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Case Report
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Case Report: Neonatal Biliary Ascites Successfully Managed with Ultrasound-Guided Peritoneal Drainage

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Abstract

Neonatal biliary ascites is a rare but important cause of progressive abdominal distension in early infancy. Diagnosis is often delayed because jaundice may be mild and stool color may remain normal. We report a term neonate presenting with increasing abdominal distention simulating bowel obstruction and respiratory compromise secondary to massive biliary ascites. Ultrasound demonstrated large-volume free fluid without biliary duct dilatation. Diagnostic paracentesis confirmed bile-stained ascites. The infant underwent therapeutic ultrasound-guided peritoneal drainage, resulting in rapid clinical improvement and stabilisation. Subsequent hepatobiliary scintigraphy demonstrated tracer extravasation consistent with spontaneous perforation of the common bile duct. Definitive surgical repair was not required with excellent recovery. This case highlights the value of early imaging, the diagnostic role of paracentesis, and the effectiveness of minimally invasive drainage as a definitive measure without further surgery. Ultrasound-guided ascitic drainage (paracentesis) for neonatal biliary ascites is a critical diagnostic and therapeutic procedure. It involves inserting a small catheter into the peritoneal cavity under local anesthesia and real-time ultrasound visualization to safely remove bile-stained fluid. This case highlights the importance of early imaging, minimally invasive stabilization, and multidisciplinary coordination in the management of neonatal bilious ascites.

Keywords: Neonatal Biliary Ascites; Spontaneous Bile Duct Perforation; Neonatal Cholestasis; Ultrasound-Guided Peritoneal Drainage; Hepatobiliary Scintigraphy; Extrahepatic Bile Duct Perforation; Neonatal Abdominal Distension; Bilious Ascites; Neonatal Surgery; Peritoneal Drain

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Introduction

Neonatal ascites is an uncommon clinical finding with diverse etiologies, including urinary, chylous, meconium and bilious causes [1-3]. Bilious ascites is particularly rare and is most often due to spontaneous perforation of the bile duct, a condition with unknown cause and variable presentation. Affected neonates may exhibit mild jaundice, normal or pale stools, and gradually progressive abdominal distension. Diagnosis typically requires imaging such as ultrasound or hepatobiliary scintigraphy, and management often involves stabilization with peritoneal drainage rarely followed by surgical correction for choledochal large perforations and distal biliary obstruction [4-6].

This case adds to the limited literature by describing successful early stabilization using ultrasound-guided drainage in a neonate with massive biliary ascites.

Case Report

A male term neonate (birth weight 3200g) was born via uncomplicated spontaneous vaginal delivery to a healthy mother. Apgar scores were 8 and 9 at 1 and 5 minutes. The infant was well until day 26 of life, when progressive abdominal distension and poor feeding were noted. On day 27, he developed tachypnoea and increasing abdominal girth and abdominal radiograph showed central gasless and peripheral bowel loops prompting general practitioner to refer us for admission for possible bowel obstruction (Figure 1).

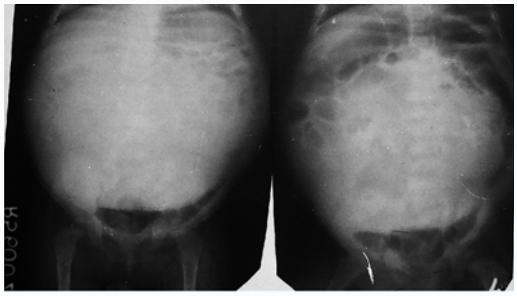

Figure 1: Abdominal radiograph demonstrating massive free intraperitoneal fluid. Upright film and supine film images showing large-volume ascites occupying all central lower abdomen and flanks, with bowel loops floating centrally in the upper abdomen.

Figure 2: Diagnostic paracentesis confirming bile-stained ascitic fluid. **A)** Clinical photograph with gastric and urinary bladder decompression and **B)** Image of aspirated peritoneal fluid demonstrating characteristic greenish-yellow bile staining and the ultrasound guided placed large bore cannula peritoneal biliary ascites drainage in situ. Laboratory analysis confirmed markedly elevated bilirubin concentration consistent with biliary ascites.

On examination, markedly distended, tense abdomen with mild subcostal recession due to abdominal pressure, mild clinical jaundice, normal stool color and no dysmorphic features. Vital signs showed tachypnea with respiratory rate of 70/min and mild hypoxia (SpO_2 94% in air). Cardiovascular examination was normal (Figure 2).

Laboratory results showed normal complete blood counts, total bilirubin: 18 μmol/L (direct 8 μmol/L), ALT: 62 U/L, GGT: 68 U/L, CRP: normal, coagulation: mildly prolonged PT (18 s), serum urea and electrolytes: normal.

