

Acute Appendicitis in Pre-School Children

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ABSTRACT

Background: Appendicitis is an emergent condition in young children which can cause serious illness.

Aim: To identify features related with appendicitis in pre-school children.

Study design: Retrospective study

Place and duration of study: Department of Paediatric Surgery, Bolan Medical College Hospital Quetta from 1st April 2020 to 31st March 2021.

Methodology: Fifty two children between 5-15 years were admitted for appendectomy. All demographic and clinical information including earlier diagnosis, symptoms, biochemical, histopathological as well as radiological imaging were properly documented. The operational technique was open appendectomy.

Results: There were 61.53% boys and 38.46% girls with mean age 8±0.8 years. Abdominal pain was presented in 90.3% while nausea in 82.7% with nausea/vomiting children. There were 51.9% children having perforated appendix with majority between 8-10 years of age. Misdiagnosis was common in 44.2% patients.

Conclusion: Appendicitis in pre-school children is difficult and challenging to diagnose which requires careful diagnosis.

Key words: Appendectomy, Pre-schoolers, Perforated, Misdiagnosis

INTRODUCTION

Appendicitis is considered as one of the most common emergencies required among school going children.^{1,2} It is reported that 1 to 8 percent of children with complain of abdominal pain suffers from acute appendicitis.³ The prevalence of acute appendicitis is uncommon in pre-school children.⁴

Although there had been much advancement in diagnostic imaging techniques still the diagnosis of acute appendicitis remains a major challenge in pediatric surgery as many patients are admitted with late diagnosis and complication development. A perforated appendix can lead into sepsis. The late diagnosis of appendix in children is mostly due to overlapping symptoms with other diseases which leads to misdiagnosis. The incidence of misdiagnosis ranges to 57% among children with various ages. Alarmingly the incidence of misdiagnosis almost reaches 100% in children below age of two years.⁵⁻⁷

Vermiform appendix is a part of colon which is tube-like diverticulum. It has a length around 4.5 centimeter in new born while 9.5 cm in grown-ups.⁸ Due to its funnel shape in neonates as well as infants there is a very rare chance of obstruction in them however school going children might be more prone towards a luminal-obstruction as with age it becomes cylindrical. Male children are more prone to it than females.⁹⁻¹⁵ The accurate understanding about pathogenesis of acute appendicitis is not still clearly known as it is accompanied by multi-factors. In school going children the obstruction is caused rather by lymphoid-hyperplasia than fecolith. This increases in its size as well as number with increasing age. Its number gets limited in teenage providing high risk of appendicitis development.¹⁻³

The present study was designed to have a better understanding of appendicitis formation among pre-schoolers, hence providing a platform for better and earlier treatment of this condition.

MATERIALS AND METHODS

This retrospective study was conducted at Department of Paediatric Surgery with collaboration of General Surgery and Neuro-Medicine, Bolan Medical College Hospital Quetta from 1st April 2020 to 31st March 2021. A total of 52 patients between 5-1 years of age were enrolled. After obtaining permission from IRB and informed consent from the parents or guardians of the children

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their data including child age, gender, symptom's duration, previous examination by clinician/surgeon, physical-findings and histopathology was gathered. Perforated and non-perforated appendix was discriminated by macroscopic finding by the operating surgeon and related with microscopic evaluations. These were further considered as complicated appendicitis. Acute and non-complicated appendix was categorized by presence of polymorphonuclear leukocytes in mucosa/submucosa. Diagnostic evaluation was based on TLC count, USG and radio-imaging. Antibiotic-prophylaxis (ceftriaxone and metronidazole as 100 and 10mg/kg respectively) was given to patients pre-operatively. However in complicated appendicitis a triple-antibiotic was administered as ampicillin, metronidazole as well as gentamycin which were post operatively continued until three to five days. Intra-abdominal pus was sent for culturing. The vessels of appendix were first cauterized and then tie, divided after the dissection of meso-appendix. Base region of the appendix was completely separated between the tie as well as end-loops. In open surgery a cut was made at midline of McBurney's region. peritoneal-lavage was established with the help of warm saline before the closure of the wound. The standard amount of drainage without any pus and below 50 mL/day was taken as clear for removal. Data analysis was performed by SPSS-24.

RESULTS

There were 32 boys and 20 girls within the age of 5-15 years. The clinical symptoms of patients included abdominal pain upto 90.3% followed by 82.7% with nausea and vomiting. Diarrhoea and fever were also common complains with a percentage of 20 and 33 respectively (Table 1).

The majority of the children belonged to 8-10 years of age. The mean age of the patients was 8±0.8 years. There were 66.6% children of age three who suffered complicated appendicitis while 55.5% of four-year age children also suffered the same (Table 2).

