



## Acute Abdomen Caused by Spontaneous Perforation of Hydatid Liver Cyst

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Received: 22.03.2017; Revised: 02.06.2017; Accepted: 27.07.2017

### Abstract

**Objectives:** The aim of this study was to evaluate acute abdomen cases that developed as a result of spontaneous perforations of hydatid liver cysts in our regions, where hydatid cyst disease is endemic.

**Methods:** The records of 218 hydatid cyst patients who underwent surgery at our clinic between 01.01.2012 and 01.08.2016 were retrospectively reviewed. Twelve (5.5%) cases who required emergency surgery due to the rupture of hydatid cysts were included in this study. The cases were reviewed with respect to age, sex, current symptoms, radiological findings, laboratory results and post-operative results.

**Results:** Ten (83.3%) of the 12 patients were females, and two (16.7%) were males, and their mean age was 40.4 y (23–69). All patients with spontaneous perforations had hydatid liver cysts. Eleven of the patients had a single cyst, and one had multiple cysts. Nine patients were diagnosed with ultrasonography (US), and three patients were diagnosed with computed tomography (CT).

**Conclusions:** Hydatid cystic rupture should be considered in cases of an acute abdomen in regions where hydatid cystic disease is endemic. We believe that patients with a single cyst that is peripherally located in the liver have a high risk of spontaneous perforation. Patients who are diagnosed with hydatid cystic rupture should undergo emergency surgery, followed by medical treatment.

**Keywords:** Hydatid liver cyst, spontaneous perforation, acute peritonitis

DOI: 10.5798/dicletip.339000

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## Karaciğer Hidatik Kistinde Spontan Perforasyonun Neden Olduğu Akut Karın

### Özet

**Amaç:** Bu çalışmada, kist hidatik hastalığının endemik olduğu bölgemizde, karaciğer kist hidatiğinin spontan perforasyonlarına bağlı olarak gelişen akut batın olguları değerlendirmeyi amaçladık.

**Yöntemler:** Kliniğimizde 01.01.2012 ile 01.08.2016 tarihleri arasında opere edilen toplam 218 kist hidatik hastasının dosyaları geriye dönük olarak incelendi. Karaciğer kist hidatik rüptürü nedeniyle acil olarak operasyona alınan 12 (%5,5) vaka çalışmaya dâhil edildi. Olgular yaş, cinsiyet, mevcut semptomları, radyolojik bulguları, laboratuvar sonuçları ve postoperatif takipleri yönünden değerlendirmeye alındı.

**Sonuçlar:** Çalışmaya alınan 12 hastanın 10 (%83,3)'u kadın, 2 (%16,7)'si erkekti, ortalama yaşları 40.4 (23-69) yıl idi. Olguların hepsinde spontan rüptür mevcuttu. Hastaların 11'inde tek kist, bir hastada ise multiple kist mevcuttu. Dokuz hastaya ultrasonografi (US), üç hastaya ise bilgisayarlı tomografi (CT) ile tanı kondu.

Sonuç olarak, kist hidatik hastalığının endemik olduğu bölgelerde, akut batın nedenleri arasında kist hidatik rüptürü de düşünülmelidir. Karaciğerde, periferik yerleşimli ve tek kisti olan hastalarda spontan perforasyon riskinin yüksek olduğunu düşünüyoruz. Kist hidatik rüptürü tanısı konulan hastalar, acil olarak operasyona alınmalı ve ameliyat sonrası medikal tedavi başlanmalıdır.

**Anahtar kelimeler:** Karaciğer kist hidatiği, spontan perforasyon, akut peritonit

## INTRODUCTION

Hydatid cystic disease is a parasitic infection. In the majority of cases, the causative agent is *Echinococcus granulosus*<sup>1</sup>. Hydatidosis disease is endemic in Mediterranean countries, including Turkey<sup>2</sup>. In humans, the incidence rate of hydatid cystic disease involving the liver is 50–70%, whereas it is 25% for the lungs and 5–10% for other organs of the body<sup>3</sup>. The main methods used for the diagnosis of hydatid cystic disease are ultrasonography (US) and computed tomography (CT)<sup>4</sup>. The majority of individuals with hydatid cystic disease may not show any symptoms until a complication develops<sup>5</sup>. Complications of liver hydatid disease are fistulisation of bile ducts to cyst, abscess formation and rupture of the cyst into the peritoneum. Cystic perforation generally occurs spontaneously or following a trauma. Hydatid cystic perforation can result in abdominal pain and have lethal consequences, such as anaphylaxis<sup>6</sup>.

