



The Diagnostic Dilemma of Identifying Perforated Appendicitis

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BACKGROUND

- Appendicitis is one of the most common diagnoses in children.
- Despite 61 clinical trials on pediatric appendicitis in the Cochrane database over the last decade, a defined best clinical pathway for classifying acute nonperforated versus complicated appendicitis remains lacking.
- The lack of accuracy in the classification of appendicitis can affect the therapeutic course and associated costs, with the average cost per case of complicated appendicitis at \$12,300, which is twice as expensive as uncomplicated appendicitis at \$6,355 per case.
- We hypothesize that the variability in the diagnosis of complicated appendicitis results in this discordance. Our goal is to investigate this discordance between three modalities: pathology, surgery, and radiology.

METHODS

- Our study is an IRB-approved retrospective review of appendectomies (N=1311) from a 16-month period from 2010 and 2011, excluding interval or incidental appendectomies and including CT imaging
- The classification of appendicitis as “perforated” was compared in a 3-way analysis between radiology (R), pathology (P), and operative reports (O) to identify the incidence of discordance.
- The classification was compared to length of stay (LOS), to determine if the classified diagnosis was consistent with being clinically “acute nonperforated” (A) <48 hours admission or “perforated” (P) >48 hours.

DATA POINTS ANALYZED:

Demographics:

- Age
- Gender
- Insurance

Diagnosis By:

- Radiology
- Operative
- Pathology

Outcome:

- Length of stay
- ICD-9/ CPT codes
- Re-admission
- Post-op antibiotics

Groups Analyzed:

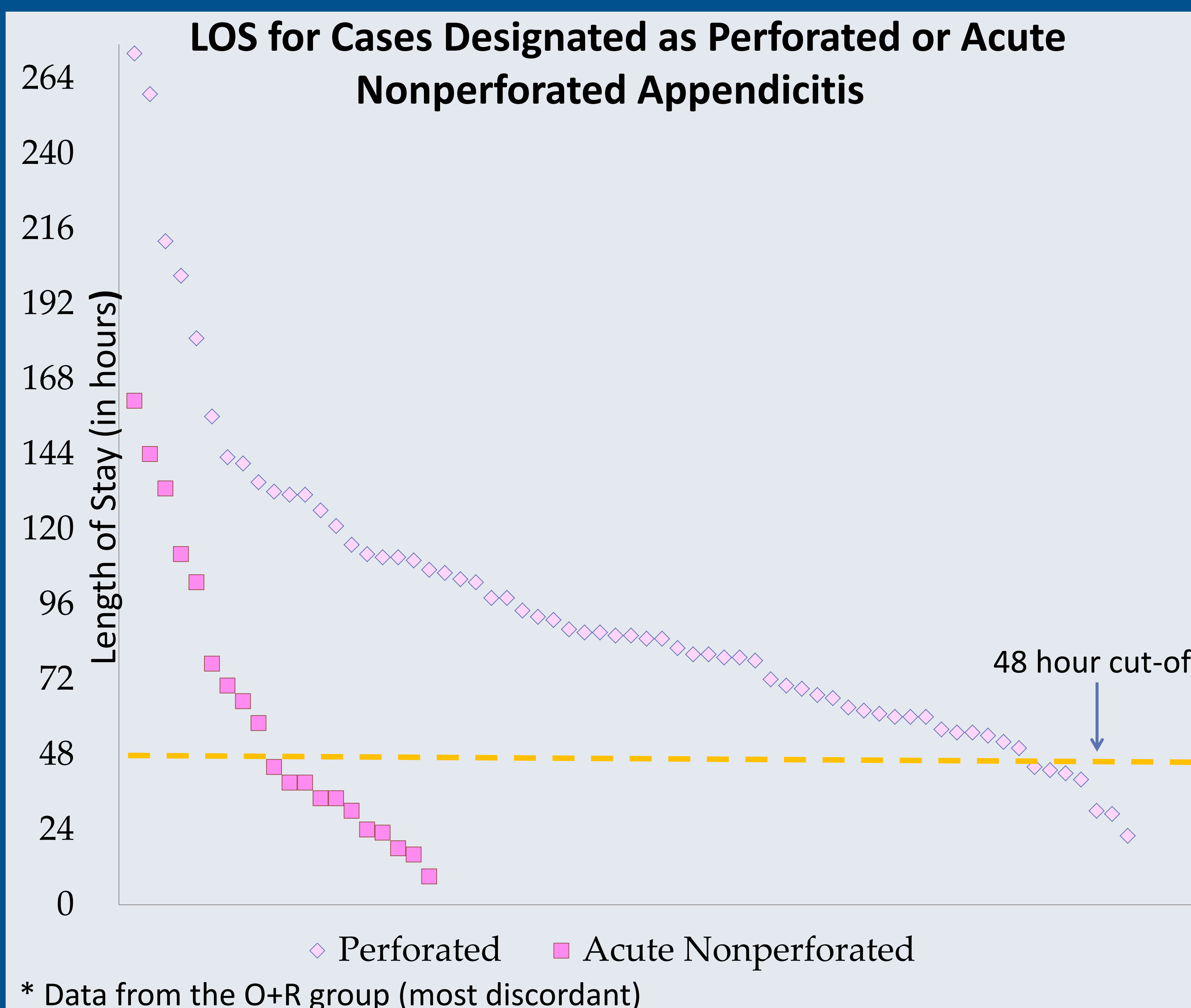
- Pathology vs. Operative (P+O)
- Pathology vs. Radiology (P+R)
- Operative vs. Radiology (O+R)

