6,13} In the studies of Beyrouti *et al.* and Sozuer *et al.*, recurrence rates are 6.7% and 14%, respectively.^{9,13} In the series of Kurt *et al.*, recurrence is reported at 28.6% in seven cases.¹¹ One recurrence (7.7%) was encountered in the present study.

In conclusion, rupture of hydatid cysts into the peritoneal cavity, although rare, still presents a challenge for the surgeon. This pathology should be included in the differential diagnosis of acute abdomen in endemic areas. Computed tomography scan, in addition to clinical presentation, is essential for diagnosis. Emergency surgery is the main treatment for intraperitoneal rupture of hydatid cysts, and medical treatment should be given postoperatively. The morbidity and mortality rates of surgical interventions for ruptured hydatid cysts are higher than the rates for elective uncomplicated cases.

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