

## Case Report

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## Anaesthetic Management of a Large Multiloculated Hydatid Cyst Left Lobe of Liver

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### ABSTRACT

Hydatid cysts are parasitic infections caused by *Echinococcus granulosus* and the cysts are mostly found in the liver (65%), followed by lungs (20%). Single lesions are noted in 75% of patients and are predominantly located within the Right lobe of Liver (80%). Liver Hydatidosis can cause dissemination or anaphylaxis after a cyst rupture into the peritoneum or biliary tract. Infection of the cyst can facilitate the development of liver abscesses and mechanical local complications, such as mass effect on bile ducts and vessels that can induce cholestasis, portal hypertension, and Budd-Chiari syndrome. (4) Management varies from medical therapy to percutaneous drainage to surgical intervention. Surgical removal of cysts can be via laparoscopic or open technique however laparoscopic approach may have an increase in the rate of recurrence. Here, we describe a male in his 20s diagnosed with a Multiloculated Hydatid Cyst Left Lobe of Liver underwent Laparotomy followed by Partial Cystectomy under General Anaesthesia with Thoracic Epidural catheterisation & Invasive monitoring. Patient was adequately prepared for the surgery with a high-risk consent with Oral Albendazole started two weeks prior to surgery. Surgery involved major blood loss and stormy post-operative course wherein patient developed Septic Shock, severe metabolic acidosis & was electively ventilated. He was managed with Broad spectrum Antibiotics, IV Crystalloids, Blood transfusion and dual vasopressors. He gradually recovered and was weaned off vasopressors by second post-operative day and was extubated uneventfully. Patient had excellent post-operative recovery started accepting orally well. Good pre-operative preparation, planning and excellent and intensive post-operative critical care support ensured a positive outcome.

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**Received:** March 24, 2025; **Accepted:** March 27, 2025; **Published:** April 08, 2025

**Keywords:** Hydatid Cyst, Parasitic Infection, Epidural, Peri Cystectomy, Critical Care, *Echinococcus Granulosus*

### Introduction

Hydatid cysts are parasitic infections caused by *Echinococcus granulosus* and the cysts are mostly found in the liver (65%), followed by lungs (20%) [1]. Single lesions are noted in 75% of patients and are predominantly located within the Right lobe of Liver (80%) [2]. Hydatid disease is a major endemic health problem in certain areas of the world [3]. Liver Hydatidosis can cause dissemination or anaphylaxis after a cyst rupture into the peritoneum or biliary tract. Infection of the cyst can facilitate the development of liver abscesses and mechanical local complications, such as mass effect on bile ducts and vessels that can induce cholestasis, portal hypertension, and Budd-Chiari syndrome [4]. Management varies from medical therapy to percutaneous drainage to surgical intervention. Surgical removal of cysts can be via laparoscopic or open technique however laparoscopic approach may have an increase in the rate of recurrence. Here, we describe a male in his 20s diagnosed with a Multiloculated Hydatid Cyst Left Lobe of Liver underwent Laparotomy followed by Partial Cystectomy under General Anaesthesia with Thoracic Epidural catheterisation & Invasive monitoring. Good pre-operative

preparation, planning and excellent and intensive post-operative critical care support ensured a positive outcome

### Case Report

A male in his twenties with no known co-morbidities presented to this hospital with complaints of multiple Vomiting episodes for 10 days. Vomitus contained ingested food particles, non-bilious, non-projectile and associated with one episode of blood-stained vomitus on two days prior to admission. There was no history of pain abdomen, Melena, Fever, Constipation or abdominal distension. Physical Examination revealed normal vitals, with mild tenderness in epigastrium.

USG Abdomen + CECT Abdomen revealed 8.5 x 6.8 x 8.6 cm multiloculated, multiseptated Hydatid Cyst involving Left lobe of Liver occupying Segment 2 and 3 with thinned out overlying Hepatic Parenchyma. Patient was started on Oral Albendazole 400 mg bd and was planned for Partial cystectomy subsequently via open approach. He underwent a thorough PAC evaluation and was accepted under ASA II (High Risk). Patient was explained about the risks associated with surgery which included perioperative Anaphylaxis & Anaphylactic Shock, risk of massive bleeding, Risk of post operative sepsis, need for prolonged ICU stay and

mechanical ventilation. A written high-risk consent was taken for the same. Blood demand for 4 units PRBC, 4 units Fresh Frozen Plasma (FFP) & 4 units Random Donor Platelets (RDP) was placed and finally surgery was planned after two weeks of Oral Albendazole.

