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Diagnosis and management of stump appendicitis in children

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Abstract

Background: Stump appendicitis is a rarely reported complication after an appendectomy. The predisposing factor include a previous incomplete appendectomy with subsequent infection and inflammation of the appendicular stump.

Methods: A retrospective review of the medical records of the children admitted with post-appendectomy abdominal pain and operated for stump appendicitis at our institution between January 2017 and December 2019 was performed.

Results: A total of 34 patients were admitted with post-appendectomy abdominal pain and 5 patients underwent surgery for stump appendicitis. The common presentation was right iliac fossa pain and peritonitis. All the patients underwent a preoperative CT abdomen. Four of them had previous laparoscopic appendectomy and one child had undergone open surgery.

Conclusion: Stump appendicitis should be considered as a differential diagnosis for post-appendectomy abdominal pain. CT abdomen is the investigation of choice. Prompt diagnosis and appropriate treatment is required to ensure prevention of complications due to delayed diagnosis.

Keywords: Stump appendicitis, post-appendectomy abdominal pain, laparoscopic appendectomy complications

Introduction

Stump appendicitis is one of the uncommon complications occurring after a laparoscopic or open appendectomy procedure. It may present in the immediate postoperative period or may occur months or years after the initial surgery. The condition is predisposed when an unusually long segment of appendix (usually more than one cm) is left behind inadvertently during the prior appendectomy procedure^[1, 2]. The children commonly present with recurrent abdominal pain localized in the right iliac fossa. The diagnosis is frequently overlooked because of the history of prior appendectomy procedure leading to delay in the diagnosis and management of stump appendicitis. In this study, we are evaluating the presentation and management of a series of cases of stump appendicitis at our institute.

Materials and Methods

The medical records of all the children who presented to the Institute of Child Health and Hospital for Children, Madras Medical College, Chennai with recurrent abdominal pain after prior appendectomy were retrospectively reviewed. The study duration was 24 months from January 2017 to December 2019. All the patient operated for stump appendicitis were included in the study. The post-appendectomy patients operated for other indications like adhesive intestinal obstruction and intra-abdominal abscess were excluded from the study.

The medical records were reviewed for various patient parameters including age, sex, symptom duration at presentation, prior surgical procedure, and complications. All the patients underwent an ultrasound abdomen and CT abdomen prior to surgery. The CT abdomen definitively identified the stump appendicitis and the complications in all the children. The patients were offered either a relaparoscopy or an open surgical exploration depending on the clinical presentation.

Results

During the study period, around 337 children underwent laparoscopic appendectomy and 248 children underwent open appendectomy at our institute. A total of 34 patients were admitted

with post-appendectomy abdominal pain were admitted during the study period and 5 patients underwent surgery for stump appendicitis. Of the five patients with stump appendicitis, three were operated in our institution previously and two children had undergone appendectomy at a different centre. Four children had prior laparoscopic appendectomy and one patient had undergone an open procedure. Since the some of the patients who presented with post-appendectomy abdominal pain were initially operated at a different institution, we could not calculate the incidence of stump appendicitis from this study population. Two children were admitted at a different centre initially and were referred to our institute after the diagnosis of stump appendicitis was made. There was a definite delay in

the presentation of the patients to the hospital after symptom onset with the mean symptom duration being 3.8 days. Two children had severe tenderness without peritonitis. Two children developed features of peritonitis and appendicular phlegmon was present in one child. One child presented in the immediate postoperative period with a localized abscess due to the ongoing infection of the residual stump after a previous laparoscopic appendectomy for a complicated appendicitis. Overall, three children presented with complicated stump appendicitis and two children presented without evidence of perforation of the appendicular stump. The clinical features of the patients are summarised in the Table 1.

Table 1: Clinical features of the children with stump appendicitis

S. no	Age/Sex	Symptom	Duration	Prior /current Appendectomy	Length of stump	Complications
1.	7/ M	Pain RIF, no fever	2 days	Laparoscopic/open	2.5 cm	Nil
2.	8/F	Pin RIF, abscess.	3 days	Laparoscopic/open	2 cm	Wound inf.
3.	10/F	Pain RIF, RIF mass	6 days	Laparoscopic/open	2 cm	Wound infection
4.	6/M	Pain Rt lumbar region	4 days	Laparoscopic/open	4 cm	Nil
5.	9/M	Peritonitis, fever	4 days	Open/open	3.5 cm	Prolonged ileus

All the patients underwent an initial ultrasound abdomen. The patients with mass and abscess was identified with ultrasound. All the patients underwent a CT abdomen when the initial ultrasound abdomen was inconclusive. The CT abdomen definitively identified the stump appendicitis in three children and identified the abscess and mass in the right iliac fossa in the other two children. All the children had raised total leukocyte count more than 10000 cells/mm³. The children with features of peritonitis, abscess, and mass were subjected to open procedure. One child was subjected to a re-laparoscopy. However, the procedure was converted to an open due to the presence of dense adhesions.

The average length of the residual stump was 2.8 cm with the minimal length at 2 cm and maximal length at 4 cm. The retrocecal position of the appendix was the most commonly encountered position during the re-exploration. The appendix stump appeared buried along the cecum in most cases. In four patients, a fecolith was found to be lodged in the base of the appendicular stump. The completion appendectomy was performed in all the patients. The patients were treated with appropriate antibiotics till discharge. Two patients developed minimal wound infection in the postoperative period, which settled with conservative treatment. One child had prolonged ileus postoperatively and recovered on conservative treatment. All the children were discharged between seven to ten days from the operative procedure.

Discussion

Stump appendicitis in children is a rarely reported complication after appendectomy [3, 4]. Only a few case reports had been published in the literature till date [5]. In our study, four children had undergone a previous laparoscopic appendectomy procedure. The retrocecal buried location of the appendicular stump suggests that the surgeons could have mistaken the proximal appendix as the base of the appendix during the laparoscopic procedure. This may be due to limited visual access to the right lower aspect of a fixed cecum during the conventional laparoscopic procedure.

The presence of fecolith in most cases suggests that the fecoliths were either left behind during the previous appendectomy or they were formed postoperatively at a later time, giving rise to the symptoms. In one patient, immediately after the laparoscopic management of complicated appendicitis, the patient developed an abscess due to the progression of infection of the long appendicular stump with a fecolith in situ. Leaving behind an inadvertently long appendicular stump with a fecolith is a predisposing factor for the development of stump appendicitis in most of the patients.

Diagnosis of stump appendicitis require high degree of suspicion. A CT abdomen is mandatory in a child with recurrent abdominal pain following a previous complicated appendicitis. Early identification and appropriate treatment will prevent complications due to delayed diagnosis. Formation of appendico-cutaneous fistula due to incomplete appendectomy had been reported [6]. A completion appendectomy (Figure 1) is recommended in patients with significant symptoms and in patients with CT identified stump appendicitis with fecolith. Laparoscopic approach is feasible for the re-exploration in selected cases. However, when there are significant adhesions with inflammation, the surgeon should not hesitate to convert to open approach to prevent or identify an inadvertent bowel injury.



Fig 1: The inflamed and perforated appendicular stump identified during completion appendectomy

Conclusion

Pediatric surgeons should be aware of the possibility of a hidden proximal appendix during the laparoscopic appendectomy procedure. When the preoperative imaging reveals the presence of fecolith, the surgeon should ensure complete removal of the appendix with the fecolith. The inflammation of residual appendicular stump should be considered as one of the causes for postoperative intra-abdominal abscess after surgery for complicated appendicitis.

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