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## Acalculous cholecystitis in Nigerian children

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**Abstract** Sixteen children with acalculous cholecystitis (AC) were treated over a 9-year period (13 male and 3 female). Their ages ranged from 8 to 18 years (median 11). Eight (50%) presented with complications (perforation 4, gangrene 2, empyema 2); 13 (80%) presented with acute AC with a duration of symptoms of 2 weeks or less while 3 (20%) presented with chronic AC with symptoms present for more than 3 months. The diagnosis was made by ultrasound except in the patients with complications, who were diagnosed at laparotomy. *Salmonella typhi* was cultured in the bile and blood in 2 cases and the Widal titre was significantly elevated in 4 others. One child had chronic blockage of the cystic duct by a lymph node; in 9 there was no identifiable cause. Open cholecystectomy was successfully performed in 15 cases, while 1 child was managed non-operatively. The need for early diagnosis of cholecystitis in children is obvious if the potentially life-threatening complications of perforation and gangrene are to be avoided.

**Keywords** Cholecystitis · Acalculous · Children

### Introduction

Gallbladder disease is rare in the pediatric age group [1]. While much has been written on childhood cholecystitis in Europe and North America, reports from tropical Africa are still scanty [2, 3]. In the developed countries the incidence of gallbladder disease seems to be increasing [4, 5], which may be attributed to improved diagnostic facilities. The various etiologic agents include

salmonella infection, major cardiac or abdominal surgery, other systemic illnesses, and prolonged parenteral nutrition [1]. We retrospectively reviewed the case records of all children treated in our institution over a 9-year period to define the clinical spectrum and treatment of this rare childhood disease in African children.

### Patients and methods

The hospital records of all children aged less than 18 years admitted between January 1992 and March 2001 to Jos University Teaching Hospital for cholecystitis were retrospectively reviewed.

### Results

There were 18 cases of cholecystitis, 2 in sickle-cell-positive children with calculous cholecystitis; 16 children had acalculous cholecystitis (AC) and form the basis of this report. During the study period no child was identified as having any other form of gallbladder disease.

The age range was 8–18 years (median 11). There were 13 boys and 3 girls. Thirteen children had acute AC with a duration of symptoms of 2 weeks or less. Of this group, 11 were male and 2 were female (age range 7–14 years, median 9). Three children had chronic AC with a duration of symptoms of more than 3 months. In this group there were 2 boys aged 14 and 18 years and 1 15-year-old-girl. All had been treated for peptic ulcer disease without success.

Table 1 shows the clinical presentation of the 13 children with acute AC, all of whom had leukocytosis ranging from  $12.2\text{--}15.5 \times 10^9/l$  (median  $13.6 \times 10^9/l$ ). Total serum bilirubin in 6 patients who had liver function tests (LFT) ranged from 75 to 145 mmol/l (normal 17 mmol/l). The liver enzymes were normal in all 6 patients. The 3 patients with chronic AC presented with right-upper-quadrant (RUQ) abdominal pain and nausea of at least 3 months duration. None had a palpable gallbladder mass. Their leukocyte counts and LFTs were normal.

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**Table 1** Acute acalculous cholecystitis: clinical presentation

Presentation	No. of patients
Pyrexia	13
Right upper abdominal pain	13
Jaundice	6
Vomiting	5
Palpable mass	3
Generalized peritonitis	6
Total	13

Ultrasonography (US) was the only radiologic test used for the diagnosis of AC. Eight patients with acute AC had preoperative abdominal US scans. The gallbladder wall was thickened in all cases, pericholecystic fluid collection was present in 5. In 1 other child there was a mass in the cystic duct that proved at laparotomy to be a lymph node, causing cystic-duct obstruction. Abdominal US was done in all 3 patients with chronic AC. The gallbladder was reported as normal in all cases. No parasitic infection was identified in any of the children with AC, and none had any pre-existing medical condition or had had surgery. One patient with an empyema of the gallbladder had an associated malrotation. Patients with suspected typhoid ileal perforation had been started on chloramphenicol before referral to the surgeons.

The 6 patients who presented with features of generalized peritonitis underwent a laparotomy. Two had a single perforation of the fundus of the gallbladder, while 2 others had multiple perforations of the fundus. In 2 patients the fundus was gangrenous, but no perforation had occurred. In 4 there was abscess collection in the right subphrenic space. A cholecystectomy was performed in all cases with antibiotic coverage. Of the 2 patients with gallbladder empyemas, 1 had a cholecystectomy while the other had a tube cholecystostomy followed 12 weeks later by a cholecystectomy.

