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Original Article

Atypical Presentations of Hydatid Cyst: A Case Series of Three Unusual Clinical Manifestations from Eastern India.

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Abstract

Background:

Hydatid disease, caused by *Echinococcus granulosus*, commonly affects the liver and lungs. However, atypical locations and unusual clinical presentations may mimic other conditions, complicating diagnosis and delaying appropriate management. This case series describes three unusual presentations of hydatid disease encountered at AIIMS Deoghar, Eastern India.

Case Presentation:

Three patients with atypical hydatid disease were managed between 2024 and 2025. The first was a 12-year-old boy with recurrent abdominal pain whose renal cyst was initially interpreted radiologically as a Bosniak type II cyst. Surgical excision and histopathological examination confirmed renal hydatid disease. The second was a 58-year-old dairy farmer who presented with fever, respiratory distress, pleural effusion, and septic shock. Investigations revealed an infected hepatic hydatid cyst with secondary bacterial infection, managed with antibiotics, percutaneous puncture, aspiration, injection, and re-aspiration (PAIR), followed by definitive surgery. The third patient, a 26-year-old man with prolonged cough and fever, had near-complete opacification of the right hemithorax on chest radiography. Surgery revealed a giant pulmonary hydatid cyst measuring 24 × 16 × 4 cm, subsequently confirmed by histopathology.

Conclusion:

These cases demonstrate the varied clinical manifestations of hydatid disease and the potential for atypical lesions to mimic benign renal cysts, severe bacterial infection, or other thoracic conditions. Hydatid disease should be considered in the differential diagnosis of cystic lesions, particularly in endemic regions. Clinical suspicion, appropriate imaging, and parasitological or histopathological confirmation are essential for accurate diagnosis and timely management.

Takeaway lessons:

Hydatid disease should be considered even at uncommon anatomical sites. Infected cysts may present with life-threatening sepsis, while giant pulmonary cysts may mimic other thoracic pathologies. Combining clinical assessment, imaging, and laboratory confirmation can help guide appropriate treatment.

Keywords: *Hydatid cyst; Echinococcus granulosus; Renal hydatid disease; Pulmonary hydatid disease.*
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Introduction

A persistent zoonotic infection, hydatid disease is brought on by Echinococcus granulosus larvae. When humans consume parasite eggs excreted in the faeces of infected dogs, they unintentionally become intermediate hosts. The liver serves as the first filter and the lungs as the second as the embryos pass through the intestinal wall and move into the portal circulation. As a result, the liver accounts for about 70% of hydatid cysts, whereas the lungs account for 20–30%. The kidneys, spleen, brain, heart, bones, and other organs are less frequently affected by the parasite. Despite the widespread recognition of hepatic and pulmonary hydatid disease, unusual presentations continue to provide considerable diagnostic difficulty. Abdominal masses, recurrent infections, pleural effusions, kidney cysts, or space-occupying thoracic lesions that resemble cancer, TB, or pyogenic abscesses can all be present in patients. Cyst rupture, subsequent bacterial infection, allergy, spread, and increased mortality are all possible outcomes of delayed diagnosis(1).

In order to make a diagnosis, radiological studies are essential. While computed tomography and magnetic resonance imaging offer better anatomical delineation and can detect daughter cysts, calcifications, detached membranes, and related problems, ultrasonography is typically the first-line imaging modality for abdominal hydatid illness. Histopathological analysis of removed tissue and the demonstration of scolices or hooklets in aspirated fluid are used to establish a definitive

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diagnosis. This case series focuses on three uncommon forms of hydatid disease: enormous lung hydatid cyst, infected liver cyst with septic presentation, and kidney-related symptoms. These cases highlight the need for interdisciplinary care and the necessity of increased clinical suspicion in endemic areas(2).

Case Series

Case 1: Primary Renal Hydatid Cyst Mimicking Bosniak Renal Cyst

A 12-year-old boy who had been experiencing dull aching pain in his right flank and hypochondrium for about four months came to the surgery department. The pain was subtle, non-radiating, and unrelated to any constitutional symptoms, fever, hematuria, dysuria, or weight loss. The patient may have been exposed to Echinococcus granulosus since they lived in a rural region and had a lengthy history of intimate interaction with domestic dogs. There was no prior history of trauma, chronic sickness, or abdominal surgery.

