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A Retrospective Study Assessing the Appropriateness of the Initial Antibiotic Therapy for Select Intra-Abdominal Infections

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Background

- The need for antimicrobial stewardship is becoming more prevalent as resistance rates and adverse effects increase throughout the United States
- Intra-abdominal infections such as appendicitis, diverticulitis, and cholangitis occur in >300,000 patients annually
- They are the second leading cause of mortality in the ICU

Objectives

- Assess the initial antimicrobial therapy used in patients with cholangitis, diverticulitis, or appendicitis.
- Assess the total duration of treatment of these patients.

Methods

- This study was a single-center retrospective patient case review
- We selected 95 patients with appendicitis, diverticulitis, or cholangitis from January 17th 2022 to November 30th 2022
- Pediatric patients were excluded in the analyses
- Initial antimicrobial regimen appropriateness was determined by referencing the latest IDSA recommendations and risk factors
- The risk factors used to assess included: immunocompromised patients, age >70, physiological instability, and delay in care >24h
- The durations of treatment (secondary outcome) were compared to results of the STOP-IT trial and the DURAPOP Randomized Controlled Trial

Results

- Overall, 49.47% of patients received appropriate therapy
- Only one of the risk factors used for this study was needed to indicate broader antimicrobials such as piperacillin/tazobactam or imipenem/cilastatin.
- A total of 49 patients had zero risk factors, 27 had one risk factor, 16 had two risk factors, and four had three risk factors. Within these patient subgroups, 14.29%, 92.59%, 68.75%, and 100% patients received appropriate therapy, respectively
- The average days of therapy was 9.81 days
- Overall, 8/95 (8.42%) of patients received therapy for ≤4 days, 25/95 (26.32%) received therapy for ≤7 days, and 36/95 (37.89%).

Table 1. Baseline Demographics and Clinical Characteristics

Variable	Total Patient Population n = 95
Average Age – yr	60
Sex - male	55 (57.89%)
Risk Factors	
Advanced Age	28 (29.47%)
Immunocompromised	36 (37.89%)
Physiological disturbance	5 (5.26%)
Delay in Intervention ≥24hr	1 (1.05%)
Hospital Acquired Infection	0 (0%)
Diagnosis	
Appendicitis	22 (23.16%)
Diverticulitis	68 (71.58%)
Cholangitis	5 (5.26%)

Figure 2.

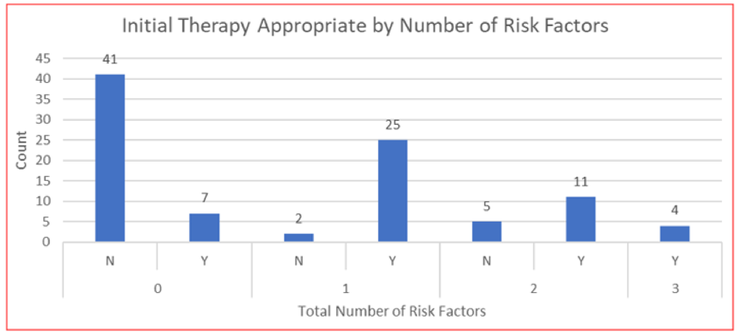

Table 2: Initial Antimicrobial Therapy

Beta-Lactams	83/95 (87.4%)
Piperacillin/tazobactam	69/95 (72.6%)
Ceftriaxone	7/95 (7.4%)
Other*	8/95 (8.4%)
non-Beta Lactam	12/95 (12.6%)
Levofloxacin	8/95 (8.4%)
Ciprofloxacin**	2/95 (2.1%)
Aztreonam**	1/95 (1.1%)
Metronidazole***	1/95 (1.1%)

*Imipenem/cilastatin and cefazolin. **One ciprofloxacin and one aztreonam had no anaerobic coverage. ***Metronidazole with no broad-spectrum coverage.

Conclusion

- Appropriate initial antimicrobial therapies were selected about half of the time
- Inappropriate use was observed to be primarily driven by providing overly-broad spectrum therapy like piperacillin/tazobactam to patients with zero risk factors
- This could be due to physicians having a preferred regimen for intra-abdominal infections, the lack of evaluation of risk factors listed within the treatment guidelines, or incomplete risk factor assessments in available order sets
- Patients with risk factors present received appropriate therapy more often
- Duration of treatment was slightly above the most recent recommendations for duration of therapy for intra-abdominal infections
- Outliers in duration could have been due to a lack of effective source control or the risk of reoccurrence for certain patients
- Possible solutions could include educating physicians on the importance of antimicrobial stewardship and implementation of new strategies for assessing patient risk factors.

Limitations

Limitations of this study included being a single center study, a small patient population, and failure to determine timing of sufficient source control due to unclear patient surgery notes.

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