

Comparative Efficacy Evaluation of Usage of Antibiotic in Children for Bacterial Enteritis

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ABSTRACT

Background: Acute diarrhea is a major cause of childhood morbidity. Important advances in the understanding of bacterial gastroenteritis have been made in the past two decades. Living conditions play a major role in the attack rate of bacterial enteric infections. This study was conducted for comparative efficacy evaluation of usage of antibiotic in children for bacterial enteritis.

Materials and Methods: A total of 20 children who were suffering from severe episodes of bacterial enteritis, subsequently confirmed by a pre-treatment stool culture were enrolled. Complete demographic and clinical details of all the patients was obtained. All the patients were randomized into two study groups as follows: Group A; 10 children who received rifaximin- oral suspension, and Group B: 10 children who received neomycin + bacitracin oral suspension. In each day of treatment, the following parameters were monitored: number of stools passed; & presence and intensity of mucus or blood. All the patients were assessed after five days for assessing and comparing the outcome.

Results: Mean age of the subjects of group A and group B was 4.1 years and 3.9 years respectively. Majority proportion of subjects were boys. Fever, abdominal cramps, abdominal pain and nausea was seen in 10, 9, 8 and 8 subjects respectively of

group A and in 10, 9, 9 and 7 subjects respectively of group B. Complete cure was seen in 90 percent cases of group A and in 70 percent cases of group B. Although non-signification, better results were seen among subjects of group A.

Conclusion: A short treatment course with rifaximin yielded, in our experience, highly satisfactory results in children suffering from severe episodes of bacterial diarrhoea.

Keywords: Enteritis, Bacterial, Antibiotic, Children.

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INTRODUCTION

Acute diarrhea is a major cause of childhood morbidity. Important advances in the understanding of bacterial gastroenteritis have been made in the past two decades. Living conditions play a major role in the attack rate of bacterial enteric infections. Lack of clean water, crowding, insufficient understanding of hygiene, nutritional deficiency, and poor sanitation are major risk factors. It is clear that poorer, less educated populations are, therefore, at high risk for these illnesses. Socioeconomic distinctions may play less of a role in developed countries.¹⁻³

Multiple studies suggest an association between infection and intussusception. In a 3-year surveillance study in Switzerland, gastroenteritis preceded intussusception in 24% of reported cases. Adenovirus is the most widely studied infection and is most strongly associated with intussusception. However, other viral and bacterial associations have been reported, including cytomegalovirus, Epstein-Barr virus, human herpesvirus 6, astrovirus, Yersinia enterocolitica, Staphylococcus aureus,

Escherichia coli O157:H7, Clostridium difficile, and Salmonella typhimurium. 6,8-20 Moreover, the oral administration of live tetravalent rhesus-human rotavirus reassortant-tetravalent vaccine (RRV-TV) has been associated with intussusception, causing this vaccine to be removed from the market.⁴⁻⁷

The management of children with acute bacterial enteritis is guided by evidence-based practices, which emphasize that the primary intervention should be the administration of oral rehydration solutions that are hypo-osmolar. This treatment should be initiated promptly to mitigate the severity and duration of symptoms, regardless of the underlying cause. Furthermore, the approach to actively treating gastroenteritis in pediatric patients is evolving, with contemporary guidelines advocating for the use of probiotics and antidiarrheal medications, as endorsed by various global health authorities.⁵⁻⁸ This study was conducted for comparative efficacy evaluation of usage of antibiotic in children for bacterial enteritis.

MATERIALS AND METHODS

A total of 20 children who were suffering from severe episodes of bacterial enteritis, subsequently confirmed by a pre-treatment stool culture were enrolled. Complete demographic and clinical details of all the patients was obtained. All the patients were randomized into two study groups as follows:

Group A: 10 children who received rifaximin- oral suspension

Group B: 10 children who received neomycin + bacitracin oral suspension

In each day of treatment, the following parameters were monitored: number of stools passed; & presence and intensity of mucus or blood. All the patients were assessed after five days for assessing and comparing the outcome. All the results were

recorded in Microsoft excel sheet and were subjected to statistical analysis using SPSS software. Chi-square test was used for evaluation of level of significance.

RESULTS

Mean age of the subjects of group A and group B was 4.1 years and 3.9 years respectively. Majority proportion of subjects were boys. Fever, abdominal cramps, abdominal pain and nausea was seen in 10, 9, 8 and 8 subjects respectively of group A and in 10, 9, 9 and 7 subjects respectively of group B. Complete cure was seen in 90 percent cases of group A and in 70 percent cases of group B. Although non-signification, better results were seen among subjects of group A.