Abdominal ultrasound revealed massive anechoic ascites normal liver echotexture, normal gallbladder morphology, no biliary duct dilatation, no choledochal cyst, no evidence of urinary tract obstruction. These findings were consistent with literature describing neonatal ascites evaluation.

Diagnostic paracentesis yielded greenish-yellow fluid and decompressed the abdominal massive distention. Ascitic fluid analysis demonstrated bilirubin: markedly elevated, protein: high (exudative), triglycerides: normal, cell count: low inflammatory cells. The presence of bile-stained fluid confirmed biliary ascites.

Differential diagnosis included spontaneous perforation of the bile duct (most likely), choledochal cyst perforation, biliary atresia with leak, traumatic perforation (unlikely) and severe neonatal hepatitis with bile leak

Treatment

Due to respiratory compromise from abdominal distension, the infant underwent ultrasound-guided peritoneal drainage under local anesthesia.

A large bore intravenous cannula was inserted into the right lower quadrant under real-time ultrasound guidance. Approximately 180 mL of bilious fluid was drained over the first 6 hours, resulting in immediate improvement in respiratory effort and feeding tolerance.

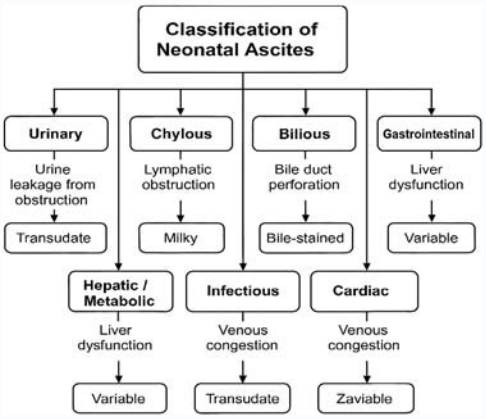

Figure 3: Classification of neonatal ascites by etiology and fluid characteristics.
Schematic diagram illustrating the major categories of neonatal ascites: urinary, chylous, bilious, gastrointestinal, hepatic/metabolic, infectious, cardiac, and idiopathic. Each category is linked to its underlying mechanism and typical ascitic fluid profile. This classification aids in diagnostic evaluation and guides targeted investigations such as ultrasound, paracentesis, and metabolic screening.

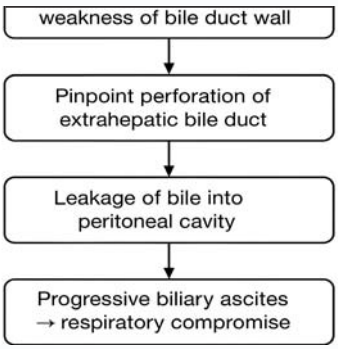

Figure 4: Pathophysiology of neonatal biliary ascites.

Category	Mechanism	Typical Fluid	Key Clues
Urinary	Urine leakage from obstruction	Transudate	Male neonates, renal insufficiency [1]
Chylous	Lymphatic obstruction	Milky, high TG	Congenital lymphatic issues [1]
Bilious	Bile duct perforation	Bile-stained	Mild jaundice, progressive ascites [1]
GI	Perforation / peritonitis	Exudate	Distension, peritonitis signs
Hepatic/ Metabolic	Liver dysfunction	Variable	Jaundice, metabolic derangements [2]
Infectious	Viral/bacterial	Exudate	TORCH, sepsis
Cardiac	Venous congestion	Transudate	Heart failure signs
Idiopathic	Unknown	Variable	Diagnosis of exclusion

Table 1: Summary table of various types of neonatal ascites.

Broad-spectrum antibiotics were initiated prophylactically.

Definitive management

On day 3 post-drainage, hepatobiliary scintigraphy demonstrated small walled off extravasation of tracer consistent with spontaneous perforation of the common bile duct, consistent with known patterns of bilious ascites in neonates.

Outcome and Follow-Up

The infant recovered well post procedure of ultrasound guided peritoneal drainage of biliary ascites. The peritoneal drain was removed on day 5 after minimal output. Enteral feeds were gradually reintroduced and tolerated. Liver function tests normalized by week 3.

At 3-month follow-up, patient is asymptomatic, thriving well with normal growth, no jaundice, normal stool color. Ultrasound showed normal biliary tree and no ascites.

Discussion

Bilious ascites in neonates is rare and most commonly results from spontaneous perforation of the bile duct, a condition with unclear etiology and variable clinical presentation (Figure 3). The etiology although remains unclear, proposed mechanisms include congenital weakness of the duct wall, ischemia, infection, or distal obstruction. Etiology in biliary ascites in neonates is rare and most commonly caused by spontaneous bile duct perforation (SBDP), often occurring at the junction of the cystic and common bile ducts [7]. Pathophysiology of biliary ascites is shown in Figure 4.

