

## Case Report

## THERE IS A NEED TO CONSIDER ACUTE APPENDICITIS IN ACUTE ABDOMEN IN CHILDREN: A CASE REPORT.

Fente B<sup>1</sup>, Egu CB<sup>2\*</sup>

<sup>1</sup>Department of Surgery, Niger Delta University Teaching Hospital, Okolobiri, Bayelsa State, Nigeria<sup>1</sup>.

<sup>2</sup>Department of Surgery, Gloryland Medical Centre, Yenagoa, Bayelsa State, Nigeria<sup>2</sup>.

\*Correspondence: Dr. Egu, Chinedu Brian; +2348062879477; alexbrian4real@gmail.com

### Abstract

**Background:** Appendicitis is relatively rare in infants under 36 months of age and for obvious reasons the patient is unable to give a history. The diagnosis is therefore delayed with increase in the incidence of complications which may occur such as bowel perforation. Appendicitis in this young age group is also more aggressive, possibly because of their short omentum. Complete aversions to food, vomiting, lack of sleep during the attack and complete absence of bowel sounds at the early stages are very common features.

The diagnosis of acute appendicitis in children remains a challenge, even with the availability of advanced diagnostic imaging. Many patients present late with complications. Here, we report a case of perforated gangrenous appendix presenting as intestinal obstruction in a 4-year-old.

**Case presentation:** A 4-year-old female presented to our Emergency Department with generalized abdominal pain and distension that we explored for presumed intussusception. On exploration, laparotomy revealed purulent fluid localized in the right lower quadrant of the abdomen, gangrenous appendix with perforation at its base, gross bowel oedema at the ileocecal junction, side-to-side adhesion of a loop of the small bowel close to the ileocecal junction.

**Conclusion:** Acute appendicitis in young children is uncommon. The delay encountered in the diagnosis and management may be as a result of poor communication skill, inability to elicit physical signs in children that are irritable, atypical presentation, and overlap of symptoms with other disorders. When patients present late to the hospital, complications such as perforated appendix and peritonitis may ensue. To make a diagnosis in this age group, requires a high index of suspicion, a careful history, and thorough physical examinations. Early diagnosis and prompt surgical intervention helps to reduce the high-risk of morbidity and mortality that is associated with complicated appendicitis.

**Key words:** Appendicitis. Intestinal obstruction. Pre-school children. Acute abdomen

**Cite this article:** Fente B, Egu CB. There is a need to consider acute appendicitis in acute abdomen in children: A case report. Yen Med J. 2020;2(2):96 – 99.

### INTRODUCTION

Appendicitis is relatively rare in infants under 36 months of age.<sup>1</sup> Acute appendicitis is reported to account for 1–2% of paediatric surgical admissions in the Emergency room.<sup>2-4</sup> Overall, 1–8% of children presenting with abdominal pain have acute appendicitis.<sup>5,6</sup> However, despite the availability of advanced diagnostic imaging, the diagnosis of acute appendicitis in young children remains a challenge as most of such patients present late with complications such as perforation leading to abscess formation, generalized peritonitis and sepsis.<sup>7</sup>

The delay in making diagnosis of acute appendicitis in children is attributed to nonspecific presentations, overlap of symptoms with other childhood illnesses, the inability of children to express themselves and difficult abdominal examination. Misdiagnosis rate ranges from 28 to 57% in 2 to 12-year-old children and approaches to nearly 100% in children younger than 2 years.<sup>7</sup> Here we report a case of perforated gangrenous appendix with intestinal obstruction in a 4-year-old child.

Embryologically, the appendix, a midgut derivative, is first delineated during the fifth month of gestation.<sup>1</sup> It

is a blind muscular tube with mucosal, submucosal, muscular and serosal layer and a few submucosal lymphoid follicles which are noted at birth.<sup>1</sup> These follicles enlarge, peak from 12 – 20 years and then decrease. This correlates with the peak incidence of acute appendicitis.<sup>1</sup> The position of the base of the appendix is constant.<sup>1</sup> It is found at the confluence of the three-taenia coli of the caecum, which fuses to form the outer longitudinal muscle coat of the appendix. This is used to find an elusive appendix as gentle traction of the taenia coli, particularly the anterior taenia, will lead the operator to the base of the appendix.

A diagnosis of acute appendicitis is usually made using a high-resolution ultrasound scan.<sup>1</sup> It is an inexpensive and non-invasive study and it does not expose the patient to radiation. The elements of the wall of the appendix have a typical target appearance. Appendicitis is suspected when wall thickening is demonstrated beyond 8-10 mm, luminal distension and a lack of compressibility.<sup>1</sup> It can also be used in detecting free intraperitoneal fluid collections which may suggest abscess formation, and to exclude other conditions like ovarian cyst.<sup>1</sup>

As this facility is presently not available in Yenagoa and its environs, there is the need to depend on the clinical acumen of the clinician and other ancillary studies.

