Postoperative Length of Hospital Stay following Open Appendectomy in a Tertiary Care Children's Hospital

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ABSTRACT

Background:

Appendicitis is a common pediatric surgical emergency. But at our hospital setting, only an open appendectomy is done in the pediatric population. Surgery is the preferred treatment for complicated appendicitis cases. Laparoscopic appendectomy has been associated with shorter recovery and fewer postoperative complications in children with acute appendicitis. Our study focus the impact of hospital stay following open appendectomy in pediatric patients.

Method:

The cross-sectional retrospective study was performed in the tertiary care children's hospital in Nepal using medical records from the anesthesia register, surgical ward and operation room. A total of 128 pediatric cases were studied and analyzed.

Results:

The average length of hospital stay was found to be 4.53± 2.2 days. The mean length of stay in non-perforated was 4.08±1.5 days whereas in perforated cases was 7.35 ±3.6 days (t = 3.7, p = 0.0019)

Conclusion:

In our tertiary hospital, the children who were undergoing open appendectomy had a higher length of stay till discharge in case of perforated appendicitis. Early confirmation of disease and timely surgical interventions help to minimize complications and shorten the hospital stay. These findings may help inform institutional planning and resource allocation for pediatric surgical services.

Keywords: Appendicitis; Appendectomy; Children; Length of stay; Laparoscopy; Pediatrics

Introduction

Appendicitis is a common pediatric surgical emergency.[1] Delayed treatment of appendicitis increases the risk of perforation.[2]

Clinical evaluation, sometimes supported by scoring tools, laboratory tests, and imaging, is used to diagnose appendicitis.[3] Treatment decisions are guided by clinical findings, supported by laboratory and imaging results.[4]

Antibiotic therapy has been used as a non-operative option in selected cases of uncomplicated appendicitis.[5] With antibiotic therapy, the failure rate, mainly caused by the presence of appendicolith, is higher. For the cases of complicated appendicitis with appendicolith, surgery is preferably suggested.[6] Laparoscopic appendectomy has been associated with shorter hospital stays and fewer postoperative complications.[7] For acute appendicitis in children, the laparoscopic technique seems to be safer than open appendectomy.[8] Certain clinical and institutional factors may influence the complexity of surgical management in appendicitis.[9] However, only an open appendectomy is available at our setup. This study aimed to determine the postoperative length of hospital

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stay among children undergoing open appendectomy in our institution.

Materials and Methods

Inclusion Criteria

Children aged 3–14 years who underwent open appendectomy for clinically suspected appendicitis and had histopathological confirmation with complete medical records were included.

Exclusion Criteria

Patients were excluded if they had laparoscopic or incidental appendectomy, incomplete records, significant comorbidities, appendicular mass/abscess managed conservatively, or postoperative complications from a previous appendectomy.

We conducted a cross-sectional retrospective study at Kanti Children's Hospital, a national pediatric referral center. A total of 128 eligible cases were reviewed. After ethical approval (ERC, March 21, 2022), data were extracted from hospital records using a standardized proforma. The cases with missing records were not included in the study. The collected data were edited in Microsoft Excel 2016 and exported to IBM SPSS version 26 for analysis using appropriate statistical tools. The continuous variables were expressed as mean ± standard deviation (SD). The categorical variables were expressed as frequency and percentage. In this study, independent two sample t test and p value (<0.05 as significant) were analyzed. The study was conducted after approval from Ethical Review Committee at Kanti Children Hospital on 03/21/2022.

Results

A total of 128 samples were studied and analyzed, and results are plotted in Table 1. The male children were twice the female children among 86 male and 42 female children. 17 cases of perforated appendix were found. The minimum age of the patient who underwent appendectomy was 3 years and the maximum age was 14 years in the study. The mean age of the patients is 9.04 with a standard deviation of 2.93 years. The minimum and maximum length of the stay were 2 days and 13 days respectively.

An independent two-sample t-test was employed to compare the length of hospital stay across different patient groups. The analysis revealed no statistically significant difference in the average duration of hospitalization between male and female patients. The mean stay was 4.40 days (SD = 2.2) for males (n=86) compared to 4.76 days (SD = 2.022) for females (n=42), a difference that was not significant (t = 0.913, p = 0.364).

In contrast, the status of appendix perforation was a strong determinant of hospitalization length. Patients with a perforated appendix (n=17) had a significantly longer mean hospital stay of 7.35 days (SD = 3.6) compared to 4.08 days (SD = 1.5) for those with non-perforated appendicitis (n=111). This difference of approximately 3.27 days was highly statistically significant (t= 3.7, p = 0.0019).

