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CASE REPORT: HEPATIC ECHINOCOCCAL CYST RUPTURE INTO THE BILIARY TREE AND GALLBLADDER

Abidov U.O.

https://orcid.org/0000-0003-4872-0982

Bukhara State Medical

Institute named after Abu Ali ibn Sina

Uzbekistan Bukhara, A.Navoi st. 1

Tel: +998(65) 223-00-50 e-mail: info@bsmi.uz

Bukhara branch of the Republican

Scientific Center for Emergency

Medical Care Uzbekistan,

Bukhara region, 200100, Bukhara, st

. **Bakhouddin Nakshbandi** 159,

tel: +998652252020 E-mail:

bemergency@rambler.ru

Resume. Hepatic echinococcosis complicated by cyst rupture into the bile ducts and gallbladder is a rare but serious condition requiring immediate medical attention. This article presents a clinical case of a 36-year-old patient with a hepatic echinococcal cyst that ruptured into the biliary tree, leading to the development of mechanical jaundice and cholangitis. The diagnostic methods, including ultrasound, MRI, and endoscopic retrograde cholangiopancreatography (ERCP), are described, along with the successful use of endoscopic papillotomy and surgical treatment (choledochotomy) to remove parasitic elements and drain the bile ducts.

The treatment was supplemented with antiparasitic therapy using albendazole to prevent recurrence. Early diagnosis and the integration of surgical and endoscopic methods, combined with medical treatment, significantly improve the prognosis for patients with this complication.

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Keywords: hepatic echinococcosis, cyst rupture, bile ducts, gallbladder, mechanical jaundice, cholangitis, choledochotomy, endoscopic papillotomy, antiparasitic therapy.

Historical reference (description of a hepatic echinococcal cyst that ruptured into the bile ducts and gallbladder).

The first mention of a hepatic echinococcal cyst rupturing into the bile ducts and gallbladder appears in medical literature of the late 19th to early 20th century, when physicians began to more closely study the clinical manifestations of parasitic liver diseases. Historical descriptions of echinococcosis, including cases of cyst rupture into the biliary system, began to appear in medical texts during the late 19th century; however, precise sources for these descriptions were not always documented in the form of specific scientific publications.

One of the key early references to parasitic liver diseases is found in the work of the French surgeon Dominique Larrey, who was among the first to study such conditions. This information is reflected in 19th-century medical treatises such as *"Traité de Chirurgie"*, which describes cases of hepatic echinococcosis and its complications.

At that time, diagnosis of echinococcosis was limited, and treatment primarily consisted of surgical interventions, often performed without a clear understanding of the underlying causes of complications. Only with the development of radiological techniques and, later, ultrasound diagnostics did it become possible to more accurately identify and describe such cases. For a more in-depth analysis, it is also advisable to consult modern literature reviews on the history of echinococcosis and the surgical treatment of parasitic liver diseases.

Echinococcosis is a natural-focal zoonotic disease caused by tapeworms of the genus *Echinococcus*. The most common form is cystic echinococcosis, caused by *Echinococcus granulosus*. It is widespread in endemic regions around the world, including Central and Middle Asia, Russia, Southern Europe, Turkey, South America,

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Africa, and Australia. The spread of the disease beyond endemic zones is associated with population migration and increased tourist activity.

The liver is affected in 65–80% of cases of *Echinococcus granulosus* infestation [1,5,6,8]. Complicated forms of hepatic echinococcosis—such as suppuration, rupture into the abdominal cavity, or into the bile ducts with the development of obstructive jaundice—are observed in 24.9–54% of cases [2,3,6,8]. Rupture of parasitic elements or daughter cysts into the bile ducts is a rare complication, occurring in 3.7–7.9% of patients [4,5,8,12].

Intrabiliary rupture of the contents of a hepatic echinococcal cyst is the second most common complication, following only suppuration of the cyst. It is considered one of the most severe manifestations of the disease. A major challenge in the treatment of hepatic echinococcosis complicated by biliary rupture is that patients typically present at the hospital with various stages of hepatic insufficiency caused by mechanical obstruction and biliary hypertension. This exacerbates the severity of their condition, increases the risk of postoperative complications and recurrence, and prolongs the postoperative rehabilitation period.

