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Anaesthetic management of infected hepatic hydatid cyst in a patient with pulmonary hypertension and heart failure with preserved ejection fraction: A case report

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Abstract
Hydatid disease complicated by secondary infection poses significant perioperative challenges, particularly in patients with multiple comorbidities such as heart failure with preserved ejection fraction (HFpEF) and chronic liver dysfunction. We report the anaesthetic management of a 68-year-old female with residual infected hydatid cysts following prior biliary instrumentation and drainage procedures, undergoing open surgical excision. A combined thoracic epidural and bilateral external oblique intercostal block (EOIB) technique was employed alongside balanced general anaesthesia to optimise analgesia, minimise opioid use, and support haemodynamic stability. This multimodal approach facilitated uneventful intraoperative and early postoperative recovery without respiratory compromise or anaphylaxis. The case highlights the importance of tailored anaesthetic planning, preparedness for cyst rupture-related complications, and the analgesic benefits of integrating EOIB into the perioperative regimen for complex upper abdominal surgeries.

Keywords: Hydatid cyst, anaesthetic management, external oblique intercostal block, thoracic epidural analgesia, heart failure with preserved ejection fraction, upper abdominal surgery, perioperative care, multimodal analgesia

Introduction
Hydatid disease, caused by the parasite *Echinococcus granulosus*, remains a significant health concern in endemic regions, with an estimated prevalence ranging from 1 to 10 cases per 100,000 population annually[1]. While uncomplicated cysts are often amenable to less invasive treatments, secondary infection and abscess formation complicate up to 10% of cases, especially following biliary instrumentation, posing additional surgical and anaesthetic challenges[2]. The coexistence of complex hydatid disease with chronic liver dysfunction, heart failure with preserved ejection fraction (HFpEF), and pulmonary hypertension is exceedingly rare and further complicates perioperative management due to the increased risk of haemodynamic instability, respiratory compromise, and anaemia. Furthermore, manipulation of hydatid cysts carries a substantial risk of anaphylaxis, necessitating meticulous anaesthetic planning to mitigate life-threatening reactions[3]. This report describes the perioperative anaesthetic management of a 68-year-old female with infected hydatid cysts and significant cardiopulmonary comorbidities undergoing open surgical excision, highlighting the clinical rationale behind the chosen approach.

Case Presentation
A 68-year-old female, weighing 49 kg with a BMI of 22.1 kg/m², presented with a 10-day history of intermittent fever, chills, reduced oral intake, and melena. Her past medical history was significant for heart failure with preserved ejection fraction (LVEF 60%), grade 2 diastolic dysfunction, mild tricuspid regurgitation, pulmonary hypertension (pulmonary artery systolic pressure approximately 50 mmHg), and mild concentric left ventricular hypertrophy. She was classified as New York Heart Association (NYHA) Class II and was on optimized medical therapy, including low-dose beta-blockers, loop diuretics, and angiotensin-converting enzyme inhibitors.

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Her surgical and interventional history included endoscopic retrograde cholangiopancreatography (ERCP) with biliary stent placement performed six months prior for a hydatid cyst communicating with the biliary tree. Previously, an infected hydatid cyst measuring approximately 6 cm in segments 6/7 was managed with ultrasound-guided pigtail catheter drainage. A smaller cystic lesion in segment 4, consistent with a bilioma measuring 3 cm, had also been aspirated.

Preoperative contrast-enhanced computed tomography (CECT) of the abdomen (Figure 1) revealed three residual infected hydatid cysts: the largest cyst (6.5 × 5.2 cm) located in segments 7-8, a 4-cm cyst in segment 5, and a 3-cm cystic biliary collection in segment 4. The biliary stent and pigtail catheter remained in situ, with minimal right pleural effusion noted. There was evidence of persistent biliary communication with the cysts, but no overt biliary obstruction.

The patient had been receiving oral albendazole therapy (800 mg/day, approximately 15 mg/kg/day) for four weeks as preoperative scolicidal treatment.