The aim of this study was to evaluate patients with an acute abdomen that developed as a result of spontaneous hepatic hydatid cystic

perforation. All the patients were treated at our clinic in Turkey, where hydatid cyst disease is endemic.

## METHODS

The records of 218 patients with hydatid cysts who underwent surgery between 01.01.2012 and 01.08.2016 at our clinic were retrospectively reviewed. Twelve (5.5%) patients who underwent emergency surgery due to the rupture of hydatid cysts were included in the study. The patients were assessed with respect to age, sex, current symptoms, radiological findings, laboratory results, operation performed, medical treatment and post-operative follow-ups (complications and recurrence). Patients who developed allergic reactions were administered anti-histamines, steroids and epinephrine, and patients who did not develop allergic reactions were administered anti-histamines and steroids for prophylactic purposes.

In all the emergency surgeries, the operations were performed with a midline incision. A right transverse incision was added for patients had

posterior segment cysts to access easily. The cystic contents were aspirated, and partial pericystectomy was performed (Fig. 1A-B). The entire interior of the cyst and abdomen were irrigated using diluted povidone-iodine and 10% hydrogen peroxide. After surgery, all the

patients received albendazole (10 mg/kg/d) for 3 months. The study was approved by the ethical committee of our university. All the data were analysed using SPSS for Windows, vs. 16 (SPSS Inc., Chicago, IL, USA).

**Table 1:** The symptoms, laboratory values, cyst location and radiological signs of patients with hydatid cysts perforated into the abdomen.

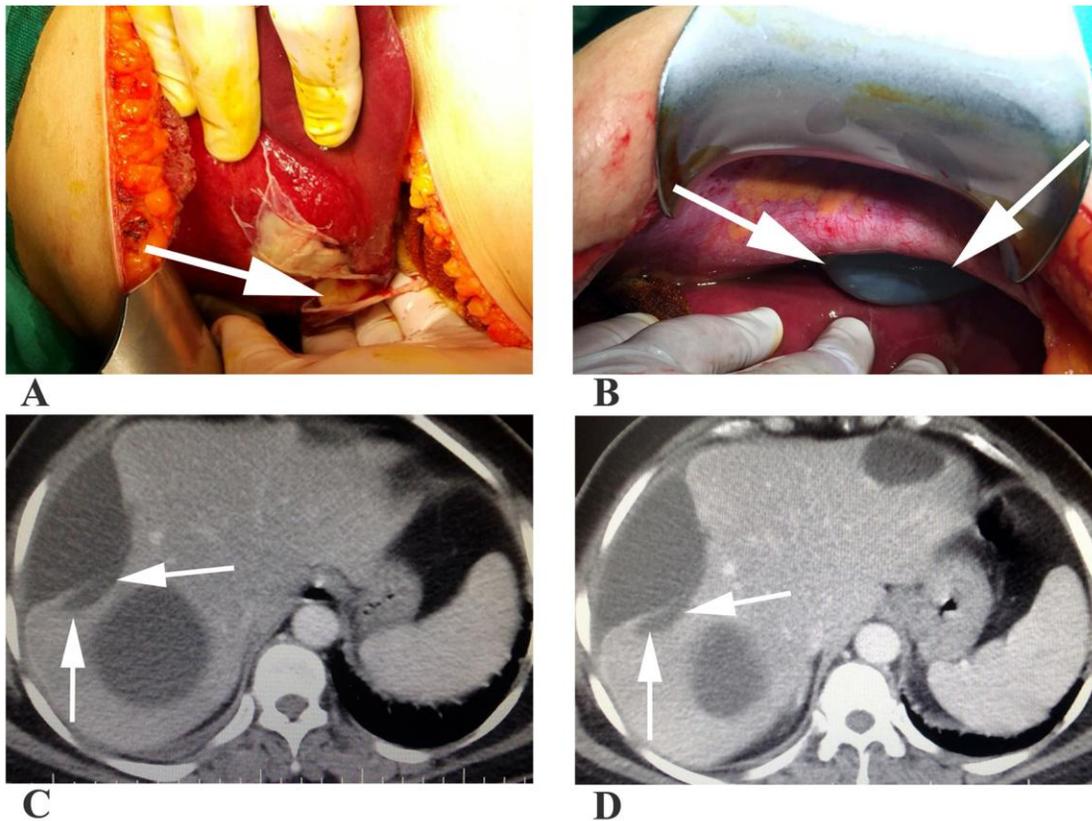
No	A	G	Symptoms	WBC(mm <sup>3</sup> )	Diagnostic method	Cyst localisation	Diameter of perforated cyst	Hospitalization day
1	23	F	AA, N-V	23000	US	RL, S: V	6	4
2	37	M	AA, N-V	13000	US	RL, S: IV	8	5
3	38	F	AA, R	15000	US	LL, S: II,III	15	5
4	23	F	AA, AR	17000	US	RL, S: IV	9	6
5	49	F	AA, N-V	16000	CT	RL, S: <b>II- VII*-VIII</b>	8	8
6	47	M	AA	18000	US	LL, S: II,III	15	4
7	40	F	AA, N-V	19000	US	RL, S: VIII	11	5
8	36	F	AA, N-V	11000	CT	RL, S: V	13	6
9	49	F	AA, AR	15000	US	LL, S: II,III	5	4
10	45	F	AA, N-V	16000	US	RL, S: VII	8	8
11	69	F	AA, AR	12000	US	RL, S: V	12	7
12	29	F	AA,N-V	11000	CT	LL, S:II,III	7	5

