Original Article

Constipation Faecolith as a Cause for Paediatric Appendicitis - A Retrospective Review from Rural Tertiary Care Centre

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Abstract

Background: Occlusion of the appendiceal lumen by faecolith results in appendicitis and its sequelae, including perforation and gangrenous alterations. A faecolith is believed to be the outcome of constipation. This study assessed the association between constipation faecolith, the occurrence of acute appendicitis and its complications. **Methodology:** This study examined the patients in the paediatric surgery department between the ages of 2 and 14 years who were diagnosed with acute appendicitis between January 2022 and January 2024. The study included 79 patients in total. The collected data were analysed using the SPSS software (IBM SPSS 25.0, Chicago, IL, USA.). AChi-square test was used to find the association between the categorical variables. $P < 0.05$ was considered statistically significant with a 95% of confidence interval. **Results:** A total of 79 patients were admitted during the study period. In that male-to-female ratio was 2.3/1. In the present study, 34% (27/79) of patients had a history of constipation, of which 22.8% (18/79) were found to have faecolith in the appendiceal lumen intraoperatively. There was a statistically significant ($P < 0.001$) association between the history of constipation among patients with appendicitis, appendicitis with faecolith and appendicitis with complications. Patients with a history of constipation had an operational finding of faecolith in the appendiceal lumen that was statistically significant ($P < 0.001$). **Conclusion:** This retrospective study showed that one of the new risk factors for the development of faecolith, which leads to acute appendicitis and its sequelae, is constipation, which may be due to poor diet habits among children. Therefore, when it comes to planning surgery and post-operative management, the presence of constipation histories and faecolith findings should be taken into consideration.

Keywords: Appendicitis, constipation, faecolith

Introduction

Appendicitis accounts for 1%–8% of paediatric patients, with a peak incidence in the second decade of life with a median age of 10–11 years slightly more common among males.[1,2] The high prevalence of acute appendicitis offers plenty of possibilities for additional research into the illness, particularly its aetiology. Several factors are likely involved in the pathophysiology of the disease, the most common factors being viral, bacterial and fungal infections; however, about half of cases are caused by obstructive causes, such as lymphoid hyperplasia and faecolith.[3,4]

Constipation is more common in the paediatric age group (0.7%–29.6%), with a growing prevalence in the rural areas every decade as a result of poor eating habits and insufficient fibre intake.[5] Appendicitis can arise from the obstruction of the appendiceal lumen caused by faecolith development, which is the outcome of constipation. The correlation between constipation and acute appendicitis stems from the increased prevalence of cases in the industrialised world with poor fibre consumption, which has spread to the developing world and further affected rural areas.[6] Compared to patients with non-obstructive appendicitis, people with faecolith have a higher risk of

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perforation and gangrene, as well as a higher failure rate for non-operative therapy.[7]

This retrospective study mainly focuses on the association between acute appendicitis and constipation faecolith, as well as the consequences of faecolith in acute appendicitis.

Methodology

This study retrospectively reviewed the patients who were diagnosed to have acute appendicitis between January 2022 and January 2024 in the paediatric surgery department of a tertiary care teaching institution located in rural areas of North India. In the above-specified time frame, patients in the age range of 2–14 years were reviewed from the medical records department of the same institution, following approval from the institutional review board.

Data collected include age, sex, date of admission, history of constipation, Alvarado score, management, type of surgery, intraoperative presence of faecolith, complications and length of hospital stay. Radiological findings were used to supplement the clinical diagnosis. Based on the clinical features, history, Alvarado scores and radiological findings, mode of management was decided. Faecal concretions or pellets discovered during surgery or through radiological examination were referred to as faecolith. Appendicitis involving perforation, gangrene and the development of a peri-appendicular abscess was classified as complicated appendicitis.

The collected data were analysed using the SPSS (IBM SPSS 25.0, Armonk, NY, USA: IBM Corp). A Chi-square test was used to find the association between the categorical variables. $P < 0.05$ was considered statistically significant with a 95% of confidence interval.

Results

During the study period, 79 patients were admitted and their files were reviewed. The mean age of the patients was 9.6 years (standard deviation ± 3.1). The youngest of all was 3 years old. Male ($n = 55$)-to-female ($n = 24$) ratio was 2.29/1. In this study, 13% (10/79) of patients were under 5 years old and 51% (40/79) of patients were between 11 and 14 years of age [Table 1].

History of constipation was present in 34% (27/79) of patients, whereas 66% (52/79) of patients had no history of constipation.

We observed that 90% (71/79) of patients had an ultrasound diagnosis of acute appendicitis, 5% (4/79) had appendicitis with faecolith and 5% (4/79) had appendicular perforation. In this study, 87% (69/79) of patients had appendectomy. Amongst 19% (15/79) of patients managed conservatively and 6% (5/79) of patients needed surgery later on [Figure 1].

In our study, 73% (58/79) of patients were managed with an open appendectomy, 9% (7/79) by a laparoscopic appendectomy and 5% (4/79) needed a laparotomy [Figure 2].