On admission, she was haemodynamically stable with no respiratory distress. Laboratory evaluation showed a haemoglobin of 8.6 g/dL, leukocytosis (WBC 14,500/mm³), serum creatinine of 1.46 mg/dL, and deranged liver function tests with elevated transaminases (AST 78 U/L, ALT 82 U/L) and hypoalbuminaemia (2.8 g/dL). Coagulation parameters were within normal limits.
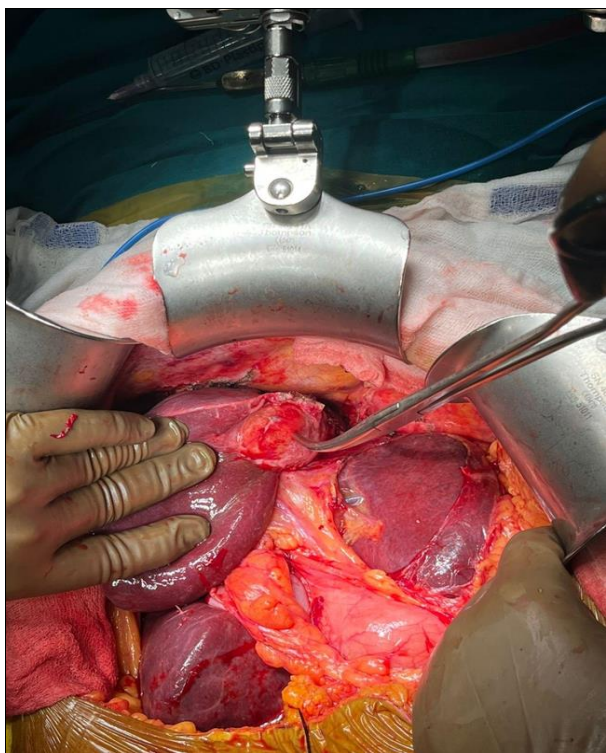

Fig 1: Depicting liver cyst

Anaesthetic Management
The planned anaesthetic approach combined thoracic epidural analgesia with balanced general anaesthesia, tailored to the patient's complex cardiac profile and the anticipated challenges of an extensive upper abdominal procedure. Comprehensive monitoring included standard ASA parameters, invasive arterial blood pressure, central venous pressure (CVP), urine output, arterial blood gas (ABG) analysis, and core temperature monitoring. Given the risk of haemodynamic instability and anaphylaxis due to cyst rupture, all vasoactive agents (including adrenaline 1:10,000), resuscitation drugs (hydrocortisone, pheniramine maleate), and emergency equipment were prepared and immediately available.

In the awake patient, a thoracic epidural catheter was placed at the T_9-T_{10} interspace using an 18-gauge Tuohy needle via the loss-of-resistance technique; the epidural space was identified at 5 cm, and the catheter was secured at 9 cm at the skin. Correct placement was confirmed with a test dose of 3 mL 1.5% lignocaine with adrenaline (1:200,000).

General anaesthesia was induced with intravenous fentanyl 100 μg, propofol 80 mg, and cisatracurium 10 mg. Endotracheal intubation was performed with a 7.0 mm cuffed tube, secured at 22 cm. Prophylactic antibiotics (piperacillin-tazobactam 4.5 g IV) were administered prior to incision. To preempt anaphylactic reactions from cyst fluid exposure, hydrocortisone 100 mg IV and pheniramine maleate 22.75 mg IV were given.

Post-induction, a right internal jugular central venous catheter was inserted under ultrasound guidance for haemodynamic monitoring and vasoactive drug administration. Anaesthesia maintenance utilized oxygen, air, and sevoflurane, supplemented by intermittent fentanyl and cisatracurium boluses. A restrictive, goal-directed fluid management strategy was employed: Total intraoperative Plasmalyte infusion was limited to 1200 mL, guided by a target CVP of 6-8 mmHg and urine output > 0.5 mL/kg/hr. One unit of packed red blood cells was transfused, and 150 mL of 20% human albumin was administered at 10 mL/hour to support oncotic pressure amid hypoalbuminaemia.

Noradrenaline infusion was titrated between 0.02 to 0.08 μg/kg/min to maintain mean arterial pressure (MAP) within 65-75 mmHg and systemic vascular resistance, addressing the patient's HFpEF and pulmonary hypertension. Heart rate remained stable between 70-85 beats per minute, and CVP trends were maintained without significant fluctuation.

Active warming measures included forced-air warming and warmed intravenous fluids, successfully maintaining normothermia throughout.

Towards the end of surgery and prior to extubation, bilateral external oblique intercostal plane blocks (EOIB) were performed under ultrasound guidance to supplement epidural analgesia. EOIB was selected over alternatives such as the transversus abdominis plane (TAP) block due to its superior coverage of the upper abdominal wall dermatomes (T6-T11) relevant to the surgical incision site, and evidence suggesting enhanced opioid-sparing effects. Each block involved a single-shot injection of 20 mL 0.25% levobupivacaine after negative aspiration, which was well tolerated and provided effective somatic pain control.

