

Available online at www.sciencedirect.com

ScienceDirect

journal homepage: www.JournalofSurgicalResearch.com

Association for Academic Surgery

The diagnostic dilemma of identifying perforated appendicitis

Zehra Farzal, BS,^a Zainab Farzal, BS,^a Nudrat Khan, BS,^b
and Anne Fischer, MD, PhD^{b,*},¹^aUT Southwestern Medical Center, Dallas, Texas^bDepartment of Pediatric Surgery, Children's Medical Center, Dallas, Texas

ARTICLE INFO

Article history:

Received 15 January 2015

Received in revised form

16 March 2015

Accepted 15 April 2015

Available online 21 April 2015

Keywords:

Perforated appendicitis

Pediatric

Discordance

Cost effectiveness

ABSTRACT

Background: Despite extensive research, the classification of perforated (PA) versus non-perforated appendicitis (NPA) remains poorly defined. We hypothesize that the variability across specialties in the classification of appendicitis as PA or NPA may be associated with variation in clinical behavior as demonstrated by a variation in length of stay (LOS).

Methods: Retrospective review of 1311 appendectomies over a 16-mo period from an independent children's hospital allowed a comparison of the diagnostic classification of appendicitis as PA or NPA based on radiology (R), operative (O), and pathology (P) reports. Three groups, P + O ($n = 1241$), P + R ($n = 516$), O + R ($n = 512$) were compared to identify interspecialty discordance in classification. The LOS was analyzed as a proxy for clinical behavior to test if the diagnostic classification was consistent with expected clinical behavior (NPA with LOS ≤ 48 h and PA with LOS > 48 h).

Results: The subsets P + O, P + R, and O + R revealed a discordance of 11%, 15.7%, and 16.6% within the classification of appendicitis, respectively. Cases designated as PA in all subsets clinically behaved as PA with a mean LOS > 48 h (97, 95, and 95 h, respectively), whereas the cases designated as NPA exhibited greater variation from the expected LOS ≤ 48 h, with means 35, 83, and 62 h, respectively.

Conclusions: Variability in the classification of appendicitis between specialties suggests an error rate inherent in diagnosis. Standardizing the criteria for classification across specialties may improve the diagnostic accuracy of the type of appendicitis needed to identify best practices for optimal use of hospital resources and for meaningful clinical trials.

© 2015 Elsevier Inc. All rights reserved.

1. Introduction

Appendicitis is known to be the most common surgical emergency in children. Peak incidence occurs between the ages of 11–12 y with a lifetime risk of 7% for females and

9% for males [1]. Approximately one-third of children have perforation at the time of surgery [2]. Being able to correctly distinguish between cases of perforated (PA) and non-perforated appendicitis (NPA) holds tremendous value in terms of applying correct clinical guidelines for antibiotic

* Corresponding author. Department of Pediatric Surgery, Beaumont Children's Hospital, 3535 W. Thirteen Mile Road, Suite 748, Royal Oak, MI 48073. Tel.: +1 248 551 7707; fax: +1 248 551 6556.

E-mail address: anne.fischer@beaumont.edu (A. Fischer).

¹ Present address: Department of Pediatric Surgery, Beaumont Children's Hospital, 3535 W. Thirteen Mile Road, Suite 748, Royal Oak, MI 48073.

0022-4804/\$ – see front matter © 2015 Elsevier Inc. All rights reserved.

<http://dx.doi.org/10.1016/j.jss.2015.04.058>

therapy and expected hospitalization. The lack of accuracy in the classification of appendicitis can affect the therapeutic course and the readmissions. For example, PA more commonly requires a longer course of postoperative antibiotics depending on the patient’s clinical course and may lead to postoperative complications such as the development of intra-abdominal abscesses. The associated costs are also a concern with the average cost per case of complicated appendicitis being \$12,300, whereas cases of uncomplicated appendicitis are approximately one-half of that amount at \$6355 per case [3].

Radiology, surgery, and pathology are all specialties involved with diagnosing PA and NPA. Despite numerous clinical trials on pediatric appendicitis in the Cochrane database over the last decade, no defined best clinical pathway exists for managing complicated appendicitis or PA causing a tremendous variation in practice and outcomes [4].