Appendicitis is uncommon in infants under 36 months of age<sup>1</sup> and these patients are unable to give history. The diagnosis is therefore delayed especially when they present with complications such as bowel perforation. Appendicitis in this group is also more aggressive, possibly because of the short omentum,<sup>1</sup> complete aversion to food, vomiting, lack of sleep during attack and complete absence of bowel sounds at early stages are very common features.<sup>1</sup>

**CASE PRESENTATION**

A 4-year-old girl of Nigeria origin presented with a 4-day history of generalized abdominal pain, abdominal distension, nausea, vomiting, passage of watery stool and constipation of about 2 days duration. There was associated dysuria and fever. On examination, she was mildly dehydrated, febrile (T=37.7 °C), with a pulse rate- of 92beats per minute, generalized abdominal tenderness worse on the right lower abdomen, positive rebound tenderness at the McBurney point, abdominal distension and hyperactive bowel sounds. Laboratory investigations, such as urinalysis and serum

electrolyte and full blood count, were essentially normal except mild hypokalaemia (K= 3.3mmol/l). Plain abdominal radiograph showed dilated large bowel loop on supine view with multiple air-fluid level on erect view, these images are shown in Figures 1A & B.

Laparotomy revealed purulent fluid localized in the right lower quadrant of the abdomen, gangrenous appendix with perforation at its base, gross bowel oedema at the ileocecal junction, side-to-side adhesion of a loop of the small bowel close to the ileocecal junction. The appendix was mobilized, the appendiceal artery ligated and the appendiceal stump was managed with ligations and inversion using purse string. The patient’s recovery was uneventful and she was managed with intravenous fluids and antibiotics post-surgery and discharged home in a stable condition. Informed consent was obtained from her parents for participation in this case study.

**Table 1: Mantrels (Alvarado) Score**

Features	Points
<b>Migration of pain from central abdomen to right lower quadrant</b>	1
<b>Anorexia</b>	1
<b>Nausea</b>	1
<b>Tenderness at right lower quadrant</b>	2
<b>Rebound tenderness</b>	1
<b>Elevated temperature ≥38°C</b>	1
<b>Leucocytosis (≥10,400/mm<sup>3</sup>)</b>	2
<b>Shifted WBC (75% Neutrophils)</b>	1
<b>Total</b>	10



**Figure 1A: Plain abdominal X-ray supine view.**



**Figure 1B: Plain abdominal X-ray erect view.**

## DISCUSSION

Acute appendicitis is still rare in children below the age of 6 years of age, accounting for only less than 5% of all childhood appendicitis.<sup>4,6</sup> The majority of children in this age group present with complex complaints usually lasting less than 2 days and up to 17% have the symptoms for more than 6 days before the final diagnosis is reached.<sup>4,6</sup> In this age group, abdominal pain is the most common presenting symptom (89% to 100%), followed by vomiting (66% to 100%), fever (80% to 87%) and anorexia (53% to 60%). On examination, localized right lower quadrant tenderness (58% to 85%) predominates over the diffuse tenderness (19% to 28%). Other physical signs include involuntary guarding (85%), rebound tenderness (50%), and temperature greater than 37.5 °C (82%).<sup>4,6</sup>

In our index case, patient had symptoms for up to 4 days before diagnosis was reached, she presented with abdominal pain, nausea, vomiting, fever, abdominal distension, constipation, hyperactive bowel sound. Poor communication of symptoms because of age could have led to the delay in making an early diagnosis.

The non-specific clinical features in children less than 5 years of age, irritability, difficult communication, inability to adequately carry out physical examination on them, and the overlap of symptoms with other childhood illnesses add to the delay in making diagnosis of acute appendicitis and high misdiagnosis rate. Hence, they are more likely to develop complications such as perforation and abscess formation, other factors which contribute to bowel perforation are thin-walled appendix, and inadequate omental barrier. The differential diagnosis in these children include, but not limited to, acute

gastroenteritis, upper and lower respiratory tract infections, urinary tract infections, cholecystitis, constipation, intussusception, pelvic inflammatory disease, blunt abdominal trauma, obstructed hernia, testicular torsion, orchitis, nephrolithiasis, right hip septic arthritis, dehydration, sepsis, encephalopathy, and meningitis.<sup>1,6,8</sup>

The overall rate of missed diagnosis ranges from 70 – 100% among children of 3 years and below, 19 – 57% in pre-school age group (with perforation in 43 – 72% of the cases). This rate decreases to 12 – 28% for school age children and less than 15% in adolescents.<sup>8-10</sup>

Plain abdominal radiographs are routinely performed in case of acute abdomen. Radiologic findings that are suggestive of acute appendicitis include right sided scoliosis, localized ileus, soft tissue mass, free peritoneal fluid, faecolith and bowel obstruction. Recent studies suggest that normal plain radiographs in acute appendicitis are misleading. Therefore, plain abdominal radiographs are mostly recommended in those cases of acute abdomen, where intestinal obstruction, peritonitis, renal or gallstones are suspected.<sup>9</sup>

In our case, plain abdominal radiograph showed features suggestive of intestinal obstruction, with the beginning of obstruction corresponding with the ileocecal junction. Fig 1.