### Day of Surgery

#### Conduct of Anaesthesia

NPO status was confirmed. Patient was given the following drugs at 6 am – IV Chlorpheniramine 22.5 mg, IV Ranitidine 50 mg, IV Hydrocortisone 200 mg. Antibiotic sensitivity testing was done and he was shifted to Operation theatre at 0830 am. Antibiotic prophylaxis was given with Ceftriaxone 2 g IV, Metronidazole 500 mg IV and Amikacin 500 mg IV 30 minutes prior to induction. Patient was wheeled in at 0850 am. All ASA Standard monitoring was applied. An Epidural catheter was inserted at T8-T9 level and fixed. 02 x 18G IV cannulae in bilateral upper limbs were placed. Intermittent Pneumatic compressions stockings were applied on bilateral lower limbs as DVT prophylaxis. Then, patient was administered General Anaesthesia as follows-Pre-oxygenation with 100% O<sub>2</sub> for 3 minutes. Midazolam 1 mg IV and Fentanyl 150 mcg IV were given as pre-medication. Induction was done with IV Propofol 120 mg and IV Vecuronium 6 mg and a size 8.0 mm ID oral PVC Endotracheal Tube was inserted and fixed. The patient was put on Volume assist control mode with Tidal Volume-475 ml, PEEP- 5 cm of H<sub>2</sub>O, Fio<sub>2</sub>-0.6, RR-15/min. Anaesthesia was maintained with Nitrous oxide: Oxygen: Isoflurane mixture with Vecuronium infusion at 4 mg/hr. Subsequently, a right sided Subclavian Central Venous catheter (7 Fr 3 lumen) was secured with landmark technique, and a left Femoral Arterial line was secured with a Leader Cath for invasive BP monitoring. The patient was handed over to the Surgeon at 1000hrs.

The patient remained hemodynamically stable throughout the procedure with ensuing Tachycardia which began after 3 hours after induction i.e after cyst excision in the range of 120-140/min. Epidural top-up was given with 3mg Morphine in 8 ml Normal Saline at 1130hrs. Ceftriaxone 2 g IV was repeated after 4 hours of surgery. Otherwise; intra-operative course was uneventful. Fluid resuscitation was guided by Pulse pressure variation, blood loss and urine output i.e it was goal directed.

Total IV Fluids given  
6600 ml (Ringers Lactate- 4500ml, Normal Saline – 2000 ml, IV Paracetamol – 100 ml)  
Urine Output – 2950 ml

Blood Loss – Approx 1600 ml  
ABG after 6 hours– pH- 7.15/ pO<sub>2</sub>- 182.6/ pCO<sub>2</sub>- 34.4/ HCO<sub>3</sub>- 12.1/ Base deficit - -16.7/ Lactate- 2.44

#### Surgical Technique

A reverse modified Makuchi incision was taken, peritoneum entered & falciform ligament was identified and preserved as pedicle. Cyst was identified and surrounding adhesions were divided. Peri cystic packing was done with 20% Hypertonic Saline-soaked Abdominal swabs. Cyst decompression was done along with decompression of daughter cysts. All loculi & septae were broken by blunt dissection. The cyst cavity was washed thoroughly with 20% Hypertonic Saline (HTS) and 20% HTS soaked Abdominal swabs were left in situ for 15 minutes. An intra-op USG was done by Radiologist to confirm complete excision of all daughter cysts. Falciform ligament was used as a flap to cover the residual cavity and held in place with sutures and haemostasis

was achieved. The peritoneal cavity was thoroughly washed with 3 L of 20% Saline and 3 L Normal Saline. This was followed by placement of a Right Subhepatic and Left Pelvic drain. The abdominal was closed and dressing applied.

In view of increased blood loss, Severe Metabolic acidosis and persistent Tachycardia by the end of surgery (HR – 130-150/min), patient was not extubated and was shifted to ICU.

#### Investigations

USG Abdomen + CECT Abdomen (12 Feb 25) revealed 8.5 x 6.8 x 8.6 cm multiloculated, multiseptated Hydatid Cyst involving Left lobe of Liver occupying Segment 2 and 3 with thinned out overlying Hepatic Parenchyma.