Table 1: Demographic and clinical data

Variable	Group A	Group B
Mean age (years)	4.1	3.9
Boys	6	5
Girls	4	5
Fever	10	10
Abdominal cramps	9	9
Abdominal pain	8	9
Nausea	8	7

Table 2: Comparison of treatment

Variable		Group A	Group B	p-value
End treatment Stool form	Formed	8	7	0.68
	Blood/mucous mixed	2	3	
Treatment outcome as assessed by number of stools passed	Complete cure	9	7	0.45
	Sufficient outcome	1	1	
	No cure	0	2	

DISCUSSION

Acute gastroenteritis—diarrhoea or vomiting (or both) of more than seven days duration—may be accompanied by fever, abdominal pain, and anorexia. Diarrhoea is the passage of excessively liquid or frequent stools with increased water content. Patterns of stooling vary widely in young children, and diarrhoea represents a change from the norm.⁹ Worldwide, 3-5 billion cases of acute gastroenteritis and nearly 2 million deaths occur each year in children under 5 years.¹⁰ In the United States, gastroenteritis accounts for about ~10% (220 000) of admissions to hospital, more than 1.5 million outpatient visits, and around 300 deaths in children under 5 annually, with a cost of around \$1bn.¹¹ In the same age group in Australia, about 10 000 hospital admissions, 22 000 visits to emergency departments, and 115 000 general practice consultations occur annually for rotavirus alone, with an estimated cost of \$A30m (£12m; €18m; \$23m).¹² In the United Kingdom, 204 of 1000 consultations with general practitioners in children under 5 are for gastroenteritis, and the annual hospital admission rate in this group is about seven per 1000 children.¹³ Children in childcare settings are often infected but asymptomatic and may unwittingly transmit infection.¹⁴ This study was conducted for comparative efficacy evaluation of usage of antibiotic in children for bacterial enteritis.

Mean age of the subjects of group A and group B was 4.1 years and 3.9 years respectively. Majority proportion of subjects were boys. Fever, abdominal cramps, abdominal pain and nausea was seen in 10, 9, 8 and 8 subjects respectively of group A and in 10,

9, 9 and 7 subjects respectively of group B. Complete cure was seen in 90 percent cases of group A and in 70 percent cases of group B. Although non-signification, better results were seen among subjects of group A. Uhnnoo I et al. In a prospective 1-year study, 144 children attending or admitted to hospital and 272 children outside hospital with acute gastro-enteritis and 200 controls were investigated by a broad panel of diagnostic methods for enteropathogenic agents in the faeces and for related antibody responses. Enteropathogens were identified in 77% of the inpatients, 63% of the outpatients and 8% of the controls. Rotavirus and Yersinia enterocolitica were detected significantly more often among inpatients. Altogether, viral, bacterial and parasitic agents were found in 58%, 14% and 1% of diarrhoeal patients, respectively. The isolation of more than one pathogenic agent was uncommon (6.5%). Rotavirus (45%) and enteric adenoviruses 40 and 41 (7.9%) predominated among the viruses, while Campylobacter jejuni (4.8%) was most common among the bacteria. Clostridium difficile and/or its cytotoxin, which were found in 14% of the children with gastroenteritis and in 15% of the controls, were significantly associated with antibiotic therapy but not with gastro-intestinal illness. Diarrhoeal infections of unknown aetiology exhibited a seasonal peak in the autumn. The duration of excretion of enteropathogens was investigated. Rotavirus particles were detectable by solid-phase immune electron microscopy for 14-25 days after the diarrhoea had ceased. Transmission of rotavirus and bacterial pathogens within families was studied also.¹³ Klem F et al. Foodborne illness affects 15% of

the United States population each year and is a risk factor for irritable bowel syndrome (IBS). They evaluated risk of, risk factors for, and outcomes of IBS after infectious enteritis. They performed a systematic review of electronic databases from 1994 through August 31, 2015 to identify cohort studies of the prevalence of IBS 3 months or more after infectious enteritis. They used random effects meta-analysis to calculate the summary point prevalence of IBS after infectious enteritis, as well as relative risk and host- and enteritis-related risk factors. They identified 45 studies, comprising 21,421 individuals with enteritis, followed for 3 months–10 years for development of IBS. The pooled prevalence of IBS at 12 months after infectious enteritis was 10.1% and at more than 12 months after infectious enteritis was 14.5%. Risk of IBS was 4.2-fold higher in patients who had infectious enteritis in the past 12 months than in individuals in those who had not; risk of IBS was 2.3-fold higher in individuals who had infectious enteritis longer than 12 months ago than in individuals who had not. Of patients with enteritis caused by protozoa or parasites, 41.9% developed IBS; of patients with enteritis caused bacterial infection, 13.8% developed IBS. Risk of IBS was significantly increased in women and with antibiotic exposure, anxiety, depression, somatization, neuroticism, and clinical indicators of enteritis severity. There was a considerable level of heterogeneity among studies. In a systematic review and meta-analysis, we found more than 10% of patients with infectious enteritis to later develop IBS; risk of IBS was 4-fold higher than in individuals who did not have infectious enteritis, although there was heterogeneity among studies analyzed. Women—particularly those with severe enteritis—are at increased risk for developing IBS, as are individuals with psychological distress and users of antibiotics during the enteritis.¹⁴

CONCLUSION

A short treatment course with rifaximin yielded, in our experience, highly satisfactory results in children suffering from severe episodes of bacterial diarrhoea.

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