

Is Nonperforated Pediatric Appendicitis Still Considered a Surgical Emergency? A Survey of Pediatric Surgeons

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ABSTRACT

OBJECTIVE: To describe the beliefs and preferences of pediatric surgeons regarding the emergent nature of nonperforated appendicitis.

METHODS: An electronic mailing was sent to all 1052 members of the American Pediatric Surgical Association (APSA) inviting participation in a 26-item survey, which was administered by Survey Monkey (www.surveymonkey.com). Chi-square and Mann-Whitney tests were used for bivariate analysis. Spearman's rho was used for nonparametric correlation.

RESULTS: Four hundred eighty-four pediatric surgeons (46%) responded to the survey. Few respondents (4%) considered nonperforated appendicitis to be a surgical emergency. A minority (14%) would come in from home to perform an overnight appendectomy. Most (92%) believe that postponing overnight

appendectomy until daytime does not result in a clinically significant increase in perforation. Respondents endorsed surgeon fatigue (56%) and limited operating room availability (56%) most often among factors that would make them more likely to postpone surgery. Sixty-eight percent reported no departmental guideline regarding delay of overnight appendectomy.

CONCLUSIONS: Most pediatric surgeons in our study believe nonperforated appendicitis is not a surgical emergency and prefer to postpone overnight appendectomy.

KEYWORDS: children; appendicitis; emergency; overnight; delay

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WHAT'S NEW

Few pediatric surgeons in our survey believe nonperforated appendicitis is a surgical emergency. Most prefer to postpone overnight appendectomy and believe this does not result in a clinically significant increase in perforation.

APPENDICITIS IS RESPONSIBLE for 4% of cases of acute abdominal pain in children presenting to the emergency department¹ and accounts for over 70,000 pediatric operations per year in the United States.² Delay in the diagnosis and treatment of appendicitis may result in complications that lead to significant increases in morbidity, hospital length of stay, and health care expenditures.³ To avoid these complications, appendicitis has historically been treated as a surgical emergency.

The need for emergent appendectomy, especially during overnight hours, has recently been challenged. Concerns regarding surgeon and staff fatigue, decreased resident work hours, and patient safety have been reported in the literature and lay press and have prompted research into safe alternatives to emergent operations.^{4–6} Several retrospective studies of adults and children have found no difference in morbidity or mortality when appendectomy is delayed up to 24 hours.^{4,6–8} Similarly, investigations in other specialties have found no difference in outcomes

when certain procedures once thought to be emergent are delayed.^{9,10}

Over a decade ago, half of all pediatric surgeons surveyed reported that they would operate emergently on clinically stable children who present with appendicitis in the middle of the night.¹¹ It is not known whether pediatric surgeons' preferences regarding appendectomy timing have changed in light of recent studies, and, to date, no widespread guidelines have been developed. The purpose of this survey was to describe the current beliefs and preferences of pediatric surgeons regarding the emergent nature of nonperforated appendicitis.

METHODS

From February 23 to April 6, 2011, a survey was distributed to all members of the American Pediatric Surgical Association (APSA), which consists of 1052 board certified pediatric surgeons, including 1001 members from the United States.

Survey topics and preliminary questions were generated by the investigators in consultation with members of the Department of Pediatrics, Division of Emergency Medicine, and the Department of Surgery at Jacobi Medical Center. Further input was obtained from experts in survey methodology and design. The survey was pilot tested on multiple general surgery and emergency medicine

attendings to assess for ambiguity and speed in filling out the survey. After review and several revisions, the APSA Outcomes and Clinical Trials Committee approved the final survey for online distribution to its members.

The 26-item survey was divided roughly in thirds among questions addressing operative timing preference, imaging preference, and departmental or group characteristics. All questions regarding operating preferences were directed towards “nonperforated” appendicitis only. Included in the operative timing subcategory were questions specifically addressing overnight practice as well as beliefs about the likelihood of perforation and the use of antibiotics. Imaging questions addressed only ultrasound and computed tomography (CT). The final questions of the survey referred to the surgeons’ departmental or group guidelines regarding overnight appendicitis, if present. The majority of questions were closed-ended, using multiple-choice and yes/no designs; several of these offered an “other” choice that allowed a typed response. Two questions were open-ended, using text boxes. A comments area was provided after most questions.

