No Clinical Benefit of Empirical Antimicrobial Therapy for Pediatric Diarrhea in a High-Usage, High-Resistance Setting

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INTRODUCTION

Diarrhea remains the second most significant cause of morbidity and mortality in children aged <5 years worldwide [1]. In 2010, the global burden of diarrhea was estimated to be 1.73 billion episodes, of which 36 million were characterized as moderate or severe; 26% (9.3 million) of the severe episodes were estimated to arise in Southeast Asia [1]. Among the bacterial pathogens causing diarrhea in children Campylobacter spp., nontyphoidal Salmonella (NTS), Shigella spp., Escherichia coli, and Yersinia enterocolitica are the most commonly identified [2, 3]. Campylobacter, NTS, and Shigella are major contributor to the global morbidity of diarrhea and the major of these occur in low- to middle-income countries. The prevalence of all-cause diarrhea in children aged <5 years in Vietnam is estimated to be 7%–11% [4] and accounts for as much as 12% of all-cause deaths in this age group.

AIMS

The excessive use of antimicrobial in animals and humans in Southeast Asia has led to the current antimicrobial resistance (AMR) crisis. Therefore, a better understanding of the bacterial agents of diarrhea, their corresponding AMR profile, the impact of antimicrobial treatment on clinical outcome, and the effects of empirical antimicrobials is required.

MATERIALS AND METHODS

Study Design and Enrollment: This study was a prospective, observational, multicenter cross-sectional study to evaluate the etiology, epidemiology, and outcomes in children (aged <16 years) hospitalized for diarrhea. Study participants were recruited from 3 hospitals (Children’s Hospital 1, Children’s Hospital 2, and the Hospital for Tropical Diseases) in Ho Chi Minh City, from May 2014 to April 2016. Children hospitalized with diarrhea, defined as ≥3 passages of loose stools within 24 hours with ≥1 loose stool containing blood and/or mucus. Microbiological Methods: Fecal specimens were inoculated onto MacConkey agar and xylose-lysine-deoxycholate agar and into selenite broth and incubated at 37°C for 18-24 hours. Salmonella, Shigella and Campylobacter were detected based on using matrix-assisted laser desorption/ionization time-of-flight mass spectrometry and API20E. Statistical Analysis: Data were analyzed using Stata (version 1.1) and R (3.2.2)

RESULTS

Among 3166 recruited participants (median age 10 months): one third (1,096 of 3,166) had bloody diarrhea. 25% (793/3166) were culture positive for Shigella, NTS, or Campylobacter. More than 85% (2697/3166) were treated with antimicrobials; fluoroquinolones were the most commonly administered antimicrobials. AMR was highly prevalent among the isolated bacteria, including resistance against fluoroquinolones and third-generation cephalosporins. Antimicrobial treatment was significantly associated with an increase in the duration of hospitalization with particular groups of diarrheal diseases.

DISCUSSION

Moderate-to-severe diarrhea has a significant healthcare burden in Vietnamese children [5]. Antimicrobial use during hospitalized diarrhea did not add benefit to supportive therapy only (i.e., rehydration and zinc supplementation). In diarrhea with less pronounced inflammation (indicated by the absence of blood and/or a low CRP level), the use antimicrobials was associated with prolonged hospital stay. Antimicrobial treatment was not associated with a reduction in diarrheal symptoms and even prolonged hospital stay in some groups.

REFERENCES