Vol 7|Issue 2| 2017 | 50-53.

e-ISSN 2248 - 9169
Print ISSN 2248 - 9150

International Journal of
Experimental Pharmacology

www.ijepjournal.com

General Surgery

LONG-TERM ABDOMINAL PAIN AND A HIGH RISK OF PERFORATION ARE COMMON SYMPTOMS OF PEDIATRIC APPENDICITIS WITH APPENDICOLITH

Dr. P. Kuppuraj, M.S., M.Ch.

Assistant Professor, Department of General Surgery, Government Thiruvnnamalai Medical College and Hospital, Thiruvannamalai – 606604, Tamilnadu, India.

ABSTRACT

Acute appendicitis is diagnosed in 1–8% of pediatric patients who are evaluated for abdominal pain and is the most common cause of urgent abdominal surgery in children. There are several characteristics that distinguish pediatric appendicitis from adult appendicitis. Perforation is common in pediatric appendicitis, with a perforation rate of 22–62 percent, which is especially high in young children. In adult patients, it has also been discovered to have a higher prevalence of appendicolith than appendicitis. An appendicolith is a stony faces concretion that can obstruct the appendix and cause acute appendicitis. The prevalence of appendicolith in pediatric appendicitis has reached 50% thanks to advanced diagnostic techniques, including radiologic modalities such as computed tomography (CT). The aim of this study, we looked into the characteristics of appendicoliths found on CT in children with appendicitis, as well as their clinical significance in terms of appendiceal perforation. Between January 2017 and June 2017, we conducted a retrospective study of children and adolescents under the age of 17 who visited our pediatric emergency department (ED). The patients were identified using our patient registration system's ED diagnosis of acute appendicitis by reviewing electronic medical records, patient data was gathered and analyzed. Our institutional review board gave its approval to this study. There have recently been reports of CT dose reduction studies in patients with suspected appendicitis. The mean effective dose in a previous study of pediatric suspected appendicitis was 5.1 3.0 mSv in standard-dose CT scans and 3.3 1.7 mSv in low-dose CT scans. The mean effective dose in our current study was 2.4 1.2 mSv, which was significantly lower than the low-dose CT scans used in their study. To overcome these limitations, well-designed prospective studies using radiation-free imaging modalities such as ultrasound or magnetic resonance imaging should be implemented.

Keywords: Long-term abdominal pain, perforation, appendicolith, paediatric appendicitis.

INTRODUCTION

Acute appendicitis is diagnosed in 1–8% of paediatric patients who are evaluated for abdominal pain and is the most common cause of urgent abdominal surgery in children [1].

Corresponding Author:

Dr. P. Kuppuraj , M.S, M.Ch.,
Email id: drpkraj@yahoo.co.uk

There are several characteristics that distinguish paediatric appendicitis from adult appendicitis. Perforation is common in pediatric appendicitis, with a perforation rate of 22–62 percent, which is especially high in young children [2, 3]. In adult patients, it has also been discovered to have a higher prevalence of appendicolith than appendicitis [4].

An appendicolith is a stony faces concretion that can obstruct the appendix and cause acute appendicitis [5, 6]. The prevalence of appendicolith in pediatric appendicitis has reached 50% thanks to advanced diagnostic techniques, including radiologic modalities such as computed tomography (CT) [7, 8]. Appendicolith is associated with appendiceal perforation, according to

several studies conducted in adult patients. As a result, the high prevalence of appendicolith could be linked to the high rate of perforation in pediatric appendicitis [9, 10]. However, there is a scarcity of data on the relationship between appendicolith and appendiceal perforation in the pediatric population. The clinical features of appendicitis with appendicolith and the characteristics of appendicolith (e.g., size, multiplicity, and location) related to appendiceal perforation have not yet been well established, even in studies in adult populations [11]. We hypothesized that certain appendicolith characteristics could influence clinical features in pediatric appendicitis, such as appendiceal perforation [12].

Aim and Objective:

The aim of this study, we looked into the characteristics of appendicoliths found on CT in children with appendicitis, as well as their clinical significance in terms of appendiceal perforation.