The patient was hemodynamically stable upon physical examination, and an examination of the abdomen showed no palpable mass or organomegaly, only slight pain across the right upper quadrant. The results of routine biochemical and haematological tests, such as liver and renal function tests, were within normal ranges. Initially identified as a Bosniak type II renal cyst, ultrasonography of the abdomen revealed a distinct cystic lesion originating from the upper pole of the right kidney. A single cystic lesion without visible daughter cysts or calcification was confirmed by contrast-enhanced computed tomography (CT) of the abdomen, and the radiological impression suggested a benign renal cyst.

The patient underwent elective surgical removal of the kidney cyst in light of the ongoing symptoms and the imaging results. To avoid cyst contents spilling, the cyst was carefully isolated and removed intact during surgery. Scolices and hooklets were seen under a microscope in the aspirated cyst fluid (wet mount preparation), which strongly suggested hydatid illness. The diagnosis was verified by histopathological analysis of the removed specimen, which showed the distinctive laminated ectocyst and germinal layer of a hydatid cyst. To lower the chance of recurrence, the patient was started on oral albendazole medication (15 mg/kg/day) for three months after an uneventful postoperative phase. The patient did not exhibit any symptoms during the six-month follow-up, and there was no radiological or clinical sign of a recurrence.



Figure 1: CT image

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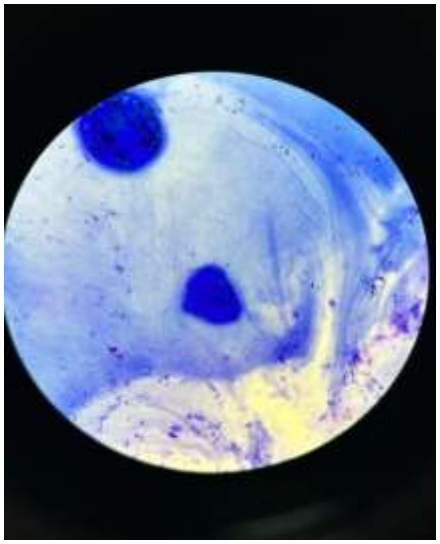


Figure 2: Histopathological image

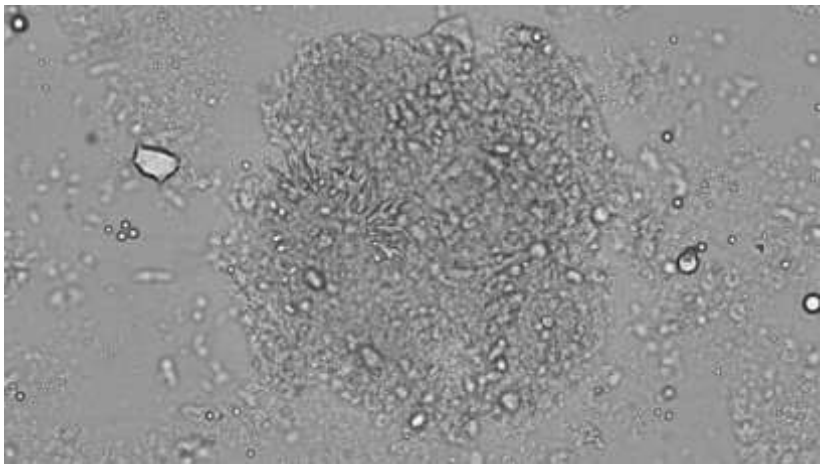


Figure 3: Wet mount showing hooklets of Echinococcus



Figure 4: Exposed Hydatid cyst in Renal parenchyma

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Case 2: Infected Hepatic Hydatid Cyst Presenting as Septic Shock

A 58-year-old male dairy farmer arrived at the emergency room with a 10-day history of right upper abdomen pain, increasing dyspnea, generalised weakness, and a high-grade fever. He stated that he was frequently exposed to domestic dogs and livestock at work, which put him at higher risk of contracting an echinococcal infection. The patient met the clinical criteria for sepsis upon admission, appearing toxic and exhibiting fever, tachycardia, tachypnea, and hypotension. The physical examination showed discomfort over the right hypochondrium and reduced breath sounds over the right lower hemithorax with stony dullness with percussion, which may indicate a right-sided pleural effusion.

Leukocytosis with neutrophilia and increased inflammatory markers were shown in early laboratory studies. Methicillin-resistant Staphylococcus aureus (MRSA) was detected in blood cultures, indicating a bloodstream infection. The abdomen's contrast-enhanced computed tomography (CT) showed several distinct cystic lesions in the liver, which were strongly suggestive of hepatic hydatid disease and had secondary infection characteristics. The largest cyst was aspirated under ultrasound guidance, and the purulent fluid produced Escherichia coli on microbiological culture. The diagnosis of an infected hepatic hydatid cyst was confirmed by direct microscopic analysis of the aspirated material using a wet mount preparation, which revealed classic hydatid hooklets.