RESULTS

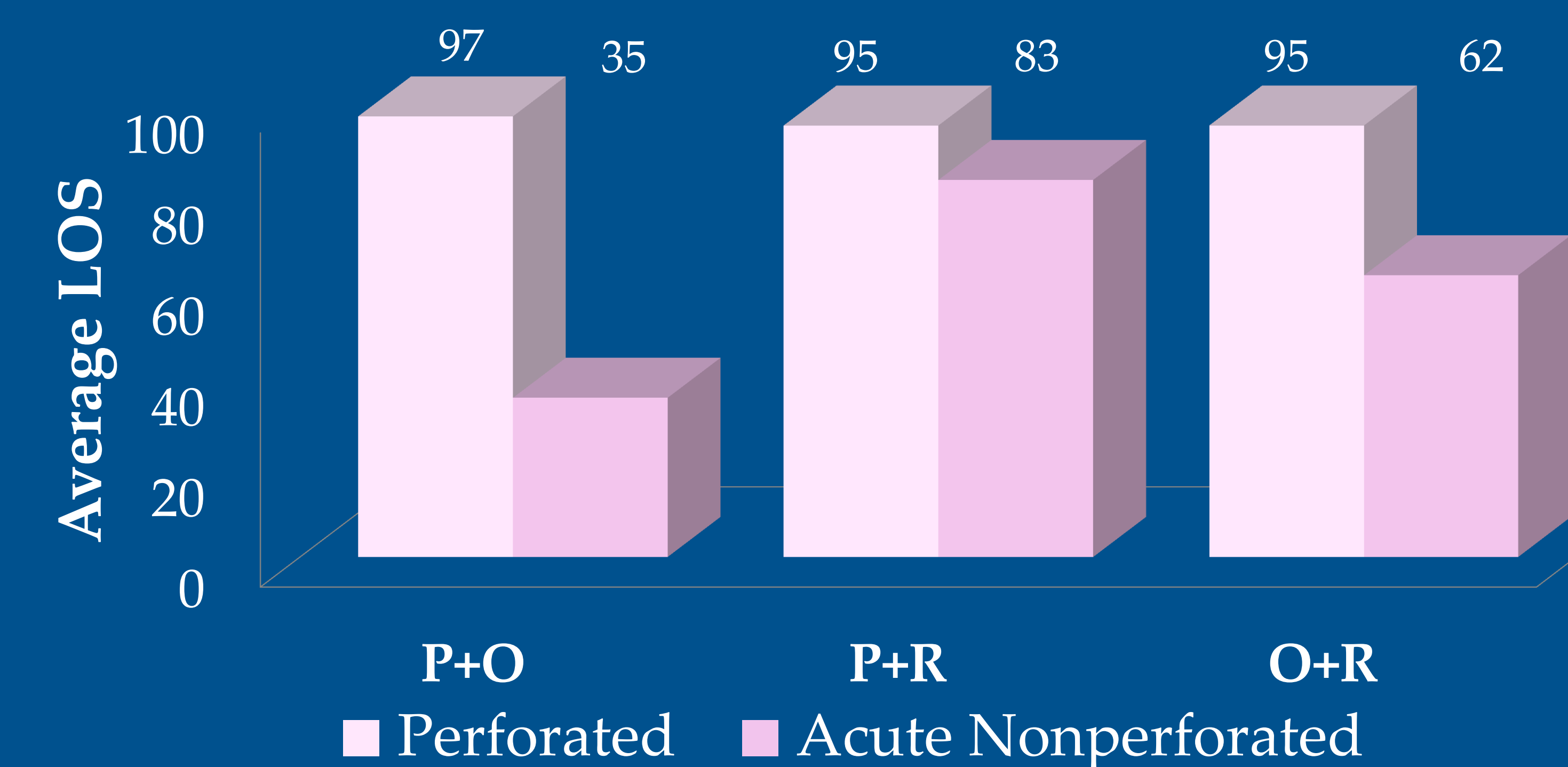
- The demographics between the three groups remained similar (average age 10.3 years, 57-60% males, 40-43% females).
- The discordance in diagnosis in P+O, P+R, O+R was 11%, 15.7% and 16.6%, respectively.

	P+O (Path. vs. Op.)	P+R (Path. vs. Rad.)	O+R (Op. vs. Rad.)
N (#)	1311	516	516
Complete Data	1241	516	512
# Discordant	137	81	85
% Discordance	11%	15.7%	16.6%

- The P+O group was most concordant with regard to the diagnosis of acute nonperforated versus perforated appendicitis
- Notably in the O+R group, 35% of cases were intraoperatively determined to be perforated, but 38.9% of those cases had a LOS of less than 48 hours, consistent with being acute nonperforated clinically.
- Cases with LOS of >48 hours in the O+R group had a median of 88 hours (range 50-272 hours).



Average LOS for Perforated and Acute Nonperforated Appendectomies



- Great variation was observed in average LOS for acute nonperforated appendectomies in the three groups.
- The largest deviations from the 48 hour cut-off for acute nonperforated cases were found in the P+R group (range 0-83 hours) and the O+R group (range 0-62 hours).
- The acute nonperforated appendectomies from the P+O group were most consistent with having a LOS of <48 hours, with an average of 35 hours.

CONCLUSION

- There is a substantial discrepancy in the diagnosis of perforated and nonperforated appendicitis between operative, radiologic, and pathologic reports with the greatest discordance in diagnosis occurring between radiologic and operative diagnoses (16.6%).
- The variation in LOS confirms this discordance.
- The varying terminology (perforated, nonperforated, suppurative, gangrenous, necrotizing, catarrhal) used to describe appendicitis between radiology, surgery, and pathology reports may contribute to the discordance.
- Standardizing the criteria for classification of the type of appendicitis across specialties may improve diagnostic accuracy needed to identify best practices for optimal use of hospital resources and health care costs.

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