

Introduction

Appendicitis is the most common surgical emergency in children with a lifetime risk of 7-9%¹. Perforation is defined as “a hole in the appendix or appendicolith in the abdomen” and carries up to a 20% risk of intra-abdominal abscess (IAA) development following appendectomy^{1,2,3,4}. This significant risk informs the current standard of care to continue antibiotic therapy following appendectomy for perforated appendicitis (PA).

Our current institutional protocol seeks to minimize antibiotic overutilization by using the leukocyte count on the day of discharge to determine need for home oral antibiotics upon discharge. If the patient has a normal discharge white blood cell (DC WBC) count for age, no further antibiotic therapy is given.

Aim: It is unknown whether a normal DC WBC count for age sufficiently predicts the risk of post-operative IAA. Therefore, we sought to assess the effectiveness of our institutional protocol and determine which children may benefit from additional oral antibiotics at discharge in the setting of a normal leukocyte count for age.

Methodology

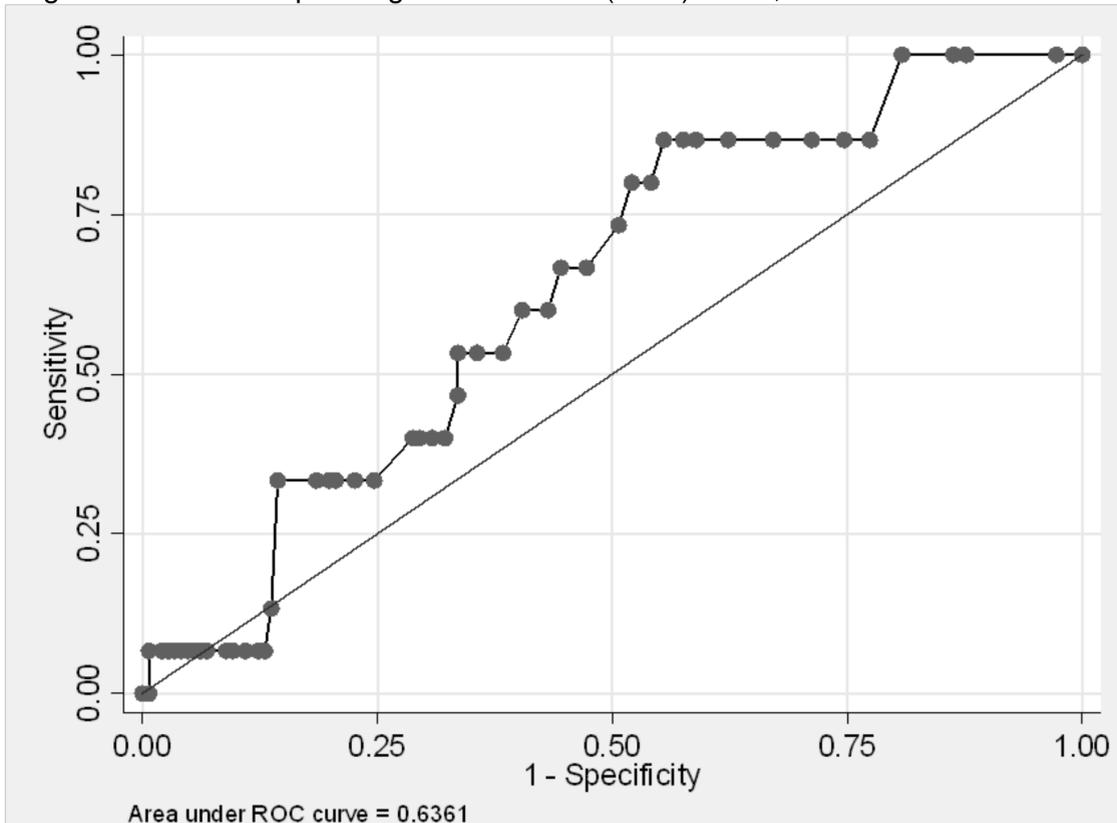
A retrospective review of prospectively collected data on children (n=552) undergoing laparoscopic appendectomy for PA at our institution between August 2011 and July 2017 was performed. Data were analyzed for patients with perforated appendicitis who were discharged home without oral antibiotics and stratified by development of a post-operative IAA. Demographic data, post-operative length of stay and discharge leukocyte counts were abstracted from medical records. Comparative analyses were performed in STATA with a p < 0.05 determined as significant.

Results

Figure 1: table of results

	No Abscess n=516 (93.5%)	Abscess n=36 (6.5%)	p-value
Age (yr)	9 [IQR 6, 12]	12 [IQR 11, 13.5]	<0.01*
Weight (kg)	32.5 [IQR 23, 50.55]	47.4 [IQR 36.9, 57.3]	<0.01*
Admission WBC count	13.4 [IQR 8.8, 17.9]	14.2 [IQR 9.4, 20.9]	0.41
DC WBC count	8.6 [IQR 7.2, 10.2]	9.9 [IQR 7.7, 12.1]	0.03*
OR Time (min)	33 [IQR 26, 45]	38.5 [IQR 29, 47]	0.08
Length of stay (hr)	94 [IQR 72.5, 118] (3.92 days)	100.5 [IQR 74.5, 122] (4.2 days)	0.14

Figure 2: Receiver Operating Characteristic (ROC) curve, DC WBC > 10 x 10³ mcL



Discussion

- Patients were still returning with IAA post operatively despite having normal for age DC WBC count and meeting clinical criteria for discharge.
- We identified a 6.5% post-operative IAA rate in children who met clinical criteria for discharge and a normal DC WBC count for age.
- Patients who developed IAA were older and weighed more.
- Admission leukocyte count was not a sufficient predictor of IAA.
- Difference in length of stay was not statistically significant, suggesting that time to meet criteria for discharge was not a sufficient predictor for IAA.
- Upon ROC analysis of various WBC count values, we found a WBC of > 10 to have the best AUC of 0.64.
- We decided a DC WBC threshold of 10 x 10³ mcL would be a simple, objective criterion to assess need for oral antibiotics at discharge, and adjusted our institutional protocol accordingly.

Conclusion

- **Children with a DC WBC > 10 x 10³ mcL, as opposed to normal for age, may benefit from oral antibiotics following laparoscopic appendectomy for PA.**
- A prospective observational study to evaluate the effectiveness of a DC WBC > 10 x 10³ mcL as a threshold for discharge antibiotics is currently underway at our institution.

References

1. St Peter SD, Sharp SW, Holcomb GW 3rd, et al. An evidence-based definition for perforated appendicitis derived from a prospective randomized trial. *J Pediatr Surg.* 2008;43(12):2242-5.
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3. Krisher SL, Browne A, Dibbins A, et al. Intra-abdominal abscess after laparoscopic appendectomy for perforated appendicitis. *Arch Surg.* 2001;136(4):438-41.
4. Fraser JD, Aguayo P, Leys CM, et al. A complete course of intravenous antibiotics vs a combination of intravenous and oral antibiotics for perforated appendicitis in children: A prospective, randomized trial. *J Pediatr Surg.* 2010;45(6):1198-202.