The patient had PAIR (Puncture, Aspiration, Injection, and Re-aspiration) as a first minimally invasive intervention to treat sepsis after hemodynamic stabilisation with intravenous fluids and culture-directed antibiotics. The hepatic hydatid cysts were effectively removed surgically after four weeks of clinical improvement and the conclusion of antibiotic therapy. The patient was released on oral albendazole medication after a smooth surgical recovery. He showed no signs of surgical complications or recurrent disease at the follow-up.



Figure 5: Right-sided pleural effusion



Figure 6: Calcified cyst in the right upper quadrant of the abdomen

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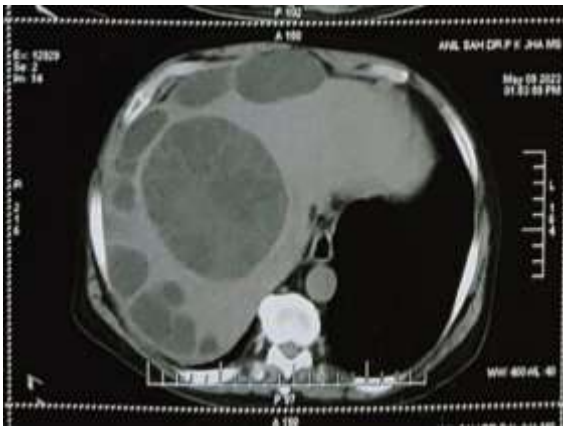


Figure 7: Multiple well-defined round cystic lesions in the right lobe of the liver



Figure 8: Yellowish purulent aspirated sample

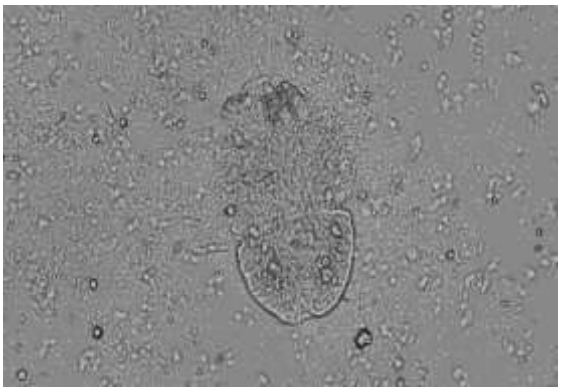


Figure 9: Scolex with hooklets of Echinococcus species

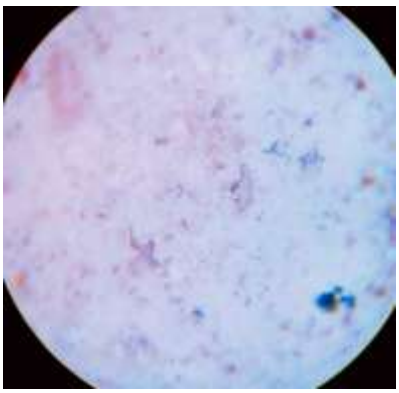


Figure 10: Weakly Gram-positive hooklets

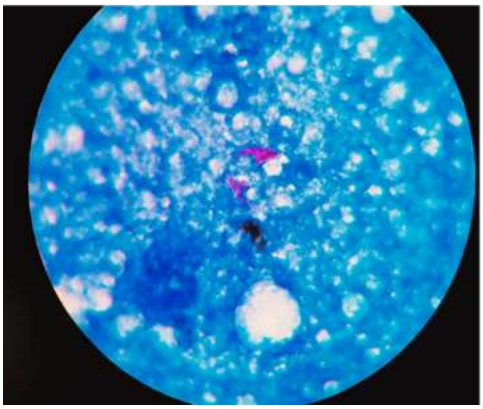


Figure 11: Pink coloured acid fast hooklets

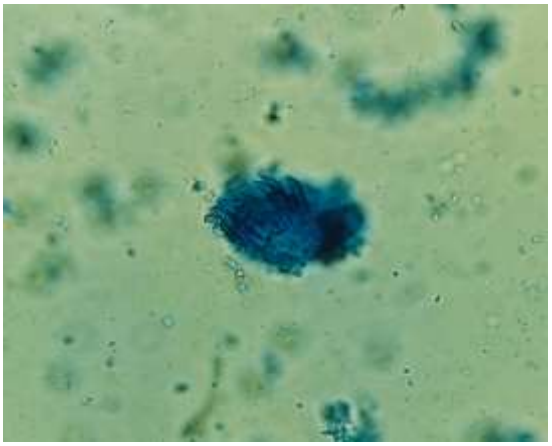


Figure 12: LPCB-Blue coloured hooklets

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Figure 13: Hydatid cyst in liver parenchyma