Postoperative Course
The patient was extubated uneventfully at the end of surgery and transferred to the high-dependency unit for continued monitoring. Postoperative analgesia was maintained via thoracic epidural infusion of 0.1% ropivacaine at 5 mL/h, supplemented by paracetamol. Pain scores (Numeric Rating Scale) remained ≤ 3 at rest and ≤ 4 on movement during the first 48 hours. There were no episodes of hypotension, respiratory depression, or allergic reactions. Epidural analgesia was continued for 72 hours, after which the catheter was removed under aseptic precautions. The patient

ambulated on postoperative day 1 with physiotherapy assistance and tolerated oral intake by day 3. Laboratory parameters remained stable, with gradual improvement in liver function tests. The patient was discharged on postoperative day 7 in stable condition, with advice for follow-up of cardiac status, liver recovery, and surgical wound assessment.
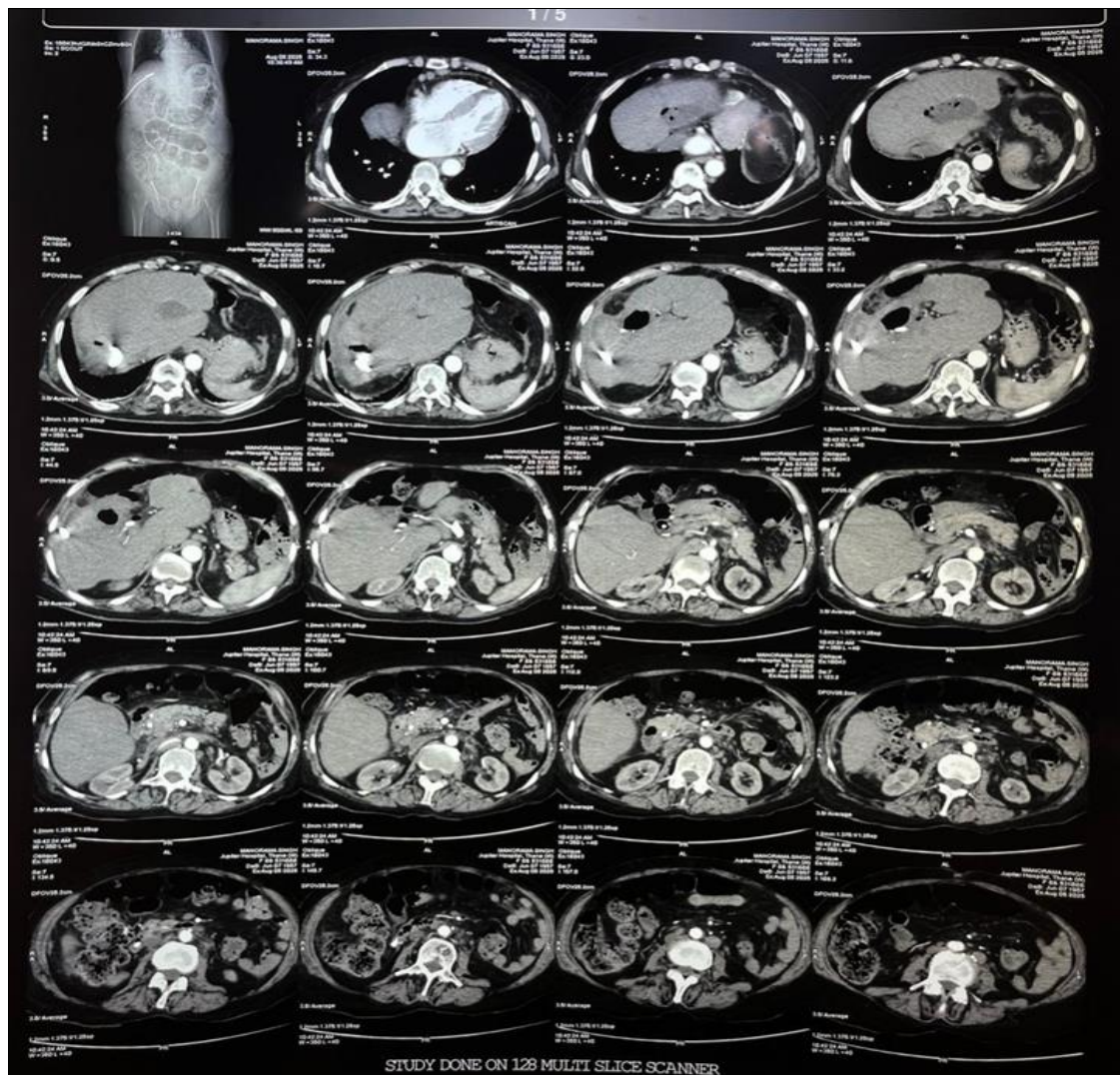

