Surgery as the Preferred Approach for Patients with Hydatid Cysts Ruptured into the Biliary Tract, Compared to Non-Invasive Methods Such as Percutaneous Aspiration, Injection, and Re-aspiration (PAIR)

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Abstract:

Background and Objective: Hepatic hydatid cyst is a common manifestation of hydatidosis caused by the parasite *Echinococcus granulosus*. In recent years, the percutaneous aspiration-injection-reaspiration (PAIR) technique has gained attention as a minimally invasive treatment option. However, in cases involving multiple or complex cysts, or where a cyst has ruptured into the biliary tree, this method may prove ineffective, demanding surgical intervention.

Case Presentation: This report describes a 54-year-old woman who presented with abdominal pain and multiple hepatic hydatid cysts, one of which had ruptured into the biliary tree. Following the failure of the PAIR technique, the patient underwent open surgery and was subsequently discharged after making a full recovery.

Conclusion: In patients with multiple or complex hepatic hydatid cysts, or in cases where a cyst has ruptured into the biliary tree, minimally invasive approaches-such as the PAIR technique-may not be effective. Open surgery remains the definitive and successful treatment for such patients.

***Keywords:** Liver Hydatid Cyst, Percutaneous Aspiration Method, Injection and Re-Aspiration, Aspiration, Multiple Liver Cysts, bile Duct, Open Surgery*

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Background and Objective

Hydatidosis, or cystic echinococcosis, is a chronic parasitic disease caused by the larval stage of *Echinococcus granulosus* and is considered one of the most significant zoonotic diseases globally. It is highly prevalent, particularly in regions with livestock farming and in developing countries-including the Middle East, the Mediterranean basin, Africa, South America, and Central Asia-and remains a major public health concern.[1,2]

The liver is the most common site of involvement in cystic echinococcosis, accounting for approximately 70% to 80% of cases, as it serves as the primary capillary filter encountered by oncospheres after they pass from the gastrointestinal tract.[1,3]

Hepatic hydatid cysts can remain asymptomatic for long periods and are often detected incidentally during diagnostic imaging. However, an increase in cyst size, the presence of multiple cysts, or the development of complications - such as infection, rupture, or communication with the biliary system - can lead to significant clinical manifestations.[4]

The rupture of a hydatid cyst into the biliary ducts is one of the most critical and dangerous complications of this disease; it may present with abdominal pain, jaundice, cholangitis, or bile leakage, and it complicates therapeutic decision-making.[1,5]

In recent decades, the percutaneous aspiration, injection, and re-aspiration (PAIR) technique has been introduced as a minimally invasive option for the treatment of simple, solitary hydatid cysts. However, evidence indicates that in cases involving multiple cysts, CE2 and CE3-type cysts, or instances where there is a connection to the biliary ducts, the failure rate and the incidence of complications associated with this method increase.[5,6] Therefore, the selection of an appropriate treatment modality must be based on the characteristics of the cyst, the patient's clinical status, and the risk of complications.

Case Presentation

A 54-year-old female, from Tehran, Iran and with no history of underlying medical conditions or prior surgeries, presented to the emergency department of Taleghani Hospital complaining of vague, persistent pain in the right upper quadrant of the abdomen. The patient reported no history of direct contact with livestock. Physical examination revealed localized tenderness in the right upper quadrant, with no signs of peritonitis; vital signs were stable.

Imaging studies, including abdominal ultrasound and CT scan, revealed multiple hydatid cysts in various lobes of the liver. One of these cysts showed evidence of a connection to the biliary system, accompanied by dilation of the intrahepatic bile ducts (Figure 1). Based on these imaging findings-and inlinewitha minimally invasive approach-an image-guided percutaneous aspiration, injection, and re-aspiration (PAIR) procedure was initially attempted. However, the appearance of bile fluid following aspiration confirmed a communication between the cyst and the biliary ducts; consequently, the PAIR procedure was halted.

Following pharmacological treatment with albendazole, the patient was prepared for surgical intervention. The albendazole regimen—administered at a dose of 400 mg twice daily—was initiated two weeks prior to the surgery. Given the patient's stable condition and the decision to proceed directly with surgical intervention, ERCP was not performed preoperatively. During open surgery, a cystectomy was performed, and the cyst cavity was irrigated with 20% hypertonic normal saline. Additionally, appropriate measures were taken to manage bile leakage. The postoperative course was uneventful. The patient’s postoperative hospital-stay lasted 6 days, and they were discharged in good general condition. At the three-month postoperative follow-up, the patient remained asymptomatic, with no evidence of disease recurrence or bile leakage.