An enlarging cyst can compress surrounding structures and lead to hepatic atrophy and fibrosis [9,11]. Compression and displacement of the bile ducts may often result in spontaneous rupture.

Timely diagnosis and treatment are essential in cases of intrabiliary perforation or rupture of a hepatic hydatid cyst, as these can lead to biliary obstruction with up to 50% mortality [10,11,14].

Following rupture, protoscolices and micro-acephalocysts can survive and implant into tissues after surgery or cyst rupture [8,10].

Imaging tools such as ultrasound (US), abdominal computed tomography (CT), magnetic resonance cholangiopancreatography (MRCP), and endoscopic retrograde cholangiopancreatography (ERCP) are useful modalities for diagnosing the disease.

Ultrasound and CT are the first-line diagnostic methods and can be used in most clinical settings [7]. Among more invasive tools, ERCP can aid in definitive diagnosis

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and treatment, particularly sphincterotomy in patients with intrabiliary cyst rupture. MRCP can help localize the site of biliary obstruction [8,13,15,16].

Currently, the primary method of treatment for intrabiliary rupture of a hepatic echinococcal cyst is endoscopic clearance of the bile ducts from chitinous membranes, followed by echinococcectomy.

This article presents the clinical picture of a ruptured hepatic echinococcal cyst into the bile ducts, including the diagnostic process and treatment of the patient. We report our own clinical case observation.

A 36-year-old male patient was admitted to the emergency department of the Bukhara branch of the Republican Scientific Center of Emergency Medical Care with complaints of right upper quadrant abdominal pain, fatigue, fever, jaundice, vomiting, yellowing of the skin, acholic stools, and loss of appetite. According to the patient, symptoms had been present for three days. His general condition was of moderate severity. He was conscious and alert. The skin and sclerae were icteric. Blood pressure was within normal limits at 120/80 mmHg, and oxygen saturation in ambient air was 96%. Body temperature was 38.8°C. On abdominal palpation, there was tenderness in the right side. Peritoneal irritation signs were negative.

In addition to laboratory analysis and evaluation of the patient's condition, abdominal ultrasound was performed to support the diagnosis. Ultrasound revealed both intrahepatic and extrahepatic bile duct dilation. The gallbladder was distended but with a normal wall thickness. Large intact liver cysts were noted in segment IV, surrounded by multilayered membranes—possibly indicating a ruptured or complicated echinococcal cyst.

Abdominal ultrasound: A hepatic echinococcal cyst measuring 11 cm in diameter was detected; no signs of hepatic fibrosis were found. Dilation of intrahepatic and extrahepatic bile ducts was noted, indicating obstruction. The right lobe of the liver presented a large solitary cyst with a hyperechoic wall, measuring 11×9 cm, with multiple internal septations and daughter cysts.

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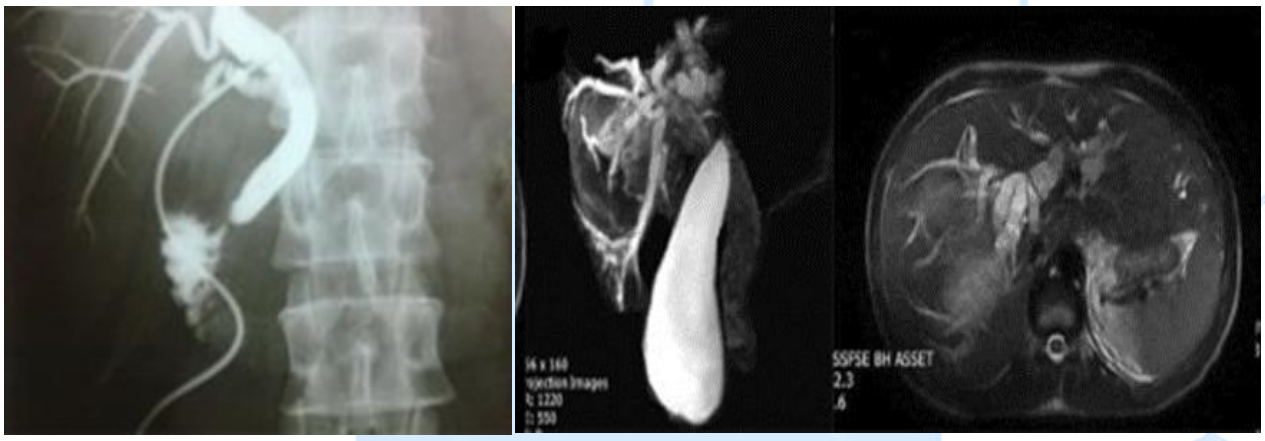
MRI with cholangiography: Perforation of the cyst into the bile ducts with partial obstruction of the common bile duct was confirmed.