A; Age, G; Gender, M;male, F; Female, AA; Acute abdomen, N-V; Nausea-vomiting , R; Rash, AR; Allergic reaction, Sp; Spontaneous, T; Traumatic, WBC; White Blood Cell, US; Ultrasonography, CT: Computed Tomography, S; Segment, RL; Liver-right lobe , LL; Liver-left lobe

## RESULTS

Ten (83.3%) of the (12) patients included in the study were females, and two (16.7%) were males, and their mean age was 40.4 y (23–69). In 12cases, the cysts had spontaneously ruptured. All patients admitted to emergency department at the day of perforation symptoms start. All the patients had abdominal pain and an acute abdomen. Three (25.0%) of the patients had allergic reactions at the time of presentation. The white blood cell count values of all the patients were high at the time of presentation (> 10,000). Nine patients were diagnosed with US, and three were diagnosed with CT. All the cases had perforated cysts and

free fluid in the abdomen on CT (Fig. 1C-D) and US scans. All the spontaneously perforated cysts were located in the liver (eight on the right and four on the left). Eleven of the patients had a single cyst, and one had multiple cysts. The mean diameters of the perforated cysts were 9.75 (5–15) cm. The postoperative hospitalization durations were 5.6 (4–8) on average (Table 1). Two (16.6%) patients developed wound site infection following surgery. No mortalities were recorded in the post-operative period. The mean follow-up time of the patients was 24 month. None of the patients experienced any recurrence.



**Figure 1: 1A - 1B:** Intraoperative appearance of a cyst in the abdomen  
**1C - 1D:** Computed tomography was used to show the perforations of the hydatid cyst into the peritoneum.

## DISCUSSION

The primary reasons for parasitic liver cysts globally are Echinococcal organisms<sup>7</sup>. Hydatid cyst disease frequently does not result in any signs until the development of complications. Rupture of a hydatid cyst into the peritoneum is a rare complication but can have serious and life-threatening outcomes<sup>6</sup>. Perforation generally develops spontaneously or following trauma. According to the literature, the incidence rate of hydatid cystic rupture into the peritoneum is 1–8%<sup>6,8-11</sup>. In this study, the rate of hydatid cystic perforation was 5.5%. Though interesting in the sense that collects a quite big number of patients with perforated cysts in a quite short period of time (2012-2016), it reflects indirectly a high prevalence of the disease in the geographical area.