The remaining 5 patients with acute disease without complications, received IV fluids, analgesics, and antibiotics. In the patients with salmonella infection, chloramphenicol 50 mg/kg IV was given. Cholecystectomy was scheduled on the next elective operation list in 4 cases, while 1 was managed non-operatively. All the children with chronic AC underwent an open cholecystectomy. No anatomic abnormalities were present in the biliary tract and no parasites were identified.

In the 12 patients with acute AC, the gallbladder was reported macroscopically as edematous. Histology showed evidence of acute inflammation characterized by polymorphonuclear infiltration, fibrinous exudate, and focal hemorrhages. In the 3 patients with chronic AC, the histology showed transmural chronic inflammation. Bile was cultured in 6 patients; 4 cultures were sterile while 2 grew *Salmonella typhi*. In these 2 patients *S. typhi* was also isolated from the blood. In 4 other patients, the widal titer was reported as O (somatic antigen) = 1:160, H (flagella antigen) = 1:240 in 3, while 1

patient had O = 1:240 and H = 1:320 (significant: > 1:80 dilutions with a high index of suspicion or a rising titer on serial tests).

Three patients had postoperative wound infections including 1 who developed an intra-abdominal abscess that required laparotomy and drainage 2 weeks after surgery. There were no deaths in this series.

## Discussion

Acalculous cholecystitis accounts for most cases of cholecystitis in children in Jos. This is similar to a report from Zaria [2], where all but one of seven children treated over a 10-year period had AC. This is in contrast to a report from the United States [1], where 25 cases were treated over a 25-year period. The age distribution of our patients is similar to that from Western countries [1], but our patients were predominantly boys [1, 6].

The exact cause of acute AC is uncertain, but it has been reported commonly after shock, salmonella infection, major abdominal and cardiac surgery, burns, sepsis, and parenteral nutrition [1, 7-10]. Acute AC has also been reported in the acquired immune deficiency syndrome [11] and in a patient with *Plasmodium falciparum* infection [12]. It is postulated that shock, sepsis, and trauma cause gallbladder ischemia and biliary stasis, which may predispose to acute AC [1, 13].

Two of our patients had *S. typhi* infection. There was indirect evidence of salmonella infection in 4 others as shown by significant elevation of the Widal titer, although the bile was sterile. None of our patients had surgery or any other predisposing illness. Though *P. falciparum* infection is endemic in our environment, we have not seen any case of cholecystitis directly related to this disease. In tropical countries, *Ascaris lumbricoides* is a well-known cause of biliary disease, including cholecystitis [14, 15], especially in children. No cases were encountered in this series, which could be due to the fact that antihelminthics are widely used, reducing complications from ascariasis.

Tsakayannis et al. [1] reported two forms of AC in children. The clinical features of our patients with acute AC compare favorably with their report. Our 3 patients with chronic AC presented with long-standing RUQ pain and had no complications.

US was the main diagnostic investigation. A preoperative diagnosis was made in less than 50% of our cases with acute AC. The majority were diagnosed as perforated appendicitis. Such errors in diagnosis have also been noted by others [2, 4, 5, 7]. Delayed diagnosis in our environment may be responsible for the high incidence of life-threatening complications of perforation and gangrene. Abdominal US, oral or IV cholangiography, and biliary scintigraphy [7, 14] are usually used for early diagnosis of cholecystitis. A high index of suspicion is needed for these investigations to be carried out preoperatively.

The treatment of AC ranges from non-operative to cholecystostomy or cholecystectomy. Most investigators, however, consider cholecystectomy the procedure of choice [1, 2, 16]. Open cholecystectomy was safely performed in 15 of our patients, 6 as an emergency, 1 as an interval procedure after cholecystostomy, and 8 as early cholecystectomies. About one-half of our patients presented late with complications. Follow-up is poor in our environment, as most patients live in rural areas far from tertiary health facilities. Cholecystectomy, which is a definitive treatment, may be performed safely even in seriously ill children, although intraoperative circumstances may warrant a cholecystostomy. Laparoscopic cholecystectomy [17, 18] is not currently available in our center. The 1 patient managed non-operatively remained symptom-free during 1 year of follow-up.

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