Hb-18.1 g%, TLC-11700, DLC- N-86/ M-0,59/ E-0.4, Platelets-238000

Blood Group – B Positive, Blood Urea- 40.4, Serum Creatinine-1.12

Total Bilirubin -1.53 mg/dl, SGOT- 25.6 IU/L, SGPT- 19.8 IU/L  
Serum Na<sup>+</sup>/ K<sup>+</sup> - 141/ 4.4; Chest Xray and ECG were normal

#### Outcome and Follow up

The patient had a stormy post-operative course with continuing Severe Metabolic Acidosis with Tachycardia and hypotension refractory to IV crystalloids and blood transfusion (1-unit PRBC was given). On evaluation, Patient had warm peripheries, ECG revealed Sinus Tachycardia with upsloping ST depression in multiple leads, collapsed Inferior Vena Cava (IVC Diameter < 1 cm) on bedside USG, raised TLC count (21000) and high-grade Fever which started after the blood transfusion (range of 101 to 103.5 deg F) & increase in Serum Creatinine to 1.82 mg/dl. Keeping in mind, the possible diagnosis of Septic Shock probably due to toxemia added with chances of possible febrile reaction to Blood Transfusion, treatment was upgraded as follows:

- Noradrenaline infusion started with requirement more than 0.3 mcg/kg/min. In view of this, Vasopressin was added @ rate of 1.8 U/hr. Alos, Inj Hydrocortisone 50 mg IV q 6 hourly was added.
- Infusion of Soda Bicarbonate 100 meq was given.
- Antibiotics were upgraded to Meropenem 1g IV TDS after loading with 2g (Based on Creatinine clearance), Teicoplanin 200 mg IV x 3 doses 12 hours apart followed by 200 mg IV OD and Metronidazole 500 mg IV TDS.
- IV Fluids – 5% Dextrose and Ringers Lactate were given alternately at 100 ml/hr.
- The Pelvic drain had an initial increased output of 1300 ml (serous fluid) upto next morning which gradually reduced.
- The patient was kept deeply sedated and paralysed over the next 36 hours.

On the second post operative day, condition had improved drastically. He was off vasopressor support by 0900 am. ABG at 0700 am showed pH- 7.40/ HCO<sub>3</sub>- 20.2/ pCO<sub>2</sub>- 41.1/ BE - -3.8/ Lac – 2.1. All investigations were within normal limits with Serum Creatinine back to 1.18 mg/dl. Sedation was stopped at 0830 am and patient was put on PSV mode (PS-15/PEEP-5/Fio<sub>2</sub>-0.4) at 1000 hrs. By 1100 am, patient was fully awake with no evidence of any respiratory distress or hemodynamic instability. He was extubated at 1110 am which he tolerated well. He had good pain relief with VAS score of 2-3/10. Hence, despite all the challenges and a stormy post-op course, the patient sailed through and recovered well. All investigations were within normal limits except for a drop in Hemoglobin to 13.5 g/dl.

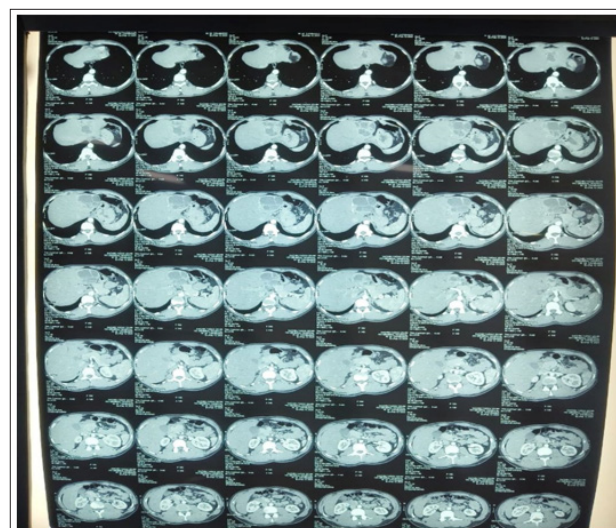
## Discussion

Hydatid disease or echinococcosis is a zoonosis that occurs primarily in sheep-grazing areas of the world but is common worldwide because the dog is a definitive host. Echinococcosis is endemic in Mediterranean countries, the Middle East, Far East, South America, Australia, New Zealand, and east Africa [5]. Humans contract the disease from dogs, but there is no human-to-human transmission [6].

