



ORIGINAL RESEARCH PAPER

Paediatric Surgery

INCIDENCE OF APPENDICITIS IN CHILDREN AT A TERTIARY CENTRE

KEY WORDS: Appendicitis, Appendicular perforation, Gangrene, Obstruction

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ABSTRACT

Objectives: Incidence of appendicitis in a tertiary care centre, to determine the effects of late referrals **Methodology:** A retrospective analysis of children treated for appendicitis between March 2021 to December 2022. **Results:** 70 children aged between 2 and 12 years (mean age 8.98) were included in this study, comprising 41 males and 29 females with male/female ratio 1.4:1. Only 25 cases (35.7%) presented within 24 hours of first episode of symptoms and in stable clinical state on arrival and 45 were referred late with different complications. Acute appendicitis reported in 25 cases (35.7%), appendicular abscess in 18 cases (25.7%), appendicular mass in 5 cases (7.14%), perforated appendix in 7 cases (10%), gangrenous appendix in 10 cases (14.28%), peritonitis in 5 cases (7.14%). Various complications like wound infection 42 cases (60%), wound breakdown 23 cases (32.8%), Septicaemia 5 (7%), Protracted fever 5 (7%), and incisional hernia 1 (1.4%) have been reported. **Conclusion:** Parents/caregivers should be suspicious of appendicitis and present children with abdominal pain to hospital early. So the complications can be reduced, leading to decreased hospital stay, and decreased burden on the healthcare system.

INTRODUCTION

Inflammation of the appendix is called Appendicitis, risk of developing appendicitis during an average lifetime is around 6 to 10%. A diet high in sugar, low in fibre content and good hygiene with a resultant decreased exposure to enteric pathogens at an early age have all been identified as risk factors for appendicitis. Incidence is low in infancy, because of a relatively wide base of the appendix. Approximately 1% of infants younger than 15 years develop appendicitis, with a peak incidence between 10 and 12 years of age.

The risk of appendicitis progressing to perforation is greater in children than adults and is seen in around 20-76% of cases. The reason for increased presentation as perforation could be due to the poor communicating capacity of the toddler or preschool-age children. Also, parents and physicians contribute all childhood fevers and gastrointestinal symptoms to viral illnesses.

Pathological sequence ending in appendicitis is mostly due to obstruction of the proximal lumen, which was established by Wangenstein. Fecoliths are the most common cause of obstruction seen in approximately 30 to 50% of appendicitis. Other causes for obstruction include lymphoid hyperplasia, foreign bodies, parasitic infection, or conditions that cause increased colonic pressure and decreased motility such as Hirschprung's disease or meconium ileus. Once there is obstruction, mucus produced causes increased intraluminal pressure, which causes venous congestion and oedema. As the intramural pressure increases it causes ischemia and tissue acidosis of the appendiceal wall. Mucosal ulceration followed by bacterial invasion leading to invasive infection of the appendix. It is hypothesized that viral infections cause lymphoid hyperplasia or lymphadenopathy, which can obstruct the lumen. In addition, dehydration due to the viral illness leads to a higher likelihood of inspissated stool or mucus leading to fecolith formation and obstruction.

Most frequent symptoms include anorexia (95%), nausea and vomiting (85%), fever (60-80%), right lower quadrant pain in 70% of cases, and diarrhoea in 10-30%. However fewer than one-half of the children with acute appendicitis present with this spectrum of symptoms.

MATERIALS AND METHODS

Cases of appendicitis presented to the pediatric surgery department from March 2021 to December 2022

Data collected includes age, sex, pattern of presentation, clinical state on arrival, diagnosis, preoperative morbidity, operation, intraoperative findings, post-operative morbidity, the treatment/ length of hospitalization and outcome.

Also, the socioeconomic status of parents, their level of education, place of residence and stable diets were noted.

Statistical Analysis: The data obtained were analyzed using SPSS and presented as count, frequency and percentage.