Case 3: Giant Pulmonary Hydatid Cyst Presenting as Complete Right Hemithorax Opacity

A 26-year-old male presented to the Department of General Surgery with complaints of intermittent fever, persistent dry cough, and progressive right-sided chest discomfort for three months. The patient denied hemoptysis, significant weight loss, or previous history of pulmonary tuberculosis. He belonged to a rural area with regular exposure to domestic animals, including dogs and livestock, which increased the suspicion of a zoonotic parasitic infection. On clinical examination, the patient was afebrile but had reduced air entry over the right hemithorax with diminished breath sounds on auscultation. Routine hematological investigations were unremarkable except for mild eosinophilia.

A chest radiograph revealed near-complete homogeneous opacification of the right hemithorax with compression of the adjacent lung parenchyma, initially raising the differential diagnoses of massive pleural effusion, lung abscess, or an intrathoracic neoplasm. Contrast-enhanced computed tomography (CT) of the thorax demonstrated a large, well-defined cystic lesion occupying the right lung, suggestive of a giant pulmonary hydatid cyst. The patient subsequently underwent surgical exploration through thoracotomy, which revealed a giant intact hydatid cyst measuring approximately **24 × 16 × 4 cm**. The cyst was carefully excised without intraoperative rupture to minimize the risk of dissemination and anaphylaxis. Microscopic examination of the aspirated cyst fluid (wet mount preparation) demonstrated numerous scolices and characteristic hooklets, confirming the parasitological diagnosis. Histopathological examination further established the diagnosis by demonstrating the laminated cyst wall and germinal layer typical of hydatid disease. The postoperative period was uneventful, and the patient was started on oral albendazole therapy for three months. At subsequent follow-up visits, the patient remained asymptomatic with complete clinical recovery and no radiological evidence of recurrence.

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Figure 15: Preoperative chest radiograph showing near-complete opacification of the right hemithorax

Figure 15 illustrates the preoperative chest radiograph demonstrating near-complete opacification of the right hemithorax caused by the giant pulmonary hydatid cyst, highlighting the atypical radiological presentation that closely mimicked other thoracic pathologies.

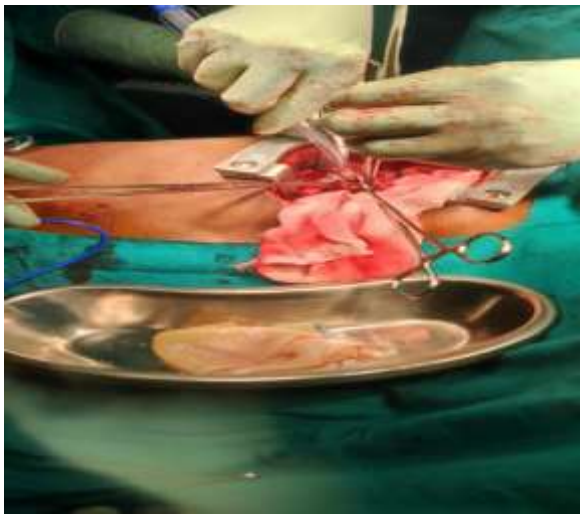


Figure 16: Extracted Hydatid cyst

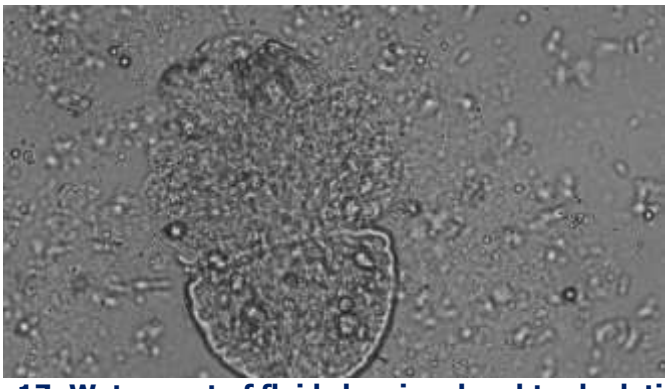


Figure 17: Wet mount of fluid showing daughter hydatid cyst

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Table 1: Summary of Cases

Variable	Case 1	Case 2	Case 3
Age	12 years	58 years	26 years
Sex	Male	Male	Male
Site	Kidney	Liver	Lung
Presentation	Renal mass	Sepsis	Giant thoracic mass
Imaging	USG + CT	USG + CECT	Chest X-ray + CT
Confirmation	Histopathology	Wet mount + Histopathology	Wet mount + Histopathology
Treatment	Pericystectomy	PAIR + Surgery	Thoracotomy
Outcome	Recovered	Recovered	Recovered