Material and Methods:

we conducted a retrospective study of children and adolescents under the age of 17 who visited our pediatric emergency department (ED). The patients were identified using our patient registration system's ED diagnosis of acute appendicitis by reviewing electronic medical records, patient data was gathered and analyzed. Our institutional review board gave its approval to this study. A three-step clinical pathway was followed by all patients with acute appendicitis symptoms. Medical histories were taken first, followed by physical examinations and laboratory tests. Point-of-care ultrasound was performed in the pediatric ED by board-certified emergency or pediatric physicians, but not by a radiologist. The main purpose of point-of-care ultrasound was to rule out non-surgical appendicitis diagnoses, but it only had a limited capacity for a complete appendicitis evaluation. Patients whose appendicitis was still suspected after the first step were given a CT scan. Radiologists interpreted the images as soon as they were obtained. Third, pediatric surgeon re-evaluated the patients and determined that appendicitis was the ED diagnosis. Initially, 252 patients with appendicitis were identified in the emergency department. 250 of them were admitted to our hospital general surgery ward, Clinical characteristics (age; sex; duration of abdominal pain; accompanying symptoms, such as fever, vomiting, and loose stool; and body temperature at ED arrival); laboratory data (leukocyte count, percentage of neutrophil, serum level of C-reactive protein [CRP] and sodium, and positive urine ketone); and radiologic data related to appendicitis. The appendicolith and no appendicolith groups were compared using the 2 test for categorical data and the t test or K-sample median test for continuous variables. Multivariate logistic analysis was used to conduct a risk factor analysis for perforated appendicitis. P values of less than 0.05 were deemed statistically significant. SPSS 20.0 was used to conduct all statistical analyses

Results and Discussion:

The appendix's maximum diameter was 12.21 3.31 mm on average. A total of 74 patients (29.6%) had perforated appendicitis, with 58 (23.2%) having an appendiceal abscess. Appendicoliths were found in 118 patients (47.2%), with 83 (32.8%) of them having multiple appendicoliths. The majority of the appendicoliths were spherical or cylindrical in shape, and their length was equal to or greater than their diameter. The appendicoliths had a mean length of 9.92 4.52 mm and a maximum diameter of 5.55 2.37 mm. The appendix's appendicoliths were found in the middle (32.8%), proximal (13.6%), and distal or tip (25.6%) of the appendix. In 80 patients (32%), an appendicolith with proximal collapse was found (Table 1).

Patients were divided into two groups: those with an appendicolith (n = 140) and those without an appendicolith (n = 110), and clinical characteristics, laboratory data, and CT findings were compared. Significant differences between the two groups were discovered in three areas (Table2).

First, the appendicolith group had a longer duration of abdominal pain than the non-appendicolith group. In the appendicolith group (36.42 percent), the most common duration of abdominal pain was between 12 and 24 hours, while in the no appendicolith group it was less than 12 hours (18.18percent). The frequency of abdominal pain lasting less than 12 hours was lower in the appendicolith group than in the no appendicolith group 17.87 vs. 18.18 percent; P = 0.001), but it was higher in the appendicolith group (36.42 vs. 29.09 percent; P = 0.013). Second, the presence of appendicoliths was linked to clinically severe appendicitis in the appendicolith group. The appendicolith group had a higher rate of accompanying fever (58.57 %; P = 0.001), and the appendicolith group also had a higher rate of vomiting (56.36%; P = 0.039).

CT is highly accurate for diagnosing appendicitis in children (sensitivity: 94%; specificity: 95%), and ED appendicitis diagnosis in our institution, including CT interpretations, has a low rate of misdiagnosis (only 2 of 250 cases received early appendectomy). As a result, these patients were included in the research. Second, the time between arriving at the ED and receiving the CT scan was not taken into account, which could have influenced the actual duration of abdominal pain. The elapsed time was largely determined by the patients' fasting time (at least 6 hours in our CT preparation protocol), which was roughly half the length of stay in the ED (mean of 6.26 3.27 hours). Third, despite the fact that CT scans at our institution were performed with the lowest possible radiation dose, cancer risk remains a concern. There have recently been reports of CT dose reduction studies in patients with suspected appendicitis. The mean effective dose in a previous study of pediatric suspected appendicitis was 5.1 3.0 mSv in

standard-dose CT scans and 3.3 1.7 mSv in low-dose CT scans. The mean effective dose in our current study was 2.4 1.2 mSv, which was significantly lower than the low-dose CT scans used in their study. To overcome these limitations, well-designed prospective studies using radiation-free imaging modalities such as ultrasound or magnetic resonance imaging should be implemented.

.

Table 1: Characteristics of the study patients and appendicolith (n=250)

characteristics	Measurements
Age, y, mean ±SD	9.96 ±3.32
Males	155 (62%)
Maximal diameter of appendix, mm, mean ±SD	12.21±3.31
Abscess	58 (23.2%)
Perforated appendicitis	74 (29.6)
Patients with appendicolith	118 (47.2%)
Number of Appendicoliths	
One	62 (24.8%)
Two	105 (42%)
Three	83 (32.8%)
Location of appendicoliths	
Proximal	34 (13.6%)
Middle	82 (32.8%)
Distal	64 (25.6%)
Tip	20 (8%)
Non- Assessable	50 (20%)
Length of appendicolith, mm, mean ±SD	9.92±4.52
Maximal diameter of appendicolith, mm. mean ±SD	5.55 ±2.37
Maximal diameter of appendicolith > 5mm	86 (34.4%)
Appendicolith with proximal collapse	80 (32%)