We hypothesize that the variability across specialties in the classification of appendicitis as PA may be associated with variation in clinical behavior as demonstrated by a variation in length of stay (LOS).

2. Materials and methods

We conducted an institutional review board–approved (072011-039) retrospective review of 1311 appendectomies performed over a 16-mo period in 2010 and 2011 at a large independent academic children’s hospital. Demographics (age and gender), symptoms at presentation (nausea, vomiting, abdominal pain, anorexia, fever, and diarrhea), duration of symptoms, LOS, and use of postoperative antibiotics were obtained from the electronic medical record. Diagnoses of PA or NPA according to radiology (R), operative (O), and pathology (P) reports were recorded and compared. For radiologic imaging, only cases with CT imaging were included to give the most precise radiologic diagnosis. Differentiating between PA and NPA types was key in this study, and although useful, ultrasound reads can be equivocal in differentiating between PA and NPA types, leading to exclusion of cases without CT scans.

Appendicitis was classified as “PA” or “NPA” based on each specialty’s designation, as the goal was to compare the diagnosis determined by each specialist. In radiology reports and operative reports, if terms such as perforated and ruptured were used by the physician, the case was designated as “PA.” In pathology reports, the terms perforation, microperforation, and rupture were all words identifying a “hole” in the appendix, and thus were consistent with the classification of “PA.” We did not superimpose a fourth definition because it would be arbitrary, given that the intent of this study was to assess the actual lack of uniformity in distinguishing PA from NPA in radiologic, pathologic, and intraoperative determinations. Exclusion criteria included interval appendectomies, open appendectomies, incomplete data sets and those with inconclusive findings on these reports.

2.1. Interspecialty subset analysis

To conduct interspecialty analysis of the diagnosis of PA versus NPA, the appendectomy cases ($n = 1311$) were divided

into three subsets: pathology and operative (P + O) group ($n = 1241$), pathology and radiology (P + R) group ($n = 516$), and operative and radiology (O + R) group ($n = 512$). For the radiology arm, only cases with CT scans were analyzed for the most definitive determination of diagnosis, explaining the smaller sample size for the P + R and O + R groups. For each of the three groups, the percentage of discordant cases between the diagnoses of PA and NPA between specialties was calculated.

2.2. Comparison of diagnostic classification to clinical behavior

Next, LOS was used as an approximate proxy of clinical behavior with the expectation that NPA cases would typically require a LOS ≤ 48 h. Similarly, cases classified as PA were expected to require a length of stay >48 h. The LOS in each group was analyzed to see if the classification as “PA” or “NPA” was consistent with the clinical behavior exhibited.

3. Results

3.1. Patient characteristics

A total of 1311 appendectomies done at the Dallas Children’s Medical Center were analyzed. In the P + O group, 1261 remained after exclusion of open and interval appendectomies and cases with incomplete information. From the 550 cases with available CT reports, 516 and 512 cases remained in the P + R group and O + R groups respectively, after exclusion of cases with incomplete information. The demographics are listed in the Table below.

3.2. Interspecialty discordance and clinical behavior

The subsets P + O, P + R, and O + R revealed a discordance of 11%, 15.7%, and 16.6%, respectively (Table). Therefore, the P + O group was the most concordant subset because pathology and operative reports most frequently concurred with the classification of the type of appendicitis. To compare the diagnostic classification to the actual clinical behavior, cases

Table – Subset demographics and characteristics.

Demographics and discordance	P + O	P + R	O + R			
N	1241	516	512			
Age	10.3 ± 3.7	10.3 ± 3.8	10.3 ± 3.8			
Female, %	40	43	43			
Male, %	60	57	57			
Discordant cases	138	81	85			
% Discordance	11	15.7	16.6			
Characteristics of discordant cases						
	P + O (138)		P + R (81)		O + R (85)	
	P	O	P	R	O	R
# Perforated	36	102	46	35	65	20
% Perforated	26	74	57	43	76	24

Download English Version:

<https://daneshyari.com/en/article/4299610>

Download Persian Version:

<https://daneshyari.com/article/4299610>

[Daneshyari.com](https://daneshyari.com)