A large sized cyst and high intra-cystic pressure are risk factors for perforation<sup>12</sup>. In this study, the mean diameter of the perforated cysts was 9.75 (5–15) cm. The cysts of 12 patients with spontaneous perforation were located in the liver. A young age and the presence of a superficially located liver cyst are risks for perforation<sup>13</sup>. In the present study, 9 of the 12 cases had perforation of peripherally located liver cysts. In a series described by Dirican et al., cysts localized in segment VI of the liver were at risk of perforation<sup>13</sup>. In the current study, the perforations in two cases were in segment VI, three were in segment V, and four were in segments II and III.

The primary signs for cystic rupture into the peritoneum are abdominal pain, nausea-vomiting and urticaria<sup>13</sup>. A rash is seen prominently in those that develop an

anaphylactic reaction, but it may also develop in patients who do not have anaphylaxis. Three (25.0%) of the patients in the present study had anaphylactic reactions, and all the patients had an acute abdomen. Seven patients had nausea-vomiting, and one patients had a rash. Sudden-onset abdominal pain and an accompanying rash should raise the suspicion of intra-abdominal perforation of a cyst in regions where hydatid cysts are endemic.

In cases of hydatid cystic perforation, US is the main radiological study used to detect intra-abdominal fluid and the location of the cyst, as it is non-invasive, sensitive, affordable and easy to use. According to the literature, the sensitivity of US is 85–90%<sup>9,11</sup>. However, it was 75.0% in the present study. For the identification of intra-abdominal cysts, cysts that are located outside the liver and perforated cystic walls, CT and MRI, both of which have high sensitivity, are also appropriate. In the present study, three patients were diagnosed using CT. Diagnostic laparoscopy may also be used to diagnose a perforated hydatid cyst, which has ruptured into the peritoneum<sup>11</sup>. The diagnosis can also be made during laparotomy<sup>13</sup>.

The surgical treatment of hydatid cystic disease includes radical methods (pericystectomy and hepatic resection) and conservative methods (unroofing associated with various procedures for the management of the residual cavity)<sup>1,14</sup>. Although conservative methods tend to be associated with recurrence and cavitory complications, radical methods are more likely to result in major complications<sup>1,9</sup>.

Emergency surgery is required in cases of perforated hydatid cysts to prevent potential complications that may develop as a result of perforation, eliminate local disease and minimize mortality, morbidity and recurrence<sup>15</sup>. There are no studies in the literature on the most effective treatment methods for perforated hydatid cysts. Surgical

treatment is needed for perforated hydatid cysts that rupture into the peritoneum to remove the cystic contents and germinative membranes from the abdomen and irrigate the cystic cavity and abdomen using scolical agents<sup>10,15</sup>. Many scolical agents are available, and there is no consensus on the most effective agent<sup>11</sup>. In the present study, the surgical management of the hydatid cysts was conservative in all cases. Povidone-iodine and 10% hydrogen peroxide were used as scolical agents.

Morbidity and mortality are more common in cases of perforated hydatid cysts that rupture into the abdomen than in cases of non-perforated hydatid cysts<sup>11</sup>. In a study of 17 cases, Derici et al. reported morbidity of 35.5% and mortality of 23.5%, whereas Sözüer et al. reported 0% mortality and 10% mortality in a study of 21 cases<sup>6,11</sup>. There was no mortality in the present study; two (16.6%) developed wound site infections. Patients should be followed up closely after hydatid cystic perforation. Uncomplicated cases of hydatid cysts should be followed up every 6 month for the first 2 year using post-operative US and haemagglutination tests, and patients who develop perforation should be followed up at more frequent intervals with CT, in addition to US<sup>6</sup>. The follow-up by CT is arguable considering the cumulative radiation dose. Probably a combination of US and MR should be better. Follow up results too short for a disease that may appear at any time in years, mostly as peritoneal spread of cysts.

In conclusion, spontaneous hydatid liver cystic rupture should be considered in patients presenting with an acute abdomen in regions where hydatid cystic disease is endemic. The presence of a rash an allergic reaction should reinforce this suspicion. Patients with a single cyst that is peripherally located in the liver have a higher risk of spontaneous perforation. Patients who are diagnosed with hydatid cystic

rupture should undergo emergency surgery, followed by medical treatment.

#### Acknowledgements

The authors would like to thank all of the study participants involved in this investigation.

**Declaration of Conflicting Interests:** The authors declare that they have no conflict of interest.

**Financial Disclosure:** No financial support was received

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