RESULTS

During the period, a total of 70 children were treated for appendicitis. They were aged between 2 and 12 years (mean age 8.98), comprising 41 males and 29 females with a male/female ratio of 1.4:1. Majority of the patients, were children who resided in rural areas and whose parents belonged to the low socioeconomic class. These children resided in rural areas with their parents and consumed more of diets rich in roughages. However, only 25 cases (35.7%) presented within 24 hours of the first episode of symptoms and in a stable clinical state on arrival and 45 were referred late with different complications.

Table I shows the relative frequency of the signs and symptoms at presentation.

Relative Frequency Of Signs/Symptoms (Table-1)

SIGNS/SYMPTOMS	NO.OF CASES	FREQUENCY (%)
Right iliac fossa pain	70	100
Generalized abdominal pain	45	64%
Fever	58	82%
Nausea/vomiting	38	54%
Anorexia	65	92.8%
Diarrhea	10	14%
Constipation	15	21%
Dysuria/urinary frequency	12	17%
Weight loss	2	2.8%

Impaired right leg movement	14	20%
Right iliac fossa tenderness	68	97%
Guarding	65	92.8%
Generalized abdominal tenderness	38	54%
Rebound tenderness	56	80%

Right iliac fossa pain in 70 cases (100.0%) was the most common symptom. Right iliac fossa tenderness was the most common sign as recorded in 68 (97%). The signs and symptoms occurred in various combinations especially those children who presented with acute appendicitis and appendicular perforation. The classical signs and symptoms of appendicitis were altered by medications taken before presentation while many children already had complications on arrival. These resulted in diagnostic difficulty in many of them. Delayed referrals and complications were more common among children living in rural areas who did not seek medical attention early due mainly to ignorance and financial constraints. All 45 children with late referrals received treatment either from a local medical practitioner or the pharmacy. They were referred when they failed to respond to treatment with continued clinical deterioration. Due to late referrals, 45 children arrived in the unit with life-threatening preoperative morbidity ranging from appendix abscess 18 (25.7%), appendix mass 5 (7.14%), perforated appendix 7(10%), gangrenous appendix 10 (14.28%) and peritonitis 5 (7.14%) which were confirmed at exploratory laparotomy (Table-II).

Preoperative Morbidity (Table-2)

PREOPERATIVE MORBIDITY	NO. OF CHILDREN	PERCENTAGE
Acute appendicitis	25	35.7%
Appendicular Abscess	18	25.7%
Appendicular mass	5	7.14%
Perforated appendix	7	10%
Gangrenous appendix	10	14.28%
Peritonitis	5	7.14%
TOTAL	70	100%

Therefore, an extremely significant statistical difference was observed when postoperative morbidity and mortality recorded were compared between the children who presented early without preoperative morbidity and those who presented late. Lanz incision centred at McBurney's point was the preferred access. Post-operative morbidity was a reflection of the preoperative clinical state; hence post-operative morbidities were recorded among the 45 children who presented with complicated appendicitis.

The post-operative morbidity, their management and outcome are shown in Table III.

Postoperative Morbidity And Outcome (Table 3)

COMPLICATION	NO.OF CASES	PERCENTAGE%
Wound infection	42	60%
Wound breakdown	23	32.8%
Septicemia	5	7%
Protracted fever	5	7%
Band and adhesion	Nil	Nil
Band and adhesion	1	1.4%
Enterocutaneous fistulae	Nil	Nil
Incisional hernias	1	1.4%
Burst abdomen	Nil	Nil

The average Duration of stay in the hospital for cases presented early without any complications was 5 days, whereas, for cases, that presented late with complications, it was about 15 days.

DISCUSSION

Although clinical diagnosis of appendicitis is straightforward in adults, it has been reported to be more difficult in children because of their inability to give accurate history, many differentials, lack of cooperation during examination and absence of classical signs and symptoms, which may be compounded by medications taken before presentation that may have altered the clinical picture as shown in this study. The mean age of presentation in this study is 8.98 years which is comparable to the study conducted by Withers et al which showed a mean age of 8.8 years. Male predominance was reported similarly to the study conducted by Withers et al and Osarunwense David Osifoet al.

