

## Anaphylactic shock complicating laparoscopic treatment of hydatid cysts of the liver

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**Abstract.** Hydatid cysts of the liver have been treated surgically for many years by several surgical techniques including evacuation, marsupialization, and filling the cyst with saline after evacuation of the endocyst. We have previously reported laparoscopic treatment of hydatid cysts using the same hydatid asepsis and surgical techniques as in open surgery, with comparable results. Spillage of hydatid fluid during open surgery has been shown to result in serious anaphylactic reaction. The present report describes the first case report of such a reaction during laparoscopic treatment of hydatid cyst of the liver.

**Key words:** Anaphylactic reaction — Liver hydatid — Laparoscopy

Hydatid cysts of the liver have been treated surgically for many years by several surgical techniques including evacuation, marsupialization, and filling the cyst with saline after evacuation of the endocyst [3–5, 10].

We have previously reported laparoscopic treatment of hydatid cysts [7, 8] using the same hydatid asepsis and surgical techniques as in open surgery, with comparable results.

Spillage of hydatid fluid during open surgery has been shown to result in serious anaphylactic reaction [2, 5, 6, 9]. The present report describes the first case report of such a reaction during laparoscopic treatment of hydatid cyst of the liver.

### Case report

An 18-year-old female complained of abdominal and flank pain, fever, and chills for many months. Her blood tests revealed a WBC of 12,000/mm<sup>3</sup>,

with eosinophilia of 11%. Her liver function tests revealed the following: SGOT = 112, SGPT = 95, Alk Phos = 83,  $\gamma$ -GT = 115.

Indirect hemagglutination test was positive = 1/512.

Ultrasonography and computed tomography of the abdomen showed a cyst of the right lobe of the liver surfacing to the peritoneal cavity, with multiple daughter cysts in it, consistent with the diagnosis of hydatid cyst (Fig. 1).

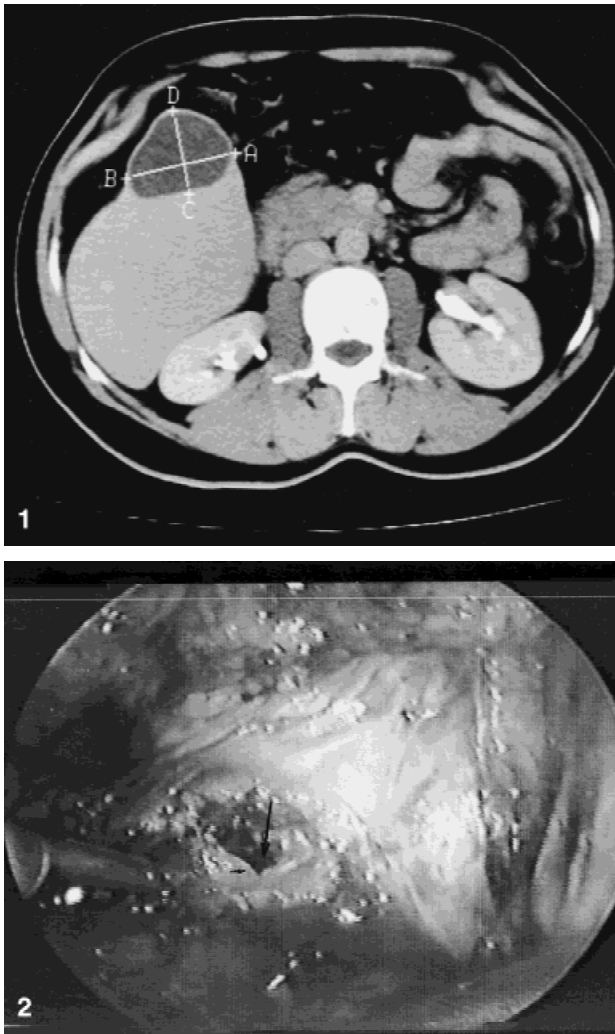
### Anesthetic management

The patient was premedicated with intramuscular meperidine 50 mg, atropine 0.6 mg, and promethazine 25 mg. Anesthesia was induced with lidocaine 60 mg, propofol 120 mg, fentanyl 100 mg, and vecuronium 8 mg. The trachea was then intubated using a 7-mm endotracheal tube. The patient was continuously monitored by ECG, noninvasive blood pressure monitor, pulse oximetry, and end-tidal capnography. The patient was hemodynamically stable at the onset of the operation with BP = 120/80 mmHg and HR = 90 bpm.

### Surgical technique

Pneumoperitonium was achieved via a Verses needle introduced in the umbilical region. The procedure was performed with the help of three trocars: the first, a 10-mm trocar at the supraumbilical area; the second, a 10-mm trocar at the subxyphoid area; and the third, a 5-mm trocar at the anterior axillary line paraumbilically, as described by us previously [7, diagram 1 therein].