Fig 2: CECT Abdomen and pelvis

Discussion

Hydatid disease caused by *Echinococcus granulosus* predominantly affects the liver and frequently necessitates surgical intervention, especially when complicated by infection, rupture, or biliary communication [3, 5]. Surgical options include pericystectomy, cystotomy with partial pericystectomy, drainage, and radical resection, chosen based on cyst characteristics and complications [4, 5]. In this case, a staged multimodal approach incorporating ERCP with biliary stenting, percutaneous drainage, and ultimately open excision aligned with current best practices for managing complex, infected hepatic hydatid cysts [5].

In our case, the patient had multiple hepatic hydatid cysts, one of which was previously treated with ERCP and biliary stenting due to a cysto-biliary communication, another drained percutaneously with a pigtail catheter, while residual infected cysts required open surgical excision. This staged and multimodal approach is consistent with current surgical guidelines and literature advocating individualized treatment strategies based on cyst complexity and clinical status [5]. (Figure 2).

From an anaesthetic perspective, managing infected hydatid cysts is challenging due to risks of intraoperative anaphylaxis, sepsis, and haemodynamic instability [2, 6, 7].

Key anaesthetic considerations in this case included:
- **Pre-existing organ dysfunction:** Liver dysfunction altered drug metabolism, necessitating cautious use of anaesthetic agents and opioids. Hypoalbuminaemia reduced oncotic pressure, necessitating 20% albumin infusion to maintain intravascular volume stability [8, 9].
- **Cardiopulmonary comorbidities:** The presence of HFpEF, pulmonary hypertension, and grade 2 diastolic dysfunction increased the risk of perioperative cardiac decompensation. Hence, meticulous fluid titration and vasopressor support (noradrenaline) were essential for maintaining perfusion without fluid overload [8].
- **Infection risk:** Surgical manipulation of infected cysts increased the risk of spillage and systemic dissemination. Therefore, corticosteroids and antihistamines were administered prophylactically, and full resuscitation protocols were in place [2].

The analgesic regimen combined thoracic epidural analgesia (TEA) and bilateral external oblique intercostal blocks (EOIB). TEA remains the gold standard for upper abdominal surgery by providing comprehensive visceral and somatic analgesia [10, 11]. However, in patients with coagulopathy or infection risk, regional fascial plane blocks like EOIB offer an appealing alternative or adjunct. EOIB targets the anterior and lateral cutaneous branches of thoracoabdominal nerves (T_6-T_{10}), covering the upper abdominal wall and potentially enhancing opioid-sparing analgesia [12-17].

Nonetheless, the evidence supporting EOIB is limited, predominantly consisting of a few randomized trials and case series, often in populations differing from complex infected cases [12-15]. Compared to other regional techniques like the transversus abdominis plane (TAP) or rectus sheath blocks, EOIB may provide better dermatomal coverage for upper abdominal incisions but requires further comparative studies to establish clear superiority. For example, TAP blocks primarily target T_{10}-T_{12} dermatomes and may inadequately cover upper abdominal segments relevant in hepatic surgery [12]. Erector spinae plane blocks have also emerged as promising alternatives, with potential advantages in safety and analgesic spread, but experience remains limited in this context.

Combining TEA with EOIB in this patient enabled effective multimodal analgesia and early recovery while minimizing opioid requirements, which was particularly advantageous given her hepatic and cardiac conditions. However, TEA placement in patients with liver dysfunction warrants caution due to bleeding risk and potential for hypotension. Similarly, EOIB requires ultrasound expertise to ensure safety and efficacy, representing a learning curve that may limit widespread adoption.

Intraoperative management benefitted from Goal Directed Fluid Therapy (GDFT), tailored vasoactive support with noradrenaline, and vigilant monitoring, which collectively maintained haemodynamic stability in the face of HFpEF and pulmonary hypertension [8, 9]. The choice of sevoflurane, fentanyl, and cisatracurium balanced myocardial stability with adequate anaesthesia and muscle relaxation.