The patients represented various clinical signs at the time of admission which included fever, tenderness, guarding, rebound tenderness as well as abdominal distension and tachycardia. However maximum number of children suffered from tenderness followed by fever episodes. Patients either suffering from complicated or non-complicated appendicitis showed tenderness as their most prevalent clinical sign followed by the presence of fever in them (Table 3).

It was also observed that there were 23 such children who were delayed in their appendicitis diagnosis due to overlapping symptoms with other disease or conditions which lead to their misdiagnosis. Most of these children were those which developed

perforated and complicated appendicitis due to their misdiagnosis and previous stage (Fig. 1). The chances of wound infection, abdominal abscess and adhesive intestinal obstruction were although seen only in few cases however all these cases only belonged to complicated appendicitis only (Fig. 2).

Table 1: Clinical Symptoms of children (n=52)

Symptoms	No.	%
Abdominal pain	47	90.3
Nausea and vomiting	43	82.7
Diarrhea	20	38.4
Anorexia	16	30.7
Cough or sore throat	6	11.5
Fever	33	63.4
Irritability	7	13.4
Lethargy & somnolence	3	5.7
Dysuria	3	5.7
Earache	1	1.9

Table 2: Distribution of age and perforated appendix among pre-school children

Age (years)	Total No. of patients	Perforation (n=27)	
		No.	%
5	9	6	66.6
8	18	10	55.5
10	25	11	44.0

Table 3: Clinical signs at the time of admission

Signs	Uncomplicated appendicitis/non perforated (n=25)	Complicated appendicitis/perforated (n=27)
Fever	13	25
Tenderness	19	26
Guarding	12	19
Rebound/ Tenderness	11	21
Abdominal distension	1	5
Tachycardia >120° beats/min	3	19

Fig 1: Misdiagnosis of other disease than appendicitis in pre-school children

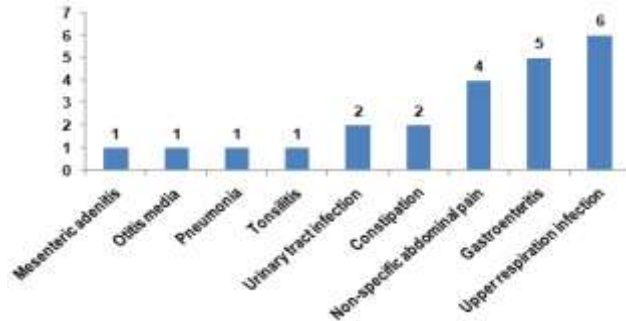
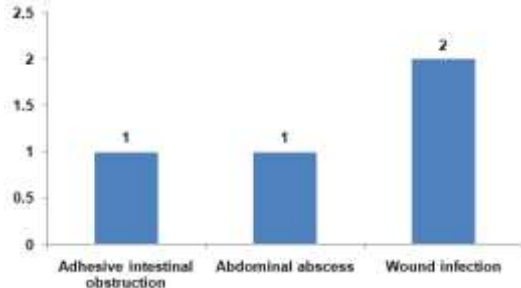


Fig. 2: Post-operative complications in perforated appendicitis cases



DISCUSSION

The present study was conducted on pre-school children suffering acute and complicated appendicitis. The frequency of male children was much higher than the female children. Males are reported to be at a higher risk of developing appendicitis than females¹⁶. The obstruction in lumina advances into suppurative-

inflammation causing perforation. Pre umbilical pain migrating to the iliac-fossa is characteristic of appendicitis in addition to episodes of fever, tenderness as well as guarding¹⁷.

In preschool children the location of pain is difficult to identify. Their age further brings difficulty in examination and diagnosis¹⁸. Many children bring similar answers for where it hurts and where it feels all right while physically examined. This makes the physical examination more challenging^{18,19}.

This study as well as literature reported in other studies has documented children complaining a vague or mild pain in abdomen or peri-umbilical initially which further starts migrating towards the lower-quadrant within an hour or more or even in days. There are other children which can exactly pin point the area of their pain. However most often it is not the case and children have difficulty in reporting where it actually hurts¹⁸.

A cohort study enrolling 120 patients reported that 94% under 5 years of age complained pain, 83% had vomiting while fever, lack of appetite and diarrhoea were reported in 80%, 74% and 32% respectively. In non-perforated appendicitis more common symptoms and signs includes tenderness at localized region, guarding, diffuse tenderness, mass and rebound in 61%, 55%, 39%, 6% and 32% respectively.²⁰

CONCLUSION

Timely and accurate diagnosis for appendicitis is a major requirement in children where red-flags should be carefully taken in consideration to avoid complications.

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