Appendicitis leading to perforation is more common in children compared to adults, because of the relatively large diameter of the appendix compared to the cecum and thin wall of the appendix in childhood. A more likely explanation of perforation is delay in presentation and delay in diagnosis. Parents are prone to assuming that symptoms might be related to "the flu" or "something he or she ate" and thus are slow to visit the physician. The goal is to make the diagnosis of acute appendicitis before perforation, the key period is the first 24 hours, for the risk of perforation within 24 hours of onset of symptoms is less than 30%. If symptoms have been present for more than 48 hours, the probability of perforation is greater than 70%. This paradigm is less useful in children younger than 5 years of age because their disease history, physical signs, and symptoms are more difficult to assess and the diagnosis is more difficult to make. Once perforation occurs, there will be a transient decrease in the pain secondary to the release of pressure in the appendix which then progresses to severe generalized abdominal pain, fever higher than 38°C, worsening anorexia with nausea and vomiting, dehydration and diarrhea (which may mislead the diagnosis suggesting gastroenteritis). Occasionally, the child progresses through these symptoms and manages to localize the perforation by "walling off" the infection between the surrounding viscera and the omentum. Younger children with their veil-like omentum are less capable of this localization and are more likely to have generalized peritonitis. Children younger than 6 years with retroileal appendicitis may present as small bowel obstruction. Mass is a consequence of perforation, it can be an abscess, or a phlegmon, lacking frank pus and composed of omentum and matted loops of bowel.

Due to late presentation, the incidence of perforation, abscess, peritonitis, gangrene and mass formation is increased. This can be prevented by early diagnosis, Furthermore, preoperative morbidities recorded were more common and severe among children who resided in rural areas that presented very late. The importance of diagnostic imaging facilities in such cases has been documented which would prevent negative appendicectomy when there is diagnostic difficulty. Consequent to wrong diagnosis and late referrals, post-operative wound infection in 42 (60%) children, wound break down 23 (32.8%), and septicemia 5 (7%) were recorded which were very challenging to manage and these resulted in prolonged hospitalization. Preoperative peritonitis has been reported to result in post-operative band and adhesion formation with the resultant intestinal obstruction which may necessitate reexploration and adhesiolysis seen in only 1 case (1.4%). Similarly, wound infections have resulted in incisional hernias which are successfully repaired as seen in this and other studies.

CONCLUSION

Parents/caregivers should be suspicious of appendicitis and present children with abdominal pain to hospital early. Physicians should give priority to appendicitis and refer children early for surgical consultation because the classical clinical pictures of appendicitis may have been altered by self-medications before presentation.

REFERENCES

1. Bekele, A., & Mekasha, A. (2006). Clinical profile and risk factors for perforation of acute appendicitis in children. *East African Medical Journal*, 83(8), 434–439. doi:10.4314/eamj.v83i8.9457
2. Demographics of paediatric patients presenting with acute appendicitis: A 5-year retrospective review of hospitals served by the Department of Paediatric Surgery at the University of the Witwatersrand. (n.d.).
3. Lee, S. L., & Ho, H. S. (2006). Acute appendicitis: is there a difference between children and adults? *The American Surgeon*, 72(5), 409–413. doi:10.1177/000313480607200509
4. Mungadi, I. A., Jabo, B. A., & Agwu, N. P. (2004). A review of appendicectomy in Sokoto, North-western Nigeria. *Nigerian Journal of Medicine: Journal of the National Association of Resident Doctors of Nigeria*, 13(3), 240–243.
5. Ohene-Yoboah, M., & Togbe, B. (2006). An audit of appendicitis and appendicectomy in Kumasi, Ghana. *West Afr J Med*, 25, 138–143.
6. Osifo, O. D., & Ogiemwonyi, S. O. (2009). Appendicitis in children: An increasing health scourge in a developing country. *Pak J Med Sci*, 25(3), 490–495.
7. Perovin, Z. (2000). Drainage of the abdominal cavity and complications in perforating appendicitis in children. *Medicinski pregled*, 53(3–4), 193–196.