Computed tomography (CT): In the right lobe of the liver, a volumetric lesion measuring 11×9 cm was observed with smooth edges, clear contours, and a heterogeneous structure due to multiple rounded cystic inclusions.

Blood tests: Fibrinogen – 3.9 g/L; General biochemical blood test total protein – 60 g/L; Glucose – 4.7 mmol/L; Urea – 6.0 mmol/L; Total bilirubin – 83 μmol/L; Hemoglobin – 127×10⁹/L; Erythrocytes – 4.15×10⁹/L; CI – 0.9×10⁹/L; Leukocytes – 5.2×10⁹/L; Eosinophils – 3%; Monocytes – 3%.

The main challenge in treating hepatic echinococcosis complicated by rupture into the biliary tree is that patients typically present to the hospital at various stages of liver failure caused by mechanical obstruction and biliary hypertension. This worsens the severity of their condition, increases the risk of postoperative complications and recurrence, and prolongs the postoperative rehabilitation period.

The patient underwent endoscopic retrograde cholangiopancreatography (ERCP), which confirmed the diagnosis. During the procedure, the common bile duct was found to be dilated to more than 25 mm (Pic. 1).



Pic. 1. A **– ERCP X-ray image of the biliary tract after cyst rupture.** B **– MRI cholangiography.**

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One of the key elements of hepatic echinococcectomy is adherence to the principle of antiparasitic safety (disinfection of the parasite's germinal elements during surgery).

In this context, ERCP offers an advantage, as it provides a minimally invasive option for managing biliary complications of echinococcosis, reducing the need for more invasive surgical interventions.

The procedure begins with endoscopic papillosphincterotomy, which facilitates access to the bile ducts. Then, after thorough cleansing of the biliary tract, a catheter is placed into the bile duct.

Using a special catheter, cannulation of the bile duct is performed, followed by the injection of contrast material to obtain X-ray images (Fig. 1) (cholangiograms), which help assess the location of the cysts and the extent of their involvement. With the use of various instruments such as extraction baskets or balloons, hydatid sand, membrane fragments, and other cyst components are removed from the bile ducts. The bile ducts are then thoroughly irrigated to eliminate residual fragments and prevent infection.

Surgical procedure name: Upper midline laparotomy. Echinococcectomy of the right liver lobe. Fundus-down cholecystectomy. Drainage of the residual cyst cavity and the right subhepatic space.

Clinical diagnosis: Tense echinococcal cyst of the right liver lobe. Complication: Rupture of the echinococcal cyst into the bile ducts. Parasitic obstructive jaundice.

In the second stage, surgical treatment of the echinococcal cyst was performed via open method.

An upper midline incision with bilateral extension into the right and left subcostal regions was made. On the visceral surface of segment IV of the liver, a nodular formation measuring 11.0×9.0 cm with dense consistency was found, extending to the left triangular and falciform ligaments; it was adherent to the hepatogastric and hepatoduodenal ligaments.

