

The Necessity of Nighttime Appendectomies: Is Appendicitis an Emergency?

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Abstract

Background: In our institution, we avoid emergency nighttime appendectomies, instead performing the surgery during daylight hours the following day. We examined whether emergency or early appendectomies affect the outcome of patient morbidity. **Materials and Methods:** Medical records of children treated for appendicitis between 2010 and 2012 were retrospectively reviewed. Outcomes were compared between Group 1, defined as those patients who presented to the hospital during the day and underwent appendectomy on the same day and Group 2, defined as those patients who presented to the hospital at night and underwent appendectomy the next day. Incidences of perforation at surgery, operative time, complications and length of stay were analysed. Cases with perforation were also analysed to determine if the perforations could have been identified preoperatively. **Results:** A total of 74 patients met the study criteria, including 41 and 33 in Groups 1 and 2, respectively. There were no significant differences in the incidence of perforation at surgery, operative time, complications and length of stay. A total of nine cases of perforation were identified during surgery, and there were no significant differences in the pre-operative characteristics between perforated and non-perforated cases. **Conclusions:** The results of this study indicate that early appendectomy is safe and did not increase patient morbidity. We, therefore, recommend performing appendectomies in the daytime.

Keywords: Appendectomy, appendicitis, emergency, perforation

INTRODUCTION

Emergency surgery is generally performed on the diagnosis of acute appendicitis. However, it is not clear that nighttime appendectomies are necessary. In our institution, we avoid nighttime emergency appendectomies, instead performing surgery the next day, during the daytime. We examined whether emergency or early appendectomy affected patient morbidity.

MATERIALS AND METHODS

Medical records of children treated for appendicitis between 2010 and 2012 were retrospectively reviewed. Appendectomy patients who underwent interval appendectomies for appendiceal masses were excluded from the study. Patients with pan-peritonitis or in shock were also excluded because they underwent operations at night.

All patients were diagnosed with appendicitis by ultrasonography. We performed appendectomy the next day for all patients who came to our hospital after 21:00. Paediatric surgeons in our

institution do not perform appendectomies between 21:00 and 9:00. All operations were performed in the same institution by multiple surgeons having >5 years of clinical experience.

Outcomes were compared between patients in Group 1, defined as those who reported to our hospital during the day and underwent emergency appendectomy the same day and Group 2, defined as those who reported after 21:00 and underwent early appendectomy the following day. The incidences of perforation identified during surgery, operative time, complications and length of stay were analysed. Cases of perforation were also analysed to determine whether the perforation could have been found preoperatively.

SPSS for Windows was used to create a database and perform statistical analyses. Data were analysed using the Chi-square,

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Fisher's exact test and Student's *t* tests. $P < 0.05$ was considered statistically significant.

RESULTS

A total of 148 patients underwent appendectomy for acute appendicitis in our institution between 1st March, 2010 and 31st December, 2012. We excluded 54 patients treated with interval appendectomy for appendiceal masses and 20 patients with pan-peritonitis or shock. Finally, the medical records of 74 patients were retrospectively reviewed.

There were 41 and 33 patients in Groups 1 and 2, respectively. All patients underwent laparoscopic appendectomies. The basic characteristics of these children are shown in Table 1. No significant differences in background characteristics were noted between the groups. All patients were administered antibiotics until surgery.

Table 2 shows the outcome data for the two groups. The waiting times until surgery were 4.3 ± 1.9 (Group 1) and 15.2 ± 3.6 h (Group 2, $P < 0.05$). Wound infections were found in 13 cases. All were treated conservatively and reoperation was not required. No significant differences were noted between groups in incidences of perforation at surgery, operative time, complications and length of stay.

	Group 1	Group 2	P
Age (years)	10.4±2.5	10.8±3.0	0.41
Sex (Male : Female)	26 : 15	24 : 9	0.46
White blood cell count (/µl)	16992±4254	17327±3894	0.72
C-reactive protein test (mg/dL)	5.37±5.52	3.77±3.93	0.15

	Group 1	Group 2	P
Waiting time (hours)	4.3±1.9	15.2±3.6	0.01
Perforation	5	4	0.63
Operative time (min)	81±25	83±35	0.78
Complications	7	6	0.56
Length of stay (days)	5.6±2.4	6.2±3.3	0.35

	Perforated (9 cases)	Non-perforated (65 cases)	P
Fecalith on ultrasound	7	27	0.07
Ascites on ultrasound	6	27	0.17
Ileus on abdominal X-ray	3	11	0.36
Preoperative temperature(□)	38.6±0.71	37.5±0.81	0.57
White blood cell count (/µl)	16893±3013	17176±4217	0.50
C-reactive protein test (mg/dL)	9.1±5.4	4.0±4.5	0.59
Use of painkillers	2	10	0.63
Waiting time (hours)	9.1±6.1	9.4±6.5	0.47
Postoperative complications (wound infection)	3	6	0.18

Perforations were identified during surgery in nine cases. No significant differences were noted in pre-operative characteristics between the perforated and non-perforated cases [Table 3].

DISCUSSION

Several reports have suggested that it is unnecessary to perform nighttime appendectomies. Yardeni *et al.* reported on 126 patients who underwent surgery within 6 h or between 6 and 24 h after emergency room triage and found no differences in operating time, perforation rates or complications.^[1] Taylor *et al.* also examined whether performing surgery within 8 h of presentation offered any outcome advantages 8 h after surgery reporting no significant differences in the post-operative outcomes between the groups.^[2] They did not recommend this approach in environments with difficult daytime operating schedules.

The results of our study were similar to those of other reports. Only, the waiting time until surgery differed significantly between the groups. Nevertheless, there were no significant differences in the incidences of perforation at surgery, operating time, complications and length of stay. Furthermore, it appears to be more important for clinicians to determine if the operation can be done the next day rather than how many hours the patient can wait until surgery. Our study indicated that patients reporting to the hospital after 21:00 might be operated on the next day. We conclude it is unnecessary to perform nighttime appendectomies (21:00-9:00) unless patients are in unstable conditions.

All cases received routine antibiotics. Surana *et al.* and Yardeni *et al.* also reported routinely initiating antibiotic therapy before appendectomy until the morning.^[1,3] These were based on the idea that antibiotics might be effective for the treatment of the disease process. However, Beres *et al.* reported that antibiotics did not reduce perforation rates.^[4] The results of this study supported the view that antibiotics might be effective. Several studies have reported successful treatment of appendicitis with antibiotics alone.^[5-7] However, the high rate of recurrence calls into question if antibiotic therapy can fully replace surgery.^[8,9]

There were nine cases in which perforations were identified during surgery. It was difficult to determine if the appendix was perforated preoperatively in our study. No cases progressed

to peritonitis while waiting for surgery. In addition, no significant differences were found in the use of painkillers. Based on these findings, we believe that none of the cases with perforation occurred while waiting for surgery after reporting to our hospital. There were no significant differences in the post-operative complications between perforated and non-perforated cases. Thus, we conclude that emergency operations can be avoided, even in cases of perforation, if the patients are in stable condition.

CONCLUSIONS

In this study, early appendectomy was safe and did not increase the patient morbidity. It was difficult to predict whether the appendix was perforated preoperatively; however, emergency operation is unnecessary if the patients are in stable condition. We recommend performing appendectomies in the daytime.

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Conflicts of interest

There are no conflicts of interest.

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