Perforated acute appendicitis complicated by multiple intraabdominal abscesses caused by *Enterococcus Avium* in a non-compromised child

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Intraabdominal abscesses are frequent complications of acute appendicitis, diverticulitis, and pancreatitis. However, abscess formation complicating acute appendicitis by *Enterococcus avium (E.avium)* is rare. *Enterococcus avium* is one of the species of the *genus Enterococcus*, found normally in the intestinal tract of human beings, pigs, and chickens. It is a rare pathogen in humans. *Enterococcus avium* induced abscesses in human beings have primarily been restricted to the abdominal cavity and include those of pancreas,[1] gall bladder[2] and spleen.[3] Rarely it has been reported from intracranial abscesses.[4,5] The bacteriology of intraabdominal abscess is diverse and usually consists of a mixture of aerobes and obligate anaerobes. Pure isolation of *E.avium* from the intraabdominal abscess is rare. Therefore, accurate identification of species involved is essential to guide determination of the most appropriate therapy. Here, we report a case of multiple intraabdominal abscesses caused by *E. avium* from a non-immunocompromised child presented with vague signs of acute appendicitis.

A 2-year-old Saudi boy was admitted with 5 days history of fever, abdominal pain, vomiting and diarrhea. On examination, he looked ill with mild to moderate dehydration. Abdominal examination revealed generalized tenderness. Other physical examination was unremarkable. Body temperature was 37.8^{0}C. Laboratory investigations showed hemoglobin 9.5 g/L, white blood cell count 33 x 10^3/L with 97% neutrophils and Erythrocyte sedimentation rate of 100 mm/hour. Biochemical profile and arterial blood gases were normal. Midstream urine, blood, and stool specimens were collected for culture. Intravenous Ceftriaxone was prescribed for presumed gastroenteritis. On day 3, the patient continued to have abdominal pain with diarrhea and high grade fever (40^{0}C). Culture results were negative. Ceftriaxone was replaced by intravenous tazocin. On day 7, with the use of broad spectrum antibiotics and enough intravenous hydration, his clinical course continued the same. Abdominal ultrasound (**Figure 1**) showed multiple intraabdominal low-density masses consistent with abscesses. Contrast-enhanced abdomen computed tomography scan confirmed a 5x2.5 cm right subhepatic abscess. Other smaller abscesses were seen between intestinal loops and behind the urinary bladder extending down to the right iliac fossa (**Figure 1**). The appendix was not visualized by CT scan, and there was an evidence of free gas in the right side of the abdomen. Based on radiological findings, provisional diagnosis of rupture appendix with multiple abdominal collections was made. Culture of the CT guided pus aspirate from the large abscess revealed pure growth of *E. avium*, which was identified by conventional biochemical tests.[6] The organism was catalase negative, hydrolyzed bile–esculin and grew in 6.5% sodium chloride. The identification was confirmed as *E. avium* by API 20 STREP (bioMerieux, France). In standard antimicrobial disk-diffusion test, the organism was susceptible to ampicillin, erythromycin, gentamicin, ciprofloxacin, and vancomycin. Intravenous vancomycin was commenced as indicated by the culture sensitivities and continued for 10 days. The patient subsequently made an uncomplicated recovery and was discharged in a stable condition. Two weeks later, he was readmitted electively for laparoscopic appendectomy. During procedure, dense adhesion of the appendix to the cecum and ileum was noted. The histopathology diagnosis of remnant of appendix revealed acute appendicitis with granulomatous reaction and calcification suggestive of previous perforation. The post-operative course was uneventful, and he left the hospital 2 days after the intervention.

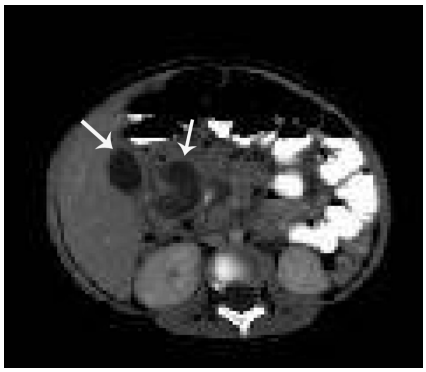

Figure 1 - Contrast-enhanced abdominal CT scan showing 5 x 2.5 cm (arrows). Right subhepatic abscess and other abscesses between intestinal loops and behind the urinary bladder.

Enterococcus faecalis and *Enterococcus faecium* constitute the species of enterococci most commonly recovered from clinical specimens; the incidence of other 12 species and their roles in specific disease processes remains unknown. *Enterococcus avium* is a gram-positive Group D streptococcus, found normally in the intestinal tract of human beings as part of polymicrobial flora. It is unusual though recognized cause of urinary tract and biliary infection, septicemia, suppurative abdominal lesions, peritonitis and rarely intracranial abscess.[4,5] Disease causing secondary intraperitoneal abscess include appendicitis, diverticulitis, pancreatitis, perforated peptic ulcers, inflammatory bowel disease and abdominal surgery. Acute appendicitis has protean

manifestations. It may simulate almost any other acute abdominal illness. Pelvic appendicitis in particular may simulate acute gastroenteritis. Pain is poorly localized. Nausea, vomiting and diarrhea tend to be more prominent than in other forms of appendicitis. In children, rupture appendicitis is still responsible for more than 50% of the cases of subphrenic abscesses.[6] The 2 sites for loculation of intraperitoneal spread after rupture appendicitis are the pelvic recess and the right subhepatic space. There are various treatment options for perforated appendicitis, including open or laparoscopic appendectomy, image guided drainage with antibiotics, antibiotics without intervention or plan for surgery. In a recent report by McCann JW, et al.[7] Successful management was achieved with minimally invasive image-guided drainage procedures combined with antibiotics in 42 children with acute perforated appendicitis with multiple intraabdominal abscesses.[7] These infections are typically polymicrobial. Anaerobes, in particular *B. fragilis*, *E. coli*, *Klebsiella*, *proteus spp* and *Enterococci* are the most frequently isolated organisms.[8] The organism in the present case was isolated in pure culture, highlighting its potential pathogenicity. In the literature, we found only 3 cases of intraabdominal abscess due to *E. avium* reported in elderly patients. Farnsworth,[3] described a rare case of *E. avium* splenic abscess in 84 years-old man presenting with vague clinical signs. Verhaegen et al,[2] reported the isolation of *E. avium* from bile and blood in a patient with acute cholecystitis and gallbladder abscess. The third case was reported from a patient with the pancreatic abscess and chronic pancreatitis.[1] In contrast to other commonly isolated *Enterococcus spp*, *E. avium* is usually susceptible to clindamycin and gentamicin. However, all *Enterococcal spp* including *E. avium* are intrinsically resistant to cephalosporin.

In conclusion, the diagnosis of intraabdominal abscess as a complication of acute appendicitis in a child presenting with vague gastrointestinal symptoms should be considered. In addition, *E. avium* should be included as a rare etiology of intra-abdominal abscess for appropriate selection of treatment.

Received 20th May 2009. Accepted 30th July 2009.

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