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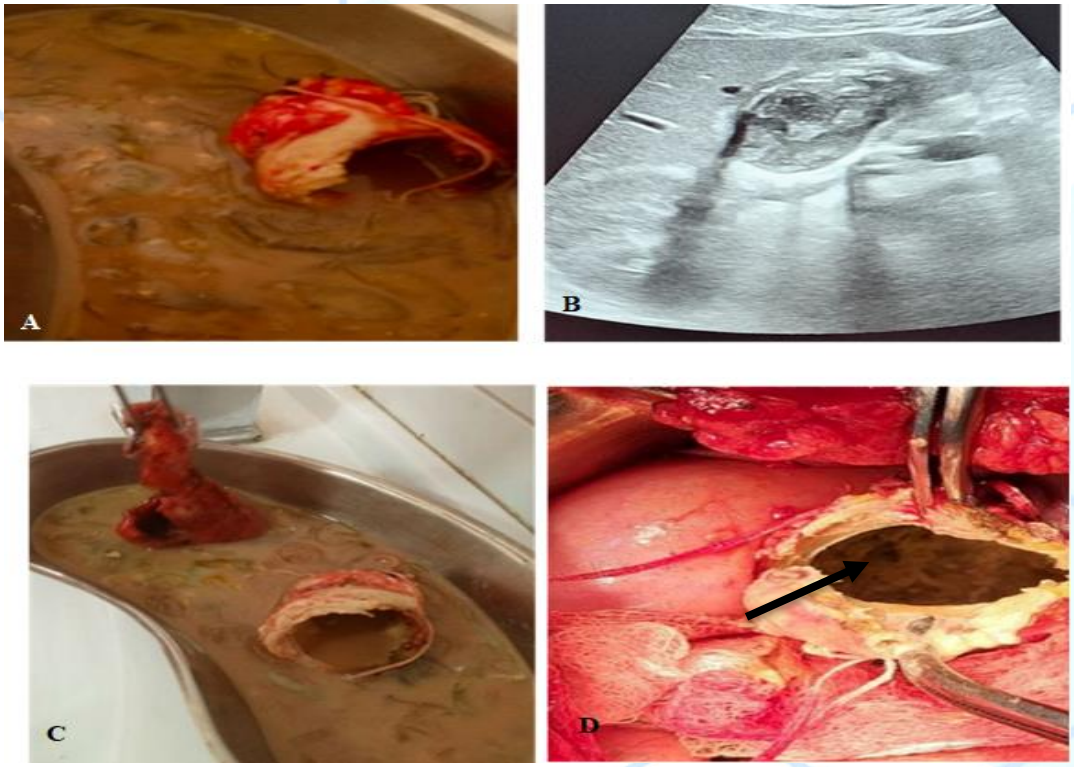
The common bile duct was dilated up to 25 mm. Fundus-down cholecystectomy was performed; the cystic duct had a diameter of 10 mm. The lumen of the hepatic duct was opened above the junction of the cystic duct via a 10 mm longitudinal linear incision. Active discharge of echinococcal cyst contents and turbid fluid mixed with bile was noted from the common hepatic duct (Pic. 2).



Pic.2. A–C – Removed gallbladder and cyst contents that ruptured into the bile ducts and gallbladder. B – Ultrasound showing chitin and echinococcal fluid in the gallbladder cavity. D – Partial pericystectomy and biliary fistula (indicated by

With full assurance of complete cyst removal, a drain was placed in the subhepatic space.

Discussion. Rupture of a hepatic echinococcal cyst into the biliary tree is a rare but serious complication of echinococcosis. The primary diagnostic method involves imaging studies such as ultrasound (US), magnetic resonance imaging (MRI), and endoscopic retrograde cholangiopancreatography (ERCP), which allow for precise localization of the perforation site and assessment of the extent of biliary tract involvement.

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In recent decades, endoscopic treatment methods such as ERCP have significantly transformed the approach to managing complicated forms of hepatic echinococcosis. The advantages of endoscopic intervention include minimal invasiveness, rapid patient recovery, and the ability to perform both diagnostic and therapeutic procedures simultaneously.

Surgical treatment of hepatic echinococcosis remains the mainstay of care for these patients. Communication between parasitic liver cysts and the bile ducts is a fairly common occurrence, as evidenced by the presence of bile in control drainage following echinococcectomy. The size and location of the parasitic cyst are risk factors for the formation of a connection between the cyst cavity and the biliary ducts.

True rupture of daughter cysts or parasitic elements into the hepatic duct (hepaticocholedochus) is a very rare complication that can lead to bile duct obstruction with the development of obstructive jaundice and cholangitis. Such situations often require urgent therapeutic interventions, with a reported mortality rate of 1.8–4.5%.

Conclusion. In cases of echinococcal cyst rupture into the bile ducts, the clinical picture is dominated by symptoms of obstructive jaundice, the resolution of which is essential before definitive surgical intervention can be safely performed. Endoscopic sanitation and retrograde administration of germicidal agents into the residual cavity offer promising prospects for reducing disease spread during the second stage of surgical treatment.

This case demonstrates the successful management of a hepatic echinococcal cyst rupture into the biliary tree using modern endoscopic technologies.

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