Early diagnosis is challenging because jaundice may be mild or fluctuating, and stool color may remain normal. Diagnosis is often delayed because the jaundice may be mild or intermittent, stools may remain normal and ascites progresses gradually. Diagnosis is straight forward if the ascitic fluid bilirubin level is higher than the serum bilirubin level, biliary ascites is confirmed [8]. Summary of various neonatal ascites types is depicted in table 1.

Ultrasound is the first-line imaging modality and can identify ascites and exclude urinary or chylous causes. Paracentesis is essential for confirming bile-stained fluid [9].

Role of ultrasound-guided drainage in this case, drainage provided: rapid respiratory improvement, decompression of the abdomen, stabilization, prevention of abdominal compartment syndrome and proved therapeutic by providing serosal patch by omentum and intestinal loops to the area of bile leak sealing it naturally once the fluid was drained.

This aligns with recommended management strategies for neonatal bilious ascites, where early stabilization and /or definitive treatment is crucial before any definitive surgical repair if at all required [10].

Purpose: To relieve abdominal pressure (therapeutic) and obtain fluid for biochemical analysis (diagnostic), specifically looking for elevated bilirubin levels which confirm a biliary origin.

Guidance: Ultrasound scan is mandatory in neonates to precisely locate fluid pockets and avoid injury to the liver, spleen, or distended bowel loops.

Anesthesia: Performed under local anesthesia to numb the insertion site, ensuring the neonate remains comfortable.

Technique: We typically used a "Z-track" method for needle insertion to prevent persistent fluid leakage from the puncture site after the drain is removed.

Further management: While drainage provides immediate relief, the underlying cause often requires further imaging like a HIDA scan or MRCP and may eventually necessitate surgical repair if the perforation does not seal spontaneously with conservative drainage.

Risks and Monitoring: Potential complications and rare risks include infection, hemorrhage, or very rarely accidental bowel perforation especially if done without ultrasound guidance [11].

Post-Procedure Care: Clinical teams monitor vital signs and measure the amount of fluid drained to prevent hemodynamic instability.

We believe this case is of particular interest because:

- Neonatal biliary ascites is rare and often diagnostically challenging.
- Ultrasound-guided drainage is an effective, minimally invasive stabilisation strategy that is under-reported in the literature.
- The case reinforces the importance of early imaging, diagnostic paracentesis, and multidisciplinary coordination in neonatal surgical emergencies.

We believe this case will be of value to clinicians involved in neonatal care, paediatric surgery, radiology, and emergency medicine, and we hope it will contribute meaningfully to the understanding and management of neonatal bilious ascites. A giant biliary pseudocyst of the lesser sac following spontaneous rupture of bile duct in the lesser sac and closure of the opening of the lesser sac into the greater sac or abdominal cavity has been reported [1].

However, the initial diagnostic and/or therapeutic procedure of ultrasound guided peritoneal fluid drainage was not applied and major laparotomy was performed which would have its own additional morbidity and mortality [12]. We strongly believe that the diagnostic and /or therapeutic potential of this simple but very effective minimal invasive bedside test help avoid major surgical procedures and should always be applied as a first step before embarking on major invasive procedures with added anesthetic and surgical risks whenever possible.

Learning Points

- Neonatal biliary ascites is rare and should be considered in infants with progressive abdominal distension and mild jaundice.

- Ultrasound and diagnostic paracentesis are key to early diagnosis.

- Ultrasound-guided peritoneal drainage is an effective temporizing measure that stabilizes the neonate before surgery.

- Spontaneous perforation of the bile duct is the most common cause of bilious ascites in neonates and is surgically correctable with excellent outcomes.

Our case describes a term neonate who presented with progressive abdominal distension and respiratory compromise due to massive biliary ascites. Early diagnostic ultrasound and paracentesis confirmed bile-stained ascites, and ultrasound-guided peritoneal drainage

provided diagnostic and therapeutic rapid clinical stabilisation. Subsequent hepatobiliary scintigraphy identified spontaneous perforation of the common bile duct, which was spontaneously repaired following real time ultrasound guided peritoneal drainage which provided serosal patch from the omentum and bowel loops to the perforation site sealing and with excellent outcome.

Conclusion

Neonatal biliary ascites, though rare, should be considered in infants presenting with progressive abdominal distension and mild jaundice. Early recognition through ultrasound and diagnostic paracentesis is essential. This case demonstrates that ultrasound-guided peritoneal drainage is a safe and effective temporising measure that facilitates not only the initial clinical stabilisation but for the definitive therapeutic value. Prompt multidisciplinary coordination and imaging-guided intervention can significantly improve outcomes in neonatal bilious ascites. Ultrasound-guided ascitic drainage (paracentesis) for neonatal biliary ascites is a critical diagnostic and therapeutic procedure. It is safe, effective minimal invasive, bedside procedure under local anesthesia, allows immediate symptom relief, higher success rate, fewer complications than non-guided methods, and can be done with a long-term tunneled drain for frequent needs for simple ascites.

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