The abdomen was explored with a telescope attached to a three-chip camera advanced through the umbilical 10-mm trocar. The cyst was visualized in the right lobe of the liver, surfacing to the peritoneal cavity. No other intraabdominal pathology was noted. The patient was then placed in deep Trendelenburg position and tilted 30° to the right. Using a 28-Fr catheter, introduced through the subxyphoid trocar, 500 ml of 1% Cetrimide (cetyl-trimethyl ammonium bromide), a potent scolicedal agent, was introduced bathing the cyst area completely. An 18-gauge needle attached to suction was then introduced through the fibrotic cyst capsule, and the cyst contents were aspirated; 360 ml of clear fluid was aspirated and replaced with the same amount of 1% Cetrimide, and this was left for 10 min to achieve maximal scolicedal effect. While aspirating the Cetrimide from the cyst cavity, the aspiration needle was inadvertently advanced too deep into liver parenchyma, aspirating frank blood. The anesthesiology team then reported a sudden drop in the patient's blood pressure from 120/80 mmHg to 60/30 mmHg, with an increase in the heart rate from 80 bpm up to 150 bpm, associated with facial flushing and edema. Anaphylactic reaction was



**Fig. 1.** Computed tomography of the abdomen showing a large cyst in the right lobe of the liver, with multiple daughter cysts within it.

**Fig. 2.** A print from the video recording of the operation showing the cyst capsule opened (*small arrow*), and posteriorly, a 2-cm laceration into liver parenchyma (*long arrow*).

diagnosed and successfully treated with the administration of repeated doses of 0.1 mg epinephrine, with a total dose of 1 mg, and the administration of 1,000 ml of lactated Ringer's solution and 500 ml of Haemaccel. Solu-Cortef 80 mg, diphenhydramine hydrochloride ( $H_1$  blocker) 20 mg, and nizatidine ( $H_2$  blocker) 100 mg were also administered. The blood pressure and heart rate returned gradually to normal. Following hemodynamic stabilization, the procedure was continued laparoscopically. The cyst cavity was then opened at its fibrous capsule site, and the contents were aspirated through a 28-Fr tube. The cyst cavity was irrigated with isotonic saline solution. The cyst was then laid open and its cavity was explored; there was a 2-cm laceration in the posterior wall of the cyst into liver parenchyma (Fig. 2). There was no evidence of bile leak and any bleeding was controlled. The cyst was marsupialized and its cavity packed with omentum. The peritoneal cavity was then washed with isotonic saline solution, and a closed suction drain was left in the subhepatic space. The abdomen was then deflated, the trocars were removed, and their sites were closed with skin sutures.

The patient had a smooth postoperative course except for altered liver function tests that normalized gradually over a 3-month period. She was started on diet on the 2 postoperative day and discharged home on the 5th day. After 4 months of follow-up, she is doing fine with no evidence of recurrence and her liver function tests are back to normal.

## Discussion

Surgery and percutaneous drainage for hydatid cysts of the liver have been associated with serious anaphylaxis [2, 5, 6, 9]. IgE-mediated anaphylactic reaction occurs when there is spillage of the highly antigenic hydatid fluid into the peritoneal cavity or secondary to direct contact of the hydatid fluid with the bloodstream [12]. Most anaphylactic reactions encountered in open surgery for liver hydatid cysts occur when the cysts are deeply seated into the liver, and thus require a hepatotomy [4, 10]. Similarly, percutaneous drainage carries the risk of free intraperitoneal spillage and anaphylaxis [2].

The present report describes a typical anaphylactic reaction as manifested by severe hypotension, tachycardia, flushing, and edema secondary to the administration of the highly antigenic hydatid fluid into the bloodstream.

Cetrimide (trimethyltetradecylammonium bromide) has been evaluated in our institution for its scolical effect and found to be six times more potent than hypertonic saline [6, 11]; When injected into the bloodstream, Cetrimide causes hemolysis [13], and methemoglobinemia as well as methemoglobinuria, which can be treated with the administration of Methylene blue [1]. Other side effects include depression of the respiratory muscles and nervous system [13]. No anaphylactic reactions have been reported following the administration of Cetrimide into the bloodstream. Also, blood samples withdrawn from the patient at the time of the anaphylactic reaction and analyzed spectrophotometrically did not show any increase in methemoglobin level, denoting no absorption of Cetrimide into the bloodstream. Laparoscopic evacuation of hydatid cyst of the liver has been reported by us previously and has been found to be most suitable for cysts surfacing to the peritoneal cavity [7, 8]. This technique would avoid puncturing the liver parenchyma and thus prevent any direct contact of the hydatid fluid with blood. In our case, the anaphylactic reaction was a complication of the inadvertent liver laceration. The increased intraabdominal pressure during laparoscopic approach may increase the risk of hydatid fluid contaminating the bloodstream in the event of any hepatic injury.

## Conclusion

The present report describes the occurrence of a serious anaphylactic reaction during laparoscopic evacuation of a liver hydatid cyst. The reaction was attributed to the inadvertent laceration of the liver resulting in direct contact of hydatid fluid with the bloodstream. Thus we recommend that only cysts surfacing into the peritoneal cavity be dealt with laparoscopically. Also, the cyst should be approached through its fibrotic capsule and adequate precision should still be used to avoid liver parenchymal injury.

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