Table 2: Comparison of clinical features and CT findings between the appendicolith groups

Variables	Appendicolith group (n=140)	Non – appendicolith group (n=110)	P value
Age,y, mean ±SD	9.60 ±3.49	10.23 ±3.15	0.091
Males	82 (58.57%)	60 (42.85%)	0.372
Duration of abdominal pain			
< 12 h	25 (17.87%)	20 (18.18%)	<0.001
12 – 24 h	51 (36.42%)	32 (29.09%)	0.171
24- 48 h	15 (10.71%)	48(43.63%)	0.345
>48 h	49 (35%)	10 (9.0%)	0.013
Accompanying symptoms			
Fever	82 (58.57%)	62 (56.36%)	<0.001
Vomiting	50 (35.71%)	22 (20%)	0.039
Loose stools	8 (5.71%)	26 (23.63%)	0.432
Body temperature,° C mean ± SD	36.23 ±0.75	35.23 ±0.82	0.947
Leucocyte count, X 10^3 µg/ml / Median (IQR)	16.5 (12.0- 18.5)	15.2 (11.2- 15.2)	0.423

CONCLUSION

Finally, pediatric appendicitis with appendicolith is associated with severe abdominal pain and clinical conditions, including a high risk of perforation. In a clinical setting, appendicoliths with proximal collapse or a maximal diameter of 5 mm or more should be treated with caution due to the risk of perforated appendicitis.

REFERENCES

1. Chung, P. H. Y., Chan, K. L., & Tam, P. K. H. (2009). Risk factors for morbidities in laparoscopic appendectomy for acute appendicitis of paediatric patients. *Surgical Practice*. https://doi.org/10.1111/j.1744-1633.2009.00453.x
2. Deutsch A, Leopold GR. Ultrasonic demonstration of the inflamed appendix: case report. Radiology. 1981;140(1)163–4.
3. Chiang DT, Tan EI, Birks D. To have.. or not to have. Should computed tomography and ultrasonography be implemented as a routine work-up for patients with suspected acute appendicitis in a regional hospital? Ann R Coll Surg Engl. 2008;90:17–21.
4. K., P. (2013). Antibiotic therapy for appendicitis in children. In *U.S. Pharmacist*.
5. Deleger, L., Brodzinski, H., Zhai, H., Li, Q., Lingren, T., Kirkendall, E. S., Alessandrini, E., & Solti, I. (2013). Developing and evaluating an automated appendicitis risk stratification algorithm for pediatric patients in the emergency department. *Journal of the American Medical Informatics Association*. https://doi.org/10.1136/amiajnl-2013-001962
6. Fleischman, R. J., Devine, M. K., Yagapen, M. A. N., Steichen, A. J., Hansen, M. L., Zigman, A. F., & Spiro, D. M. (2013). Evaluation of a novel pediatric appendicitis pathway using high- and low-risk scoring systems. *Pediatric Emergency Care*. https://doi.org/10.1097/PEC.0b013e3182a5c9b6
7. Babl, F. E., Dalton, S., Cheng, N., Jay, G., Keijers, G., Lee, M., Neutze, J., Craig, S., Herd, D., Borland, M., Phillips, N., Dalziel, S., Krieser, D., Rao, A., & Schutz, J. (2014). Management of children with possible appendicitis: A survey of emergency physicians in Australia and New Zealand. *EMA - Emergency Medicine Australasia*. https://doi.org/10.1111/1742-6723.12272
8. Esposito S. Immune system and site infection. J Chemother. 2001;1:12–6.
9. Goldberg, L. C., Prior, J., & Woolridge, D. (2016). Appendicitis in the Infant Population: A Case Report and Review of a Four-Month Old with Appendicitis. *Journal of Emergency Medicine*. https://doi.org/10.1016/j.jemermed.2016.01.021
10. Ozguner, I. F., Buyukyavuz, B. I., & Savas, M. C. (2004). The influence of delay on perforation in childhood appendicitis. A retrospective analysis of 58 cases. *Saudi Medical Journal*.
11. Singh, A., Danrad, R., Hahn, P. F., Blake, M. A., Mueller, P. R., & Novelline, R. A. (2007). MR imaging of the acute 2abdomen and pelvis: Acute appendicitis and beyond. In *Radiographics*. https://doi.org/10.1148/rg.275065021
12. Acosta, R., Crain, E. F., & Goldman, H. S. (2005). CT can reduce hospitalization for observation in children with suspected appendicitis. *Pediatric Radiology*. https://doi.org/10.1007/s00247-004-1384-4