Discussion

Appendicitis is the most common surgical emergency in the pediatric population. Studies comparing laparoscopic versus open appendectomy have not clearly defined which is superior in terms of clinical advantages and cost-benefit. Some studies have shown that laparoscopic appendectomy is an effective alternative to open appendectomy for the management of acute appendicitis. Since the laparoscopic surgical option is not available at the center we have studied, we analyzed cases who underwent open appendectomy.

Some of the concerning complications of acute appendicitis, such as perforation, abscess formation, peritonitis, and bowel obstruction, also determine

Table 1: Comparison of length of hospital stay by sex and perforation status among children undergoing open appendectomy

Parameters		Number	Mean	SD	Min	Max	t value	P value
Sex	Male	86	4.40	2.2	2	13	0.913	0.364
	Female	42	4.76	2.0	2	13		
Perforation Status	Perforated	17	7.35	3.6	2	13	3.7	0.0019
	Non-perforated	111	4.08	1.5	2	8		
Total		128	4.52	2.2	2	13		

the choice of surgical technique. The duration from the onset of symptoms to diagnosis, followed by surgical intervention, determines the outcome of the surgery, which is reflected by the length of hospital stay.[3] In this cross-sectional retrospective study, we aimed to determine the length of hospital stay following an open appendectomy in the pediatric population. From our study, we found that the average length of hospital stay was found to be 4.53 days (standard deviation of 2.2 days).

Our findings indicated the average length of hospital stay following open appendectomy was higher than that of other published studies.[8] The length of hospital stay after laparoscopy was 3.4 days shorter than after open appendectomy, according to a study published in the American Journal of Surgery. In another paper, Laparoscopic Appendectomy Versus Open Appendectomy for Acute Appendicitis: A Prospective Comparative Study: Kumar S. et al. 2016, the hospital stay was 2.63 ± 0.60 days in the laparoscopic appendectomy group and 3.26 ± 0.68 days in open appendectomy group ($p < 0.05$).[10] This may be because the center where the study was done is the tertiary center dealing mostly with the referred cases, mostly complicated ones.

One of the most common complications is perforation, and the length of hospital stay varied among the non-perforated and perforated cases. In our study, the mean length of stay in non-perforated cases is 4.08 days (standard deviation of 1.5), and that of perforated cases is 7.35 days (standard deviation of 3.6), which shows that the average length of hospital stay in the case of perforated appendicitis is higher as compared to non-perforated cases, and the difference was 3.27 days. This emphasizes the fact that timely intervention can decrease the chances of perforation, hence the duration of hospital stays. Previous observational studies have shown that delays from symptom onset to diagnosis and surgery are associated with higher perforation rates and longer hospital stays.

Our findings suggest that the length of hospital stay following appendectomy is affected by several factors rather than the surgical approach alone. The most recent study showed the early diagnosis and timely surgical approach and hygienic postoperative care reduced the length of stay and less the postoperative complications in pediatric patients.[11] In tertiary care hospitals, many children present at a late stage of appendicitis, including perforated cases. These patients often require longer hospitalization and are managed with prolonged antibiotic therapy, nutritional support, and, in some cases, more complex surgical or interventional procedures.[12]

In hospital, many children present late, and limited availability of advanced diagnostic tools and minimally invasive surgical facilities, which contributes to extended hospital stays following appendectomy.[13,14] In addition, inappropriate antibiotic use, variations in postoperative management protocols, inadequate nutritional support, and differences in discharge criteria may also contribute to prolonged hospital stay.[15] Studies have reported that the use of structured perioperative care protocols, including ERAS (Enhanced Recovery After Surgery) protocols, is associated with earlier recovery, reduced postoperative morbidity, and shorter hospital stays.[16] Antibiotic resistance is another factor, especially in treating perforated appendicitis. This resistance results in longer recovery periods, as patients need extended antibiotic courses and spend more time in the hospital.[17,18]

Our study also indicates that the length of the surgical procedure not only contributes to extended hospital stays but also depends on the complexity of the patient and the quality of healthcare facilities. Therefore, a multicenter prospective study is needed to identify modifiable factors that can help minimize the length of stay (LOS) while maintaining high-quality healthcare standards.

This was a single-center retrospective study using consecutive sampling. Some clinical variables could not be analyzed because of incomplete medical records. Multicenter prospective studies are needed to further evaluate factors influencing length of hospital stay. Therefore, more prospective studies are required for comprehensive data collection, postoperative management protocols, and the formulation of variations in hospital stays.

Conclusions

In this study, the average postoperative hospital stay following surgery was 4.53 days. Patients with perforated appendicitis had a longer hospital stay, averaging 7.35 days, while those with non-perforated appendicitis had an average stay of 4.08 days. This difference emphasizes the complexity of the cases and their impact on hospital discharge. Therefore, Children who were diagnosed and treated earlier tended to have

shorter hospital stays after surgery, including those with perforated appendicitis. In the hospital, timely diagnosis and early surgical management were associated with shorter hospital stays in children with appendicitis.

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