Table 1: Number of cases across various age groups (years)

Age group (years)	Number of cases
<5	10
5–10.0	29
11–14.0	40
Total	79

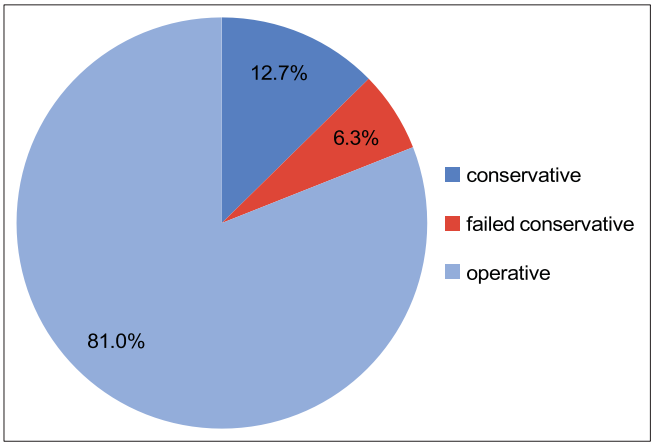


Figure 1: Pie chart depicting the type of management

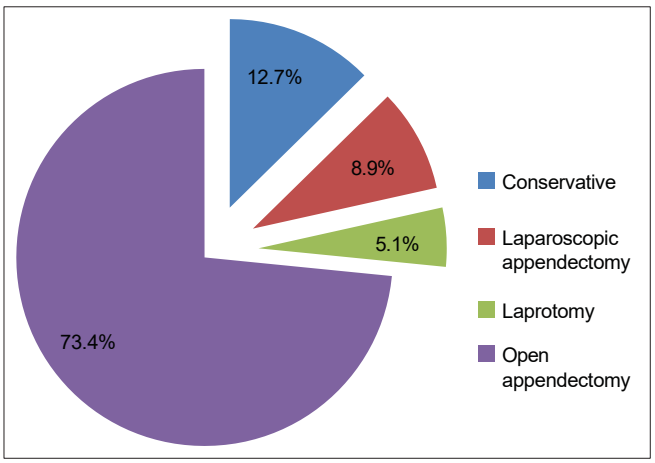


Figure 2: Pie chart depicting the type of surgical management

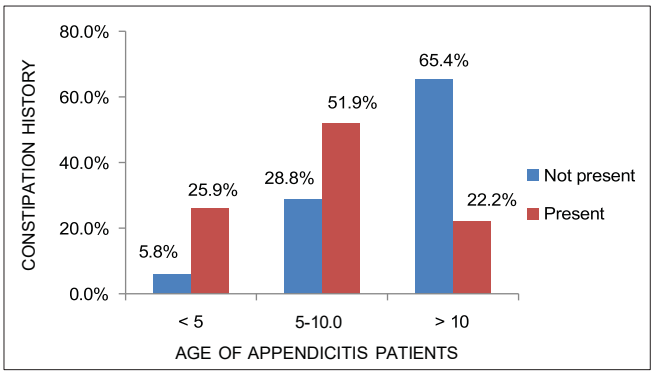


Figure 3: History of constipation amongst appendicitis patients of various age groups

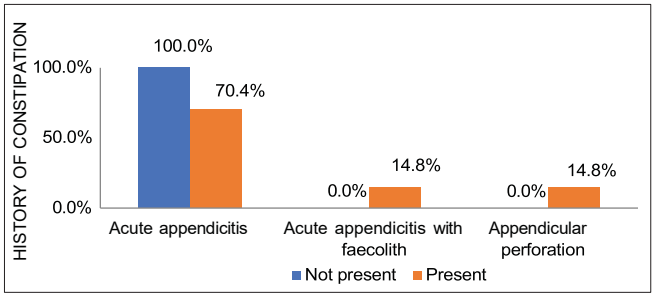


Figure 4: Association between the history of constipation and appendicitis

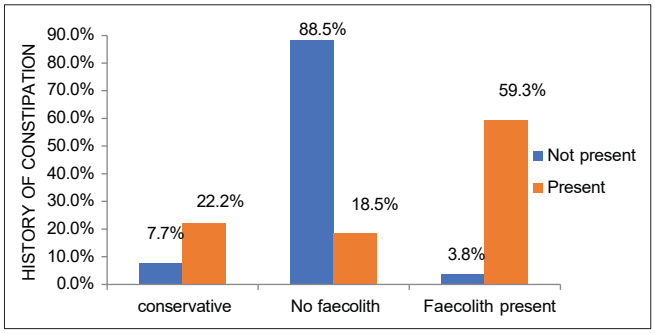


Figure 5: Association with intraoperative presence of faecolith and constipation



Figure 6: Appendix specimen with faecolith *in situ*

Overall, in 22.8% (18/79) of patients, faecolith was found to be present during surgery. The history of constipation in appendicitis patients between <5, 5–10 and >10 years age groups showed statistically significant ($P < 0.001$) association [Figure 3]. While there was no difference in a history of constipation amongst male and female patients ($P < 0.05$).

