

Comparative Effectiveness of Ceftriaxone Plus Metronidazole Versus Antipseudomonal Antibiotics for Perforated Appendicitis in Children

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Background

- Appendicitis is the most common pediatric surgical emergency and one of the most common indications for antibiotic use in hospitalized children.
- Antibiotic choice for appendicitis varies widely across children's hospitals, and the optimal antibiotic regimen for perforated appendicitis remains unclear.

Objective

- To compare the outcomes of children with perforated appendicitis who were treated on hospital admission with ceftriaxone plus metronidazole compared to an antipseudomonal regimen.

Methods

- Study design:** Retrospective cohort study
- Study sites:** The Children's Hospital of Philadelphia
- Data source:** Electronic health records
- Study population:** Children hospitalized between January 2011 and March 2015 who underwent surgery for perforated appendicitis who received either ceftriaxone plus metronidazole (CTX/MTZ) or an antipseudomonal regimen (including cefepime, piperacillin-tazobactam, ciprofloxacin, imipenem, or meropenem) within the first two days of diagnosis.
 - Exclusion criteria:
 - admitted for ≥ 48 hours prior to diagnosis
 - prior history of appendicitis
 - receipt of inotropic agents
 - immunocompromised
- Outcome:** The primary outcome of interest was inpatient treatment failure, defined as development of wound infection or abscess prior to discharge. Secondary outcomes include antibiotic-related complications and hospital length of stay.
- Analysis:** A multivariable logistic regression model for the probability of treatment failure adjusting for:
 - Sex
 - Age
 - Race
 - Initial white blood cell count
 - Underlying medical conditions

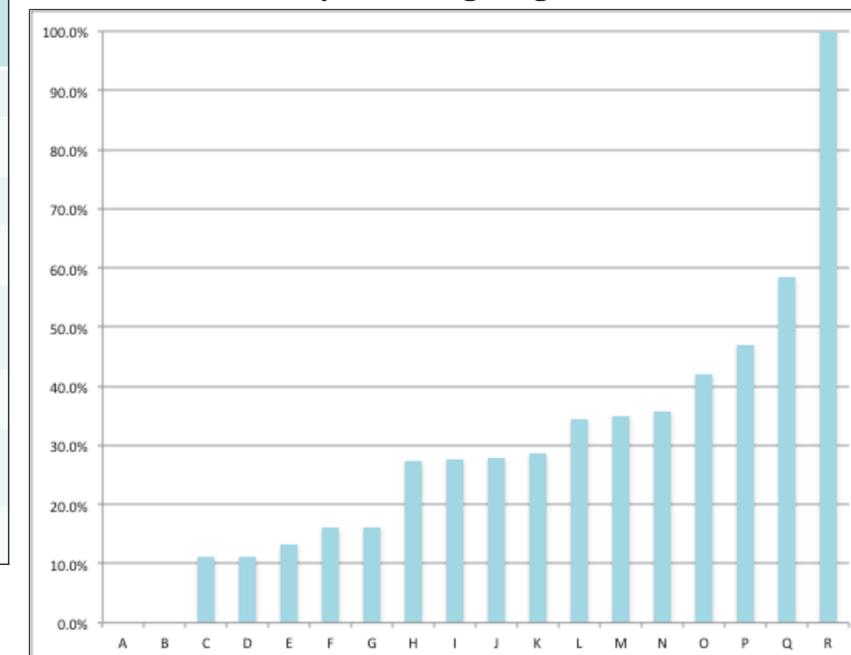
Results

Baseline characteristics	Total n=353	Anti- pseudomonal* n=101	CTX/MTZ n=252
Male Sex, N(%)	222 (60.7)	63 (62.4)	155 (61.5)
Age in years - Median (IQR)	10.0 (7.6-13)	9.8 (7.8-13.1)	10.0 (7.5-12.9)
Black Race, N(%)	73 (20.0)	19 (18.8)	53 (21)
Chronic medical condition, N(%)	16 (4.4)	5 (5.0)	11 (4.4)
Duration of symptoms prior to diagnosis – median (IQR)	2 days (1-3)	2 days (1-3)	2 days (1-3)
Admission temp – median (IQR)	37.6 (37.1-38.3)	37.6 (37-38.3)	37.5 (37.1-38.3)
White Blood Cell Count - median (IQR)	15.3 (11.8-20.4)	15.2 (11.7-20.2)	15.5 (11.9-20.5)
C-Reactive Protein - median (IQR)	6.9 (4.5-17.4)	7.0 (4.2-17.2)	7.0 (4.5-17.9)

Outcomes	Total n=353	Anti- pseudomonal* n=101	CTX/MTZ n=252
Inpatient Failure, N(%)	49 (13.9)	16 (15.8)	33 (13.1)
Wound infection, N(%)	2 (0.6)	0	2 (0.8)
Abscess, medical management, N(%)	31 (8.8)	12 (11.9)	19 (7.5)
Abscess, drained, N(%)	19 (5.4)	5 (5.0)	14 (5.6)
CVC-related complication, N(%)	2 (0.6)	2 (2.0)	0
Antibiotic-related complication, N(%)	18 (5.1)	7 (6.9)	11 (4.4)
Length of stay in days, mean (SD)	6.3 (3.9)	6.0 (4.6)	6.4 (3.5)

*Anti-pseudomonal antibiotics included piperacillin-tazobactam (36) and ciprofloxacin (68)

Proportion treated with antipseudomonal antibiotics, by attending surgeon



- The proportion of children treated with antipseudomonal antibiotics varied across providers from 0 to 100%
- In a multivariable logistic regression model adjusting for measured confounders, the odds of treatment failure with antipseudomonal antibiotics was 1.38 (95% CI 0.65 - 2.93) compared to treatment with CTX/MTZ.
- Mean length of stay did not differ by treatment group.

Conclusions

- Antibiotic choice for perforated appendicitis varied widely among providers.
- Treatment failure rates did not differ between children treated with antipseudomonal antibiotics versus CTX/MTZ.