Post-induction ABG confirmed adequate oxygenation and ventilation under anaesthesia despite underlying hepatic and cardiac conditions, and serial ABGs ensured the absence of intraoperative metabolic derangements or hypoxia.

Overall, this case underscores the importance of individualized anaesthetic planning, integrating traditional and newer regional techniques while carefully weighing their benefits and limitations. Future research should focus on direct comparisons of EOIB with other regional blocks in infected hydatid disease surgery, assessing efficacy, safety, and impact on outcomes.

Conclusion
Anaesthetic management of hepatic hydatid disease complicated by infection, biliary communication, and significant cardiac and hepatic dysfunction requires a meticulous, multidisciplinary approach. This case demonstrates that combining balanced general anaesthesia, thoracic epidural analgesia, and external oblique intercostal blocks can achieve stable intraoperative conditions and effective postoperative pain control. Anticipation of anaphylaxis, invasive haemodynamic monitoring, and goal-directed therapy remain essential components. Surgical strategies should be individualized, utilizing ERCP and percutaneous drainage as adjuncts in complex scenarios. While EOIB shows promise as part of multimodal analgesia, its use should be balanced against limitations such as operator expertise and comparative evidence. This case advocates for integrating novel regional techniques with established approaches to optimize safety and recovery in high-risk upper abdominal surgery.

Conflict of Interest
Not available

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Not available

References
1. Gohil VB, Thakur SU, Mehta SM. Anesthetic management of large hydatid cyst removal: Role of regional anesthesia and intraoperative preparedness. EAS J Anesthesiol Crit Care. 2023;5(5):89-91.
2. Chandran P, Agarwal A, Tripathy DK, Thakur N, Chandra V. Anesthetic considerations in simultaneous management of pulmonary and hepatic ruptured hydatid cyst: A case report. Anesth Analg Crit Care; 2023.
3. Yi S, Zhang X, et al. The impact of external oblique intercostal block on early postoperative pain and recovery in upper abdominal J-shaped incision surgery: a randomized controlled study. BMC Anesthesiol. 2025;25:158.
4. Elsharkawy H, Kolli S, et al. The external oblique intercostal block: Anatomic evaluation and case series. Pain Med. 2021;22:2436-42.
5. White L, Ji A. External oblique intercostal plane block for upper abdominal surgery: Use in obese patients. Br J Anaesth. 2022;128:e295-7.
6. Comparison of analgesic efficacy of ultrasound-guided external oblique intercostal block vs subcostal TAP block. Indian J Anaesth; 2024.
7. Joshi GP, Rawal N, Kehlet H; Prospect collaboration. Evidence-based management of postoperative pain in adults undergoing open liver resection. Br J Anaesth. 2013;111(5):729-738.
8. Chin KJ, Adhikary SD, Sarwani N, Forero M. The analgesic efficacy of ultrasound-guided external oblique intercostal block in abdominal surgery: A case series. Anaesth Intensive Care. 2017;45(3):464-470.
9. Elsharkawy H, Ahuja S, DeGrande S, Maheshwari K, Chin KJ. Subcostal blocks: A review of anatomy and techniques. Reg Anesth Pain Med. 2018;43(5):520-6.
10. Randomized controlled trials on EOIB and TAP blocks.
11. Dziri C, Haouet K, Fingerhut A. Treatment of hydatid cyst of the liver: Where is the evidence? World J Surg. 2004;28(8):731-736.
12. Camargo LF, Silva Junior GA, et al. Anaphylactic shock during hepatic hydatid cyst surgery: Case report and review. Rev Bras Anestesiol. 2009;59(5):656-662.
13. Sahin S, Turkyilmaz Z, et al. Hepatic hydatid cyst ruptured to the peritoneum with sepsis: A case report. World J Emerg Surg. 2010;5:27.
14. Cecconi M, et al. Goal-directed therapy in high-risk surgical patients: A review. Crit Care. 2010;14(2):207.
15. Rawal N. Epidural technique for postoperative pain management. Best Pract Res Clin Anaesthesiol. 2002;16(4):491-505.
16. WHO Informal Working Group. International classification of ultrasound images in cystic

echinococcosis for application in clinical and field epidemiological settings. Acta Trop. 2003;85(2):253-261.

17. Kayaalp C, Bzeizi K, Demirbaş S. Hydatid cyst of the liver: A review of current surgical treatment. Ann Hepatol. 2007;6(2):89-93.

18. Georgiou GK, Lianos GD, Lazaros A, *et al*. Surgical management of hydatid liver disease. Int J Surg. 2015;20:118-122.

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