There was a statistically significant ($P < 0.001$) association between the history of constipation among patients with appendicitis, appendicitis with perforation and appendicitis with faecolith [Figure 4]. There was a weak statistical significance seen between the Alvarado score and history of constipation amongst appendicitis patients ($P = 0.032$).

There was a statistically significant ($P < 0.001$) association of operative finding of faecolith among patients with a history of constipation than no history of constipation [Figure 5].

Discussion

There has been limited research on the role of constipation as a cause of appendiceal faecolith and appendicitis in the paediatric population, which has resulted in complications. Although lymphoid hyperplasia is considered the leading cause of paediatric appendicitis, constipation leading to faecolith and appendicitis is also an emerging cause in recent times as a result of increasing constipation among paediatric age groups.[4-6] A faecolith (also known as stercolith, coprolith, appendicolith or concretion) is a faecal concretion or pellet occupying the appendiceal lumen and is thought to be the result of constipation due to consumption of a low-fibre diet, causing obstruction of the appendiceal lumen and leading to appendicitis.[8]

The rising prevalence of patients with low-fibre consumption in the industrialised world has expanded to the developing world and further affected rural regions as well, which is the reason for the strong association between acute appendicitis and constipation.[6] According to the epidemiological research, constipation may have a significant role in the pathophysiology of appendicitis. According to studies from Africa and North America, populations on high-fibre diets have a lower incidence of appendicitis than those on a more westernised diet.[9] In our study, the history of constipation was present in 34% of patients, and we found that there was a strong association between constipation history and the formation of acute appendicitis with faecolith presence intraoperatively.

Support for the theory that obstruction by faecolith is the main cause of appendicitis comes from older studies (1970) showing a high prevalence of faecolith in appendicitis. In the largest study of appendix specimens to date, Collins described a faecolith prevalence of 44.25% in 71,000 specimens. These included 12,119 prophylactic appendicectomies and 6409 post-mortem specimens but only 11,961 cases of simple acute appendicitis.[10]

When only paediatric studies were considered, the prevalence of faecoliths in children (≤17 years) with appendicitis was consistently higher than in adults, with a higher risk of complications such as perforation and gangrenous changes.[11] In our study, the operative findings of faecolith were 23%, which is consistent with most of the previous studies [Figure 6].

The presence of a faecolith has also been implicated in increased risk of recurrent appendicitis, the development of complications and the failure of non-operative management in children.[12] In a recent European randomised controlled trial of non-operative management of children with uncomplicated acute appendicitis, 60% (3/5) of patients with an appendicolith identified preoperatively who were randomised to non-operative treatment underwent appendectomy within 1 year.[13,14]

In our study, we noticed that patients with faecolith had complications of acute appendicitis such as perforation,

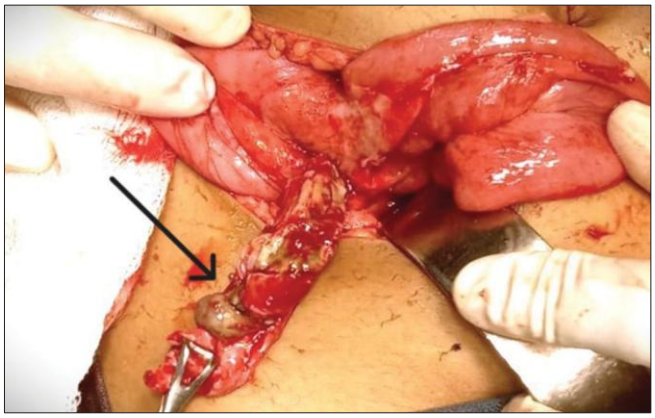


Figure 7: Perforated appendix with faecolith

post-surgical complications such as intra-abdominal abscess, wound infection and a longer hospital stay compared to other patients without a history of constipation. Faecolith causes obstruction of the lumen, leading to a decrease in capillary perfusion and causing ischaemic necrosis, which explains the complications of appendicitis such as gangrenous changes and perforation[15] [Figure 7].

The results of our study showed that there is a strong association between constipation, the formation of faecolith and the occurrence of acute appendicitis with its complications and failure of non-operative management. The limitations of this study include its retrospective nature from a single centre, a limited study population and a limited duration of follow-up.

Conclusion

The study demonstrated a higher rate of faecolith presence amongst children suffering from constipation, which could be due to the consumption of a low-fibre diet and poor diet habits. Based on the results of our retrospective study, we conclude that the presence of a faecolith in acute appendicitis is a strong predictor of complications and thus highlights the importance of early operative management to prevent the complications of acute appendicitis.

RECOMMENDATIONS

- Constipation should be managed aggressively for the patient presenting in the outpatient department
- The presence of faecolith in the investigations should be considered one of the parameters in the paediatric Alvarado score
- Parental education regarding weaning, diet and toilet training is important for preventing constipation in the paediatric age group
- Early operative management should be done for patients with appendicolith.

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Conflicts of interest

There are no conflicts of interest.

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