Several scoring systems have been designed as alternative or complementary ways to improve the diagnostic accuracy of acute appendicitis.<sup>6,10</sup> An improved diagnostic accuracy in adult population has been reported in some studies. Alvarado scoring system (MANTRELS) is one of commonly used scoring systems (Table 1).

Early diagnosis and prompt surgical intervention helps to reduce the high-risk of morbidity and mortality that is associated with complicated appendicitis. In this scoring system, patients with a score less than 5 can be investigated for non-appendicular cause of pain, those with score of 5–6 should be admitted for observation and further investigations; patients with a score of 7 and above, most likely have acute appendicitis and will benefit from surgery. The Alvarado score of 7 or higher has a sensitivity of 88% to 90% and a specificity of 72% to 81% for acute appendicitis.<sup>6,11</sup>

Our patient had an ALVARADO score of 7, thus necessitating an urgent laparotomy. Open appendectomy has been the practice for acute appendicitis in young children all over the world. However, with the advent of minimally invasive techniques, laparoscopic appendectomy has become increasingly popular among paediatric surgeons. Recently, researchers have started the use of antibiotics alone to treat low grade appendicitis as an alternative to surgery when the family refuses or prefers to avoid surgery.<sup>12,13</sup>

When the diagnosis of acute appendicitis is made in the absence of a localized mass (appendicular mass), the treatment is immediate surgical removal of the appendix (appendectomy).<sup>1,6</sup>

### CONCLUSION

Acute appendicitis in young children is uncommon. The delay encountered in the diagnosis and management may be as a result of poor communication skill, inability to elicit physical signs in children that are irritable, atypical presentation, and overlap of symptoms with other disorders. When patients present late to the hospital, complications such as perforated appendix and peritonitis may ensue. To make a diagnosis in this age group, requires a high index of suspicion, a careful history, and thorough physical examinations. Early diagnosis and prompt surgical intervention helps to reduce the high-risk of morbidity and mortality that is associated with complicated appendicitis.

### REFERENCES

1. O'Connell PR, Russell RC, Williams NS, Bulstrode CJ. The vermiform appendix. In: Russell RC, Williams NS, Bulstrode CJ, eds. Bailey and Love's Short Practice of Surgery, 23rd ed. London, UK: Arnold; 2000:1076–1083.
2. Addiss DG, Shaffer N, Fowler BS, Tauxe RV. The epidemiology of appendicitis and appendectomy in the United States. *Am J Epidemiol.* 1990;132(5):910–925.
3. Albiston E. The role of radiological imaging in the diagnosis of acute appendicitis. *Can J Gastroenterol.* 2002;16(7):451–463.
4. Bachoo P, Mahomed AA, Ninan GK, Youngson GG. Acute appendicitis: the continuing role for active observation. *Pediatr Surg Int.* 2001;17(2-3):125–128.
5. Rothrock SG, Pagane J. Acute appendicitis in children: emergency department diagnosis and management. *Ann Emerg Med.* 2000;36(1):39–51.
6. Fente BG, Echem RC. Prospective evaluation of the Bengezi and Al-Fallouji modified Alvarado score for presumptive accurate diagnosis of acute appendicitis in University of Port Harcourt Teaching Hospital, Port Harcourt. *Niger J Med.* 2009;18(4):398-401.
7. Puri P, Boyd E, Guiney EJ, O'Donnell B. Appendix mass in the very young child. *J Pediatr Surg.* 1981;16(1):55–57.
8. Nance ML, Adamson WT, Hedrick HL. Appendicitis in the young child: a continuing diagnostic challenge. *Pediatr Emerg Care.* 2000;16(3):160–162.
9. Almaramhy H.H. Acute appendicitis in young children less than 5 years: review article. *Ital J Pediatr.* 2017;43(1):15.
10. Chang YJ, Chao HC, Kong MS, Hsia SH, Yan DC. Misdiagnosed acute appendicitis in children in the emergency department. *Chang Gung Med J.* 2010;33(5):551–7.
11. Alvarado A. A practical score for the early diagnosis of acute appendicitis. *Ann Emerg Med.* 1986;15(5):557–564.
12. Schneider C, Kharbanda A, Bachur R. Evaluating appendicitis scoring systems using a prospective pediatric cohort. *Ann Emerg Med.* 2007;49(6):778–784.
13. Minneci PC, Mahida JB, Lodwick DL, Sulkowski JP, Nacion KM, Cooper JN, et al. Effectiveness of patient choice in nonoperative vs surgical management of pediatric uncomplicated acute appendicitis. *JAMA Surg.* 2016;151(5):408–415.