Note. CECT = contrast-enhanced computed tomography; CT = computed tomography; PAIR = puncture, aspiration, injection, and re-aspiration; USG = ultrasonography.

Discussion

The current case series demonstrates the wide range of hydatid disease clinical presentations as well as the difficulties in diagnosing atypical organ involvement. In underdeveloped nations where close contact with domestic dogs and animals is frequent, hydatid disease—which is mostly caused by Echinococcus granulosus—remains a significant public health risk. Unusual presentations, including kidney involvement or infected cysts with systemic signs, are rare and frequently result in delayed diagnosis and improper initial care, even though the liver (about 70%) and lungs (20–30%) are the most commonly affected organs. The three cases in this series highlight the significance of keeping a high index of suspicion, especially in endemic areas, and demonstrate the variety of clinical and radiological manifestations of hydatid illness(3).

In the first instance, a primary renal hydatid cyst appeared on imaging as a Bosniak II renal cyst. Only 2–4% of hydatid infections constitute renal hydatid disease, and isolated renal involvement is considerably less frequent. It is often mistaken for a simple renal cyst, cystic renal tumour, or renal abscess due to its rarity and nonspecific clinical appearance. Our patient was first diagnosed with a benign kidney cyst since computed tomography and ultrasonography did not show the traditional radiological signs of hydatid illness, such as daughter cysts or detached membranes(4). Only after surgical removal, when microscopic analysis of the cyst fluid revealed hooklets and scolices and histological analysis verified the distinctive laminated cyst wall, was a definitive diagnosis made. This case serves as a reminder that hydatid disease should always be taken into account when making a differential diagnosis for complex kidney cysts, particularly in patients from endemic regions or those who have previously been exposed to dogs or cattle(5).

The second patient showed pleural effusion, respiratory discomfort, and septic shock as a result of an infected hepatic hydatid cyst. A rare but possibly fatal consequence of a hydatid cyst is secondary bacterial infection, which might mask the underlying parasitic aetiology. Diagnosis is particularly difficult in these situations because patients frequently exhibit symptoms that resemble pyogenic liver abscess, severe pneumonia, or generalised sepsis. Our patient exhibited positive blood cultures for methicillin-resistant Staphylococcus aureus (MRSA), whereas aspiration of the hepatic cyst gave Escherichia coli, indicating superimposed bacterial infection(6). Nonetheless, the final diagnosis was made when hydatid hooklets were shown during wet mount examination. A tiered treatment strategy that included initial PAIR (Puncture, Aspiration, Injection, and Re-aspiration) for infection control and definitive surgical removal following stabilisation was well received by the patient. This instance highlights the importance of integrating parasitological, radiological, and microbiological studies to direct suitable treatment(7).

In the third instance, the right hemithorax was nearly completely occupied by a massive pulmonary hydatid cyst. Pulmonary hydatid cysts generally present with cough, chest pain, dyspnea, or hemoptysis; however, giant cysts are relatively uncommon in adults and may radiologically mimic massive pleural effusion, lung collapse, congenital cysts, or thoracic malignancies. In our patient, chest radiography demonstrated near-complete opacification of the right hemithorax, while surgical exploration revealed a giant hydatid cyst measuring 24 × 16 × 4 cm. The preferred course of treatment for these lesions is still complete surgical excision while maintaining functional lung parenchyma. In order to avoid rupture, secondary infection, anaphylaxis, and daughter cyst dissemination, early diagnosis is crucial(8).

The critical role of laboratory confirmation was a noteworthy finding in all three cases. The final diagnosis depended on the identification of the distinctive laminated ectocyst and germinal layer by histopathology and the demonstration of scolices or hooklets in aspirated cyst fluid, even though imaging modalities like computed tomography and ultrasonography offered useful anatomical information. These results highlight how crucial it is to combine clinical examination, imaging, microbiological analysis, pathological confirmation, and epidemiological history in order to make an accurate diagnosis(9).

