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Acute Appendicitis In Young Children-A Diagnostic Challenge

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Case

Miss O.D. a 1 year 4 month old female child presented to us at Jimoh hospital, Benin City on 27th September 2005 with the following complaints: inability to pass stool; abdominal distension; vomiting; and fever all of two weeks duration. Before presentation she had treatment at a private hospital where she received injection ceftriaxone for 3 days, nasogastric intubation, and 4.3% dextrose in 0.18% saline. She spontaneously passed seven round worms (ascaris lumbricoides) while on admission in that hospital.

On examination she was febrile (38.1°C), and dehydrated. The chest was normal but the abdomen was grossly distended.

Abdominal x-ray was suggestive of small bowel obstruction with multiple air fluid levels, absence of gas in the rectum but no free peritoneal gas. Packed cell volume was 35%. Human Immunodeficiency Virus 1 and II screen, Widal test, Random blood sugar, and Electrolytes, urea and creatinine were normal. Total white blood cell count was 7,700 cells/mm^3, neutrophils 60%, lymphocytes 35%, monocytes 0% eosinophils 5% and basophils 0%.

Our assessment was that of acute intestinal obstruction probably due to ascariasis with complicating peritonitis.

She was placed on intravenous infusion of 4.3% Dextrose in 0.18% saline; cefuroxime, genticin; metronidazole, nil by mouth, continous nasogastric aspiration, and worked up for exploratory laparotomy. Access was via supraumbilical transverse muscle cutting incision. Findings were those of pyoperitoneum, gangrenous-ruptured appendix leaking stools and pus into the general peritoneal cavity with fibrinous exudates, adhesions and interloop abscesses. Appendicectomy was performed; irrigation and lavage of the peritoneal cavity done and a pelvic drain left insitu.

The abdominal drain was removed in 48 hours and enteral feeding commenced on day 3-post operation.

The post-operative course was complicated by anaemia and wound infection due to staphylococcus aureus, which were managed by blood transfusion and the relevant antibiotics. She spent 10 days on admission and was discharged home well.

Discussion

Acute abdominal pain is the most common condition necessitating surgical admission to a paediatric hospital. The vast majority of cases are due to either appendicitis or acute non-specific abdominal pain.[1]

Appendicitis is the commonest acute surgical emergency of childhood, and occurs in approximately 2-4 per 1000 infants. It is usually seen in children older than 5 years but can occur at any age. Atypical clinical findings are seen in 30-50% of children, especially the younger ones and often leads to a delayed diagnosis.[2,3] It is however a rare disease in infants and very young children.[4]

The diagnosis is usually based on medical history and physical examination. However non-specific clinical presentations make a diagnosis difficult in infants. In addition it is not easy to communicate with children in this age group. Therefore acute appendicitis always manifests as perforation or sepsis in this population.[4] This is what happened in the index case.

A number of factors have been associated with an increased likelihood of perforated appendicitis, including young age[5,6] delay in seeking medical attention[7,8] and delay in treatment once the patient reaches medical care.[9,10]

Douglas et al[11] found that in children with acute appenditicitis, perforation was more common in both black and Hispanic children compared with white children. However no data exists that suggests that black and Hispanic patients develop appendicitis that is more prone to perforation.[11]

Diagnosis of appendicitis in children poses a continuing diagnostic dilemma for emer-

gency room physicians and paediatric surgeons.[3, 12, 13]

Several scoring systems have been designed to improve the accuracy of preoperative diagnosis[12,14,15] but none has proved satisfactory.

Various biochemical and haematological markers have equally been assessed in their role of improving diagnostic accuracy of acute appendicitis in children: C-reactive protein, total white blood cell count, Leucocyte differential count (our patient had normal total and differential leucocyte counts), serum and peritoneal levels of interleukin-8 (IL-8), IL-10, granulocyte colony-stimulating factor, interferon gamma soluble intercellular adhesion molecule-1, matrix metalloproteinase-9 and tissue inhibitor of metallo proteinases-1. In a study by Dalal I et al[16] peritoneal granulocyte colony-stimulating factor levels were elevated in subjects with perforation but the study noted that presently it was not practical to differentiate appendicitis in a paediatric population from other causes of abdominal pain based on the detection of systemic inflammatory response markers.[16] C-reactive protein has been found not to be a good tool in making a diagnosis of acute appendicitis.[17] Similarly measurement of procalcitonin levels proved to be of no value in the diagnosis of acute appendicitis.[18]

The investigation of the acute abdomen in infants and children has evolved during the last two decades, placing radiologists at the forefront of the evaluation and diagnosis of acute right lower quadrant abdominal problems.[19] Ultrasound and Computerised Tomography (CT) scans of the abdomen have increasingly become helpful in reaching a diagnosis, although some worry on the widespread use of CT in children has been expressed concerning radiation.[1] The reported sensitivity of ultrasound varies between 87 and 95% vs 95-97% for helical CT while the specificity ranges between 85 and 98% for ultrasound and 94 and 97% for helical CT.[2]

Ultrasound criteria for the diagnosis of acute appendicitis include the identification of tubular, non compressive, aperistaltic bowel which demonstrates a connection with caecum and blind terminal.[20] Others include measurement of the antero-posterior diameter, mural thickness, and width of periappendicular fat tissue. These are highly significant ultrasound criteria in the evaluation of the appendix inflammation level.[20]

An improvement in the diagnoses has been reported in a second clinicial and sonographic examination after fluid substitution and the application of large bowel enema.[3,18]

Routine ultrasound study in paediatric patients with suspected acute appendicitis is a worthwhile diagnostic procedure that may save money, shorten hospital stay, decrease the complication rate and avert unnecessary surgery.[21]

CT is a complementary tool[2] but in the developing nations like Nigeria these imaging tools may not be accessible or affordable by the patient. Our patient could not afford a CT scan. Her parents were peasant farmers. The surgeon may in these circumstances proceed with laparotomy. Laparascopic appendicectomy has been found to be safe and effective method of managing children with acute uncomplicated appendicitis[22] but is not widely available in developing nations.

In the assessment of the paediatric patient with acute abdomen it is important to remember all the differential diagnosis of the acute abdomen but in particular some peculiar conditions such as intussusception, torsion of ovarian teratoma, periappendicitis, acute non-specific mesenteric lymphadenitis, omental infarction, Burkitt's lymphoma and blunt abdominal trauma which has been associated with appendicitis.[23]

In conclusion, in children with abdominal pain, high diagnostic accuracy of appendicitis can only be achieved by a carefully combined evaluation of all individual diagnostic parameters and repeated investigations.

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