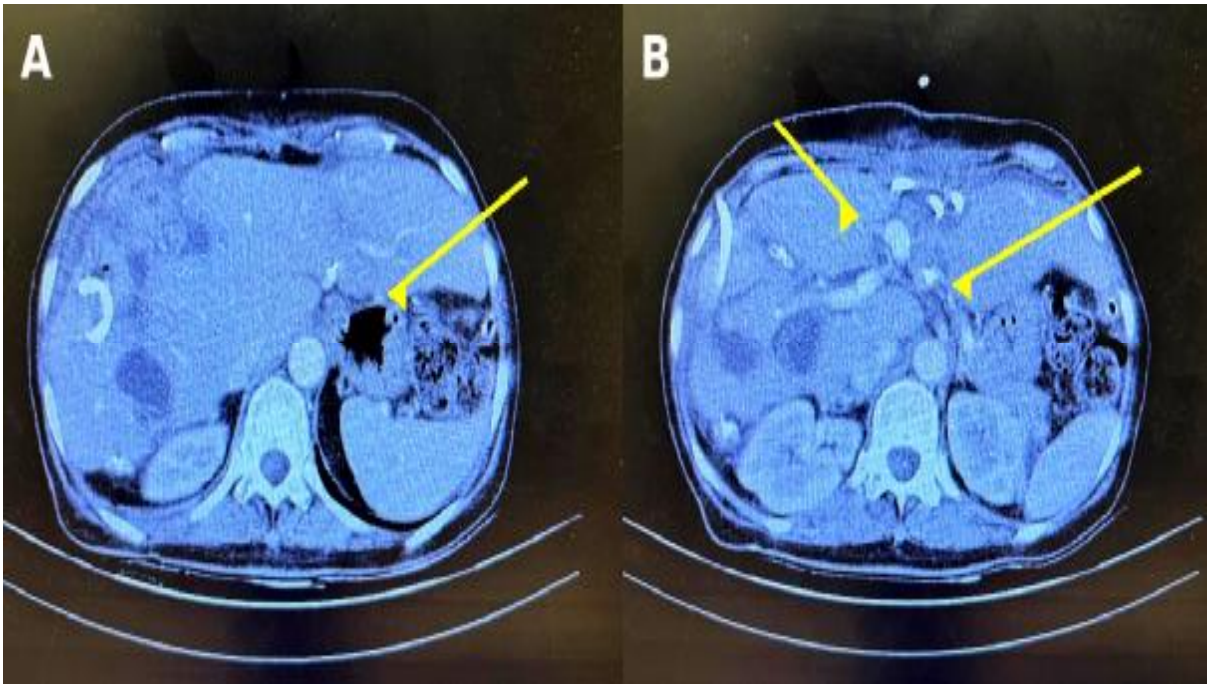


Figure 1- Abdominal CT scan (axial view with contrast injection) showing multiple hydatid cysts in different lobes of the liver. One of the cysts has a connection with the intrahepatic bile ducts, which is associated with the expansion of these ducts.

Discussion

In recent years, the percutaneous aspiration-injection-reaspiration (PAIR) technique has been introduced as a minimally invasive alternative to surgery for the treatment of simple hydatid cysts, yielding acceptable results in selected patients. [5,6] This approach is particularly recommended for solitary cysts that lack communication with the biliary tree and possess a simple structure.[6,7]

However, the presence of a communication between the cyst and the biliary ducts is considered a significant relative or absolute contraindication for the PAIR technique, as it may lead to biliary leakage, cholangitis, sepsis, and treatment failure.[1,5] Furthermore, in cases involving multiple cysts or cysts with complex internal membranes, there is an increased risk that viable parasitic elements will remain, potentially leading to disease recurrence.[6]

In the present case, the presence of multiple hepatic cysts, combined with a rupture into the biliary system, rendered the PAIR technique ineffective, necessitating surgical intervention as the definitive treatment. Recent review studies also emphasize that for complex cysts, open or laparoscopic surgery remains the gold standard of treatment.[1,4,6]

Surgery allows for the complete removal of the cyst, the management of biliary leakage, and a reduction in the risk of recurrence, albeit with a higher degree of invasiveness. Therefore, the choice of treatment modality should be individualized, based on a careful assessment of the risks and benefits associated with each approach.

Conclusion

Although the percutaneous aspiration-injection-reaspiration (PAIR) technique has yielded favorable results as a minimally invasive treatment for simple hepatic

hydatid cysts, the likelihood of treatment failure and complications increases in patients with complex or multiple cysts, or in cases where the cysts communicate with the biliary tree. Under such circumstances, the PAIR procedure may lead to bile leakage, cholangitis, or the need for re-intervention.

In the present case, the presence of multiple cysts combined with a rupture into the biliary system resulted in the failure of the minimally invasive approach, necessitating surgery. Open surgery allowed for the complete evacuation of the cysts, as well as the management and repair of the biliary communication.

Consequently, the choice of treatment for patients with hepatic hydatidosis should be individualized, based on the specific characteristics of the cysts, the presence of complications, and the patient's clinical status. Despite advancements in minimally invasive techniques, surgery continues to play a fundamental and decisive role in the definitive treatment of complex cases, particularly those involving biliary communication.

Informed Consent

Written informed consent was obtained from the patient for the publication of clinical data and imaging findings.

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