



## Acalculous Cholecystitis in a Neonate

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### Abstract

Acalculous Cholecystitis (AAC) is uncommon in neonates, associated in most cases with intercurrent systemic disease. The clinical manifestations can range from asymptomatic patients to obstruction or perforation secondary to gallbladder inflammation. The diagnosis of AAC can be challenging due to lack of specific clinical features, and abdominal ultrasound is the most sensitive and practical diagnostic tool. Classically, cholecystectomy is considered the treatment of choice. We report a case of neonatal acalculous cholecystitis successfully managed non-operatively.

### Case Presentation

An 18-day-old new-born boy was admitted to our hospital with a 12-h history of irritability, vomiting and anorexia. He was being monitored by his pediatrician due to weight stagnation. He did not have any other personal or family history of interest.

On admission he presented with irritability, slight skin paleness and was poorly hydrated. In addition, abdominal examination revealed moderate tenderness and a right upper quadrant mass. Laboratory tests included normal blood cell count, elevated liver enzymes (GOT 253 IU/L, GPT 133 IU/L, GGT 185 IU/L, alkaline phosphatase 207 IU/L) and conjugated hyperbilirubinemia of up to 2.84 mg/dl. Acute phase reactants, serologies, cultures and liver function tests were normal for our patient's age.

Abdominal ultrasound showed a markedly distended gallbladder (42.9 mm × 10.4 mm) with wall thickening (2.5 mm), hyperemia, internal membranes, sludge, significant perivascular edema and a small amount of perivascular fluid. No gallstones were present. The biliary tree was not dilated. Therefore, diagnosis of acute acalculous cholecystitis and dehydration was made.

Medical treatment was initiated with intravenous fluid therapy, analgesia and antibiotics with amoxicillin/clavulanic acid and gentamicin. Progressive clinical improvement allowed restart of oral tolerance 24 h after admission and to discontinue fluid and antibiotic therapy at the third and fifth days respectively.

The inflamed gallbladder progressively decreased in size. Follow-up ultrasound scans at 1 and 3 weeks demonstrated reduction in size and thickness of the gallbladder. At 2 months, the patient was asymptomatic with normalization of analytical and imaging tests (Figure 1).

### Discussion

Neonatal acalculous cholecystitis is an inflammatory disease of the gallbladder in the absence of demonstrated gallstones [1].

Acute Alithiasic Cholecystitis (AAC) is the most frequent form of acute cholecystitis in children. It has been reported in healthy children, most of them are associated with infectious diseases such as bacterial, parasitic and viral, immune-mediated disorders, systemic diseases, medications (ceftriaxone, furosemide) and malignancy [2,3].

The pathogenesis of AAC is poorly understood [4]. Gallbladder ischemia may be the main factor in sepsis, trauma and burns [1]. Dehydration can be seen in those pathologies which lead to bile stasis that may alter chemical bile composition and cause gallbladder mucosal injury [5].

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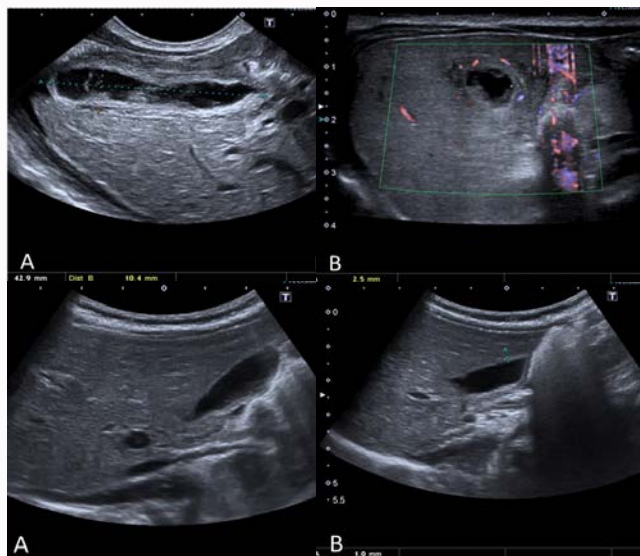
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**Figure 1:** Above: Ultrasound of the gallbladder at the time of diagnosis. A: Longitudinal view of the gallbladder showing marked distention (42.9 mm × 10.4 mm), wall thickening, internal membranes and sludge and some perivesicular fluid at the fundus. B: Transverse view of the gallbladder showing parietal thickening (2.5 mm) with hyperemia, internal membranes and sludge and perivesicular edema. Below: Follow-up ultrasound at 7 weeks showing normalization of the gallbladder which now appears with clear content as well as normal size and wall thickness.

The diagnosis of AAC can be challenging due to lack of specific clinical features [1]. Abdominal ultrasound is the most sensitive and practical diagnostic tool to achieve an early diagnosis, even in critically ill children [1,4]. For this reason, ultrasonographic criteria have been established in older children and adults: Gallbladder wall thickening over 3 mm, distention of the gallbladder more than 5 cm in transverse diameter, pericholecystic fluid and sludge. The presence of at least 2 of these criteria, in addition to the absence of gallstones supports the diagnosis of AAC in children [5].

In our patient, 2 of these 4 criteria were clearly present, pericholecystic fluid and sludge. In addition, parietal thickening and gallbladder distention were also found, although they did not absolutely meet these sonographic criteria. This is due to the fact that these ultrasound criteria are meant for older children and adults. There are no well-established criteria in neonates, and the gallbladder measurements differ in this age range. In patients under one year of age, a longitudinal gallbladder diameter of 0.9 cm with a maximum range of up to 1.2 cm is considered normal, while the maximum coronal diameter would be 1.4 cm [6]. It is for this reason that we believe that the distention found in our 18-day-old patient (42.9 mm × 10.4 mm) and marked wall thickening of 2.5 mm should also be considered diagnostic.

In adults AAC is surgically treated. In children conservative management is usually the rule. Regardless of the etiology, analgesia and suspension of oral feeding and rehydration is mandatory [2,5]. Antibiotics are prescribed, even in cases with a viral infection in order to prevent further complications.

A timely surgical approach might be considered in selected patients if the clinical condition allows it and before irreversible clinical deterioration. The main indications for surgery are empyema and perforation [2]. A low value of hemoglobin, platelet count and fibrinogen, the presence of pericholecystic fluid, high sonographic scores and septic shock are risk factors of mortality in childhood [7]. In our patient, none of these risk factors were present and conservative management achieved good results with complete resolution.

Many cases of AAC have a good prognosis because of they are due to viral illness or dehydration, as in our case. Children with AAC must be admitted to hospital in order to provide close clinical and sonographic monitoring, to assure a complete recovery and solve potential complications which may even require surgery.

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