Antibiotics for Clinical Dysentery in the Pediatric Emergency Department

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ABSTRACT **Background:** Clinical dysentery causes hundreds of thousands of deaths annually worldwide. However, current recommendations reserve antibiotics for those either clinically sick or with highly suspected cases of shigellosis. This treatment stems from rising antibiotic resistance. Children diagnosed with clinical dysentery in the pediatric emergency department (PED) are regarded more cautiously.

Objectives: To explore the use of antibiotics in children diagnosed with clinical dysentery in the PED.

Methods: A retrospective case study of children with clinical dysentery at a single PED during the years 2015 and 2018. Demographics as well as clinical findings were compared to culture results and antibiotic treatment.

Results: The study included 281 children who were diagnosed with clinical dysentery during the study period; 234 (83%) were treated with antibiotics. However, cultures were positive in only 162 cases (58%). Only 32% were *Shigella* spp. Younger age, fever, and leukocytosis were related to antibiotic treatment.

Conclusions: The diagnosis of clinical dysentery is misgiven commonly in the PED leading to widespread use of antibiotics when not indicated. This treatment may impact antibiotic resistance patterns. Further studies and interventions are necessary to create clear guidelines in the PED setting..

IMAJ 2023; 25: 5–7

KEY WORDS: antibiotics, clinical dysentery, pediatric emergency medicine, shigella

Clinical dysentery in children remains a significant cause of morbidity and mortality. According to recent reports, *Shigella* spp. alone accounts for up to 63,700 deaths annually [1]. The current European Society for Pediatric Gastroenterology, Hepatology and Nutrition (ESPHGAN) guidelines recommend not administering empiric antibiotics to most children with clinical dysentery who are in good health condition [2]. This recommendation reflects the self-limited course of most cases as well as the concern regarding increased antibiotic resistance observed in many countries [3]. Prolongation of salmonella carriage and an increased risk of hemolytic uremic syndrome, both historically associated with antibiotic treatment, are additional factors contributing to recommendations, which limit indications for empiric antibiotic therapy. The Israeli Gastrointestinal Society has endorsed similar recommendations [4,5].

In many pediatric emergency departments (PEDs), children presenting with clinical dysentery are often treated with oral or parenteral antibiotics, optimally after a stool culture has been obtained. The reasons for liberal empiric antibiotic therapy in this setting may stem from the notion that the mere presentation to the PED suggests that the child is sufficiently ill to warrant antibiotic therapy.

We reviewed all cases of children evaluated in our PED over a 4-year period who were diagnosed with clinical dysentery. The aim of this study was to assess treatment decisions in view of subsequent stool culture results. We also determined the degree of adherence to the local treatment guidelines.

PATIENTS AND METHODS

This retrospective cohort case review included all children ages 0–18 years who were evaluated in the PED of Shaare Zedek Medical Center during the years 2015–2018 and whose final diagnosis was clinical dysentery. Children from whom a stool culture was not obtained were excluded from the study. Various clinical parameters, including the child's age and clinical appearance, the presence of fever, the presence or absence of blood or mucous in the stool, the degree of elevation of white blood cells and neutrophils in the complete blood count, and stool culture results, were compared to children who were and were not treated empirically with antibiotics. Treatment decisions were at the discretion of the PED physician. Children admitted were excluded assuming a more significant illness thus effecting treatment decisions.

Statistical analyses were performed using IBM Statistical Package for the Social Sciences statistics software, version 26 (SPSS, IBM Corp, Armonk, NY, USA). We used the *t*-test and chi-square test to compare the study groups.

This study was approved by the hospital's institutional research board (Helsinki).

Table 1. Culture results by antibiotic treatment group. Treatment is indicated for *Shigella* spp. and *Campylobacter* spp. only

	Culture positive			Culture negative	Total
Spp.	*Shigella*	*Salmonella*	*Campylobacter*		
Antibiotic therapy	81	23	30	100	234
No antibiotic therapy	10	4	14	19	47
Total	91	27	44	119	281

RESULTS

During the study period 281 children were diagnosed with dysentery (ICD-9: clinical dysentery or gastroenteritis/dysentery), of whom 247 (88%) were under the age of 7 years.

An enteric pathogen grew from the stool cultures of 162 children (58%). The pathogens detected were *Shigella* spp. (56%), *Campylobacter* spp. (27%), and *Salmonella* spp. (17%). There were no cases of *Escherichia coli* spp. or other enteric pathogens [Table 1].

We treated 234 (83%) children empirically with antibiotics [Table 2]; 134 (57%) presented with a positive stool culture as compared to 28 (60%) among the 47 children who were not treated empirically. There was no correlation between a positive stool culture and antibiotic treatment ($P = 0.77$) [Table 1]. Logistic regression analysis revealed a statistically significant association between antibiotic treatment and the presence of fever ($P = 0.004$), peripheral blood leukocytosis (> 15 × 103 /µl, $P = 0.026$), and neutrophilia (> 15 × 103 /µl, $P = 0.002$). In addition, there was a trend, although not significant, to treat patients under the age of 5 years ($P = 0.314$) [Table 3]. Our analysis did not show any correlation between other clinical features and the decision to treat. As treatment decisions were made before culture results were received, we did not review actual culture sensitivity compared to treatment decision. However, in Israel current resistance of *Shigella* spp. to ceftriaxone and macrolides is low.