Hydatid cyst may remain asymptomatic for years long. Its presence may become evident when the hepatomegaly is found or a cystic lesion is noted when the liver is imaged for other reasons. It may be painful or lead to complications such as rupture into biliary tract or peritoneal cavity which may cause cholangitis or anaphylactic shock [7]. Although conservative modalities for treatment exists, surgery is considered as best possible treatment having potential to remove the cyst and complete cure [8]. According to the American College of Gastroenterology guidelines; surgery, either laparoscopic or open, based on available expertise, is recommended in complicated cysts with multiple vesicles, daughter cysts, fistulas, rupture, haemorrhage or secondary infection [9]. In laparoscopic approach, post-operative morbidity ranges from 8% to 25% and mortality in most series is 0% with recurrence rates of 0% to 9% (vs 12-63% morbidity, 0% to 3% mortality, and 0% to 30% recurrence in open surgery). However, major complications like Anaphylaxis are more common in laparoscopic approach as a result of peritoneal spilling during debridement and removal of cyst contents [10]. The main aim of surgery is to eradicate the parasite, prevent intra-operative spillage of contents and obliterate the residual cavity to prevent any recurrence. Partial peri cystectomy with cyst evacuation followed by cavity management may be considered a simple and safe conservative technique in management of hepatic hydatid cyst. However, their main disadvantage high frequency of biliary leakage from a cystobiliary communication [11]. Biliary leakage and fistula formation are the most common postoperative complication of liver hydatid surgery and they are the main reasons of morbidity and mortality.

Anaphylactic shock is another dreaded complication that can be encountered in the perioperative period. Various intraoperative factors can cause contamination by hydatid fluid with triggering of anaphylactic reactions. The symptoms vary from mild urticaria to anaphylactic shock [12]. The mechanism of these reactions is complex. In some cases, it is typically a hypersensitivity reaction type I associated with immunoglobulin E in response of a high plasma concentration of antigens *Echinococcus* [13]. Anaphylactic or anaphylactoid reactions may also be secondary to complement activation with liberation of anaphylatoxins [14]. During anaesthesia cardiovascular signs, such hypotension, tachycardia, and arrhythmia predominate. Cutaneous symptoms, such as rash, flushing, and urticaria, are common in the neck, face, but these signs may often be hidden by surgical drapes. Occurrence of bronchospasm is less frequent especially after general anaesthesia. In incomplete presentations (only one symptom: hypotension, bronchospasm etc) diagnosis of anaphylactic shock occurs after elimination of other causes: acute myocardial infarction, Septic Shock due to sudden bacteraemia, and hypovolemic shock.

In our case, Tachycardia was the only presenting feature, that too towards the end of surgery which might be possibly attributed to toxemia and bacteraemia secondary to spillage of cystic contents in the abdominal cavity with hypotension ensuing post operatively in the ICU. Also, other evidences of Septic Shock were present, i.e Hypotension refractory to IV Crystalloids, raised lactates and high-grade pyrexia and improvement in blood pressure with dual vasopressors. Also, the addition of low dose IV Hydrocortisone may have helped in addressing not only the hypotension and response to vasopressors but also to some extent in treating any occult anaphylactic reaction. To conclude, adequate pre-operative preparation & planning, good counselling informing the patient about expected complications, use of goal directed fluid resuscitation & invasive monitoring modalities and comprehensive post operative critical care are required to ensure a good outcome in these cases.



**Figure 1:** CECT Abdomen



**Figure 2:** Image Depicting Insertion of Epidural Catheter





**Figure 3:** Cyst Identified

### Conclusion

- Adequate and comprehensive pre-op planning by both surgical and Anaesthesia team ensured a good outcome
- Invasive monitoring in the peri operative period essential to handle minute to minute hemodynamic changes and prevent any organ injury
- Expect a stormy intra-op and post-op course with preparation to handle complications like perioperative anaphylaxis/shock, Hemorrhage, Toxemia and Sepsis which are known to occur in these surgeries.
- Use of goal directed fluid resuscitation using multiple modalities such as ABG, Urine output, Pulse pressure variation etc.
- Use of multimodal analgesia especially with Epidural Anesthesia is essential to ensure smooth extubation and prevention of any post-operative pulmonary complications.
- Intermittent Pneumatic compression stockings to be put up intra-operatively to prevent DVT and associated complications.
- Keen eye to be kept on Serum Electrolytes due to use of high volumes of Hypertonic Saline and possible occurrence of Hypernatremia.

**Financial Support (If any):** None Declared

**Conflict of Interest (If any):** None Declared

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