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All things considered, this case series shows that hydatid disease can resemble a wide range of infectious, neoplastic, and surgical conditions. Understanding these unusual presentations can help reduce morbidity, prevent life-threatening complications, and improve long-term patient outcomes through early detection, prompt intervention, and appropriate multidisciplinary management(10).

Generalizability

Although this case series describes only three patients, the clinical observations may be relevant to healthcare settings in regions where hydatid disease is endemic. The cases illustrate that hydatid disease can involve uncommon anatomical sites, present with secondary bacterial infection and sepsis, or produce extensive pulmonary lesions that resemble other thoracic conditions. These observations may help clinicians recognize atypical presentations and include hydatid disease in the differential diagnosis when evaluating patients with compatible clinical and radiological findings. However, because the series was conducted at a single tertiary care centre and included only three patients, the findings cannot be generalized to all patients with hydatid disease. Further studies involving larger patient populations and multiple centres are required to establish the broader applicability of these observations.

Takeaway Lessons

This case series highlights three important clinical lessons. First, hydatid disease should be considered in the differential diagnosis of renal cystic lesions, particularly in patients from endemic regions, even when characteristic imaging features are absent. Second, secondary bacterial infection of a hepatic hydatid cyst may present with severe systemic infection and septic shock, emphasizing the importance of combining radiological findings with microbiological and parasitological investigations. Third, a giant pulmonary hydatid cyst may cause extensive hemithoracic opacification and mimic other thoracic conditions. Across these cases, careful clinical assessment, appropriate imaging, and parasitological or histopathological confirmation were essential for establishing the diagnosis and guiding treatment. These observations reinforce the importance of maintaining clinical suspicion for hydatid disease when evaluating unusual cystic lesions or unexplained infectious presentations.

Conclusion

In endemic areas, hydatid disease should continue to be a crucial differential diagnosis for cystic lesions of the kidney, liver, and lungs. Atypical presentations can mimic neoplastic, infectious, or inflammatory conditions, delaying diagnosis. Excellent clinical outcomes are achieved by early detection through imaging, microbiological confirmation, and histopathological examination, followed by prompt surgical or minimally invasive treatment with adjunctive albendazole therapy.

Limitations

This case series has several limitations. First, it includes only three patients from a single tertiary care centre, which limits the generalizability of the observations. Second, the descriptive nature of the case series does not allow comparisons between different diagnostic or therapeutic approaches or establish the effectiveness of any particular intervention. Third, the cases represent selected atypical presentations and may not reflect the full clinical spectrum of hydatid disease. Finally, the follow-up information available in the reported cases is limited, which restricts conclusions regarding long-term outcomes and recurrence. Despite these limitations, the cases illustrate unusual clinical presentations that may assist clinicians in recognizing hydatid disease in patients with atypical findings.

Acknowledgements

The authors thank the clinical and laboratory staff involved in the care and investigation of the patients included in this case series.

List of Abbreviations

CECT: Contrast-enhanced computed tomography
CT: Computed tomography
E. coli: *Escherichia coli*
MRSA: Methicillin-resistant *Staphylococcus aureus*
PAIR: Puncture, aspiration, injection, and re-aspiration
TB: Tuberculosis
USG: Ultrasonography

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Conflict of Interest

The authors declare that they have no conflicts of interest related to the publication of this case series.

Author Contributions

Arvind Kumar contributed to the clinical management of the patients and the preparation and critical revision of the manuscript. Supriya Kumari contributed to the laboratory investigations, interpretation of the findings, and preparation and revision of the manuscript. Both authors reviewed and approved the final version of the manuscript and agree to be accountable for its contents.

Data Availability

The clinical information supporting this case series is included in the article. Additional de-identified data may be made available by the corresponding author upon reasonable request, subject to institutional policies,

patient confidentiality requirements, and applicable ethical restrictions.

Author Biographies

Dr. Arvind Kumar is an Assistant Professor in the Department of General Surgery at the All India Institute of Medical Sciences (AIIMS), Deoghar, Jharkhand, India. His contribution to this case series concerns the clinical and surgical management of patients with atypical presentations of hydatid disease.

Dr. Supriya Kumari is a Senior Resident in the Department of Microbiology at the All India Institute of Medical Sciences (AIIMS), Deoghar, Jharkhand, India. Her contribution to this case series concerns the microbiological investigation and laboratory confirmation of hydatid disease.

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