There were no cases of return visits to the PED in the study cohort.

Table 2. Antibiotics by administration events

Antibiotics	Number of Administrations
Amoxicillin	3
Ampicillin + Amikacin	1
Azithromycin	214
Ceftriaxone	12
Cefuroxime	1
Ciprofloxacin	3
Total	**234**

Table 3. Comparison of clinical and laboratory data between children with dysentery who were treated with antibiotics

	Antibiotic therapy	No antibiotic therapy	*P*-value
Age in years (median)	2	1.96	0.078
Temperature (median)	37.6°C	37.3°C	0.002
White blood cell count (median)	13.1	9.2	< 0.001
Percentage of neutrophils (median)	64.9	56.8	0.013
Bloody/mucous diarrhea (%)	80.76	76.59	0.637

DISCUSSION

This study from a single pediatric tertiary care center revealed that children with clinical dysentery evaluated and discharged from the PED were likely to be treated with antibiotics. Younger age, fever, and leukocytosis were independent factors that increased the likelihood of antibiotic treatment. The lack of correlation between empiric antibiotic treatment and bloody stools, hospitalization, or worse clinical appearance was surprising, as children with any of these clinical parameters would be considered most in need of empiric therapy.

Current guidelines recommend empiric antibiotic treatment for clinical dysentery when epidemiology or the clinical presentation suggests *Shigella* spp. or *Campylobacter* spp., and for children who are either under the age of 3 months, immune compromised with fever, or significantly ill [1,2,6]. Accordingly, in our study, considering subsequent stool culture results, empiric antibiotic therapy was indicated in only 111 of the 234 children (47.4%) who received it. Conversely, 24 children (17.7%) who tested positive for either *Shigella* spp. or *Campylobacter* spp. were not administered antibiotics. None of those discharged without treatment returned to the PED. These findings highlight the limited ability of the PED physician to correctly identify children with clinical dysentery and the need to readdress the current guidelines and their implementation for the treatment of children with suspected clinical dysentery in the PED setting. The introduction of multi-pathogen molecular panels testing may further minimize the margin for error.

Our study was limited by its retrospective nature as well as

being from a single PED. However, it may provide impetus for other centers to review the management of suspected clinical dysentery. This change may show the need for appropriate antibiotic stewardships in the PED setting [7]. As treatment decisions were made before culture results were received, we did not review actual culture sensitivity compared to treatment decision. However, in Israel current resistance of *Shigella* spp. to ceftriaxone and macrolides is low.

CONCLUSIONS

A need exists for clear and appropriate guidelines for treating children with suspected clinical dysentery in the PED setting. Such a change may be another step in improving antibiotic stewardship in general and lowering resistant strain incidence in dysentery specifically.

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Capsule

Prostate cancer screening with PSA and MRI followed by targeted biopsy only

Screening for prostate cancer is burdened by a high rate of overdiagnosis. The most appropriate algorithm for population-based screening is unknown. **Hugosson** et al. invited 37,887 men, 50–60 years of age to undergo regular prostate-specific antigen (PSA) screening. Participants with a PSA level of 3 ng/ml or higher underwent magnetic resonance imaging (MRI) of the prostate. One third of the participants were randomly assigned to a reference group that underwent systematic biopsy as well as targeted biopsy of suspicious lesions shown on MRI. The remaining participants were assigned to the experimental group and underwent MRI-targeted biopsy only. Of the men who were invited to undergo screening, 17,980 (47%) participated in the trial. A total of 66 of the 11,986 participants in the experimental group (0.6%) received a diagnosis of clinically insignificant prostate cancer, compared with 72 of 5994 participants (1.2%) in the reference group, a difference of -0.7 percentage points (95% confidence interval [95%CI], -1.0 to -0.4; relative risk, 0.46; 95%CI, 0.33–0.64; $P < 0.001$). The relative risk of clinically significant prostate cancer in the experimental group compared with the reference group was 0.81 (95%CI, 0.60–1.1). Clinically significant cancer that was detected only by systematic biopsy was diagnosed in 10 participants in the reference group; all cases were of intermediate risk and involved mainly low-volume disease that was managed with active surveillance. Serious adverse events were rare (< 0.1%) in the two groups. The authors concluded that avoidance of systematic biopsy in favor of MRI-directed targeted biopsy for screening and early detection in persons with elevated PSA levels reduced the risk of overdiagnosis by half at the cost of delaying detection of intermediate-risk tumors in a small proportion of patients.

N Engl J Med 2022; 387: 2126
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If we would only give, just once, the same amount of reflection to what we want to get out of life that we give to the question of what to do with a two weeks' vacation, we would be startled at our false standards and the aimless procession of our busy days.
Dorothy Canfield Fisher (1879–1958), author, educational reformer, and activist