The APSA sent its member surgeons an invitation via email to participate in a voluntary and confidential survey administered by Survey Monkey (www.surveymonkey.com). Associated internet protocol addresses were used as unique identifiers to check for duplication of responses. Two reminders to participate were sent before the study was closed. As an incentive for participation, respondents were given instructions for contacting the investigators by email if they desired preliminary results of the main survey questions at the close of the survey period.

Typed comments were assigned to appropriate categories or categorized as “other” by consensus of the investigators. Data analysis was performed using SPSS 14.0 for Windows-Graduate Student Version (SPSS Inc, Chicago, Ill). Respondent characteristics and outcomes were summarized using frequencies and proportions for categorical variables and medians and interquartile ranges (IQRs) for continuous variables. Operative timing preferences were compared with surgeon demographics and other survey responses using chi-square and Mann-Whitney tests for bivariate analysis. Spearman’s rho was used for nonparametric correlation between the percentage of the surgeon’s patients that were operated on without imaging and the percentage of negative appendectomies that the surgeon found acceptable. The institutional review board at the Albert Einstein College of Medicine approved the study and waived the need for written informed consent.

RESULTS

Four hundred eighty-four pediatric surgeons (46%) responded to the survey. Respondents reported a median of 15 years in practice since completion of pediatric surgical training (IQR: 8–24). Demographic data are noted in Table 1.

Table 1. Respondent Demographics*

Characteristics	Respondents		
	No.	%	95% CI
Principal practice site			
Children’s hospital	318	71.3	66.9–75.5
Community hospital	46	10.3	7.7–13.5
University affiliated general hospital	81	18.2	14.7–22.1
Other	1	0.2	0.0–1.2
Pediatric appendectomies performed in most recent year of active practice			
<15	11	2.5	1.2–4.4
16–30	81	18.2	14.7–22.1
31–45	99	22.2	18.4–26.3
46–60	85	19.1	15.5–23.0
61–75	45	10.1	7.5–13.3
>75	125	28.0	23.9–32.4
Location of overnight call			
In hospital	48	10.8	8.1–14.1
At home <30 minutes away	371	83.6	79.8–86.9
At home >30 minutes away	25	5.6	3.7–8.2
Membership in department or group practice	431	97.5	95.6–98.8

CI = confidence interval.

*Denominators vary according to number of responses.

The majority of respondents did not consider nonperforated appendicitis to be a surgical emergency (Table 2). This was true regardless of time of day, whether the surgeon worked at a children’s hospital, the number of appendectomies he or she performed in the last year of practice, or the travel time to the hospital while on call. However, surgeons

Table 2. Operative Timing Preferences for Presumed Nonperforated Appendicitis*

Preferences	Respondents		
	No.	%	95% CI
Belief on appendectomy			
Surgical emergency	18	3.8	2.2–5.9
Urgent surgical issue	387	81.5	77.7–84.9
Non-urgent surgical issue	65	13.7	10.7–17.1
Attempt nonoperative treatment	0	0.0	0.0–0.8
Other	5	1.1	0.3–2.4
Appendectomy timing for daytime presentations			
Immediate (postpone other cases)	41	8.6	6.3–11.5
Daytime (during or after scheduled cases)	422	88.4	85.7–91.5
Following day	1	0.2	0.0–1.2
Attempt nonoperative treatment	0	0.0	0.0–0.8
Other	11	2.3	1.2–4.1
Appendectomy timing for overnight presentations			
Immediate (even if surgeon has to come from home)	68	14.3	11.3–17.8
Immediate (only if already in hospital)	51	10.7	8.1–13.9
Before scheduled morning cases	203	42.7	38.2–47.3
Daytime (during or after scheduled cases)	145	30.5	26.4–34.9
Attempt nonoperative treatment	0	0.0	0.0–0.8
Other	8	1.7	0.7–3.3

CI = confidence interval.

*Denominators vary according to number of responses.

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