



Assessment of the Risk Factors for Gastroenteritis and the Role of Antibiotics -Ampicillin and Ampicillin plus Amikacin-

Gastroenteritin Risk Faktörlerinin Değerlendirilmesi ve Ampisilin ve Ampisilin artı Amikasinin Rolü

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Cukurova Medical Journal 2014;39(4):697-704.

ABSTRACT

The term gastroenteritis denotes infections of the gastrointestinal (GI) tract caused by bacterial, viral, parasitic pathogens or chemical agents and food intolerance, none of which requires antimicrobial therapy. The broad principles of management of acute gastroenteritis in children include oral rehydration therapy, enteral feeding and diet selection, zinc supplementation, and additional therapies such as probiotics. Dehydration must be evaluated rapidly and corrected in 4-6 hr according to the degree of dehydration. Probiotics—used as an adjunct to oral rehydration therapy—decreased the duration of diarrhea, especially in rotavirus gastroenteritis. Early refeeding reduces the duration of diarrhea. The aim of this study is to evaluate the risk factors associated with diarrhea and the antibiotic used ampicillin and ampicillin plus amikacin in the treatment of inpatient children with acute gastroenteritis.

Key words: gastroenteritis, antibiotics, ampicillin, amikacin, hydration, feeding.

ÖZET

Gastroenterit gastrointestinal sistemdeantimikrobiyal tedavilerektirmeyen fakat bakteriyel, viral, parazitik patojen enfeksiyonları veya kimyasal ajanlara ve gıdaya toleransına bağlı olarak ortaya çıkan bir hastalıktır. Çocuklarda oral rehidrasyon tedavisi, enteral beslenme ve diyet seçimi, çinko takviyesi, probiyotikler gibi ek terapiler akut gastroenterit yönetiminin temel basamaklarıdır. Dehidrasyon derecesine bağlı olarak 4-5 saat içinde doğru ve hızlı olarak kontrol edilmelidir. Probiyotikler- oral rehidrasyon tedavisinde ek olarak kullanılan- özellikle gastroenterit rotavirüse bağlı gelişen diyare süresini azaltmıştır. Erken beslenmede diyare süresini azaltmıştır. Bu çalışmanın amacı, diyare ve antibiyotik olarak ampicillin ve ampisilin artı amikasin kullanan hastanede yatarak tedavi edilen çocuklarda risk faktörlerini ilişkilendirerek değerlendirmektir.

Anahtar Kelimeler: Gastroenterit, antibiyotik, ampisilin, amikasin, hidrasyon, beslenme

INTRODUCTION

The term gastroenteritis denotes infections of the gastrointestinal (GI) tract caused by bacterial, viral, parasitic pathogens or chemical agents and food intolerance, none of which requires antimicrobial therapy, but viruses are the predominant cause of acute diarrhea in developed

countries^{1,2,3,4,5}. The World Health Organization (WHO) and UNICEF estimate that almost 2.5 billion episodes of diarrhea occur annually in children below 5 yrs of age in developing countries, with more than 80% of the episodes occurring in Africa and South Asia (46% and 32%, respectively)^{1,4}. The symptoms are diarrhea or

vomiting (or both) of more than seven days duration—may be accompanied by fever, abdominal pain, and anorexia⁵. Diarrheal disorders in childhood account for a large proportion (18%) of childhood deaths, making it the second most common cause of child deaths worldwide. Additional risks include young age, immunodeficiency, measles, malnutrition, and lack of exclusive or predominant breast-feeding^{1,7,8}. The broad principles of management of acute gastroenteritis in children include oral rehydration therapy, enteral feeding and diet selection, zinc supplementation, and additional therapies such as probiotics. Dehydration must be evaluated rapidly and corrected in 4-6 hr according to the degree of dehydration^{9,10,11}. In a systematic review, probiotics—used as an adjunct to oral rehydration therapy—decreased the duration of diarrhea, especially in rotavirus gastroenteritis¹². Breast feeding must not interrupted and early refeeding reduces the duration of diarrhea¹³. Treating gastroenteritis due to Shiga toxin producing E coli with antibiotics may increase the risk of haemolyticuraemic syndrome. Antibiotics are required, however, for bacterial gastroenteritis complicated by septicaemia and in cholera, shigellosis, amoebiasis, giardiasis, and enteric fever¹⁴. In developing countries, oral zinc given at the onset of symptoms decreases the duration and severity of acute diarrhea and is recommended by the WHO^{8,15}. The NICE guidelines published in april 2009 guidelines looked at therapeutic options such as probiotics and antiemetics but were unable to find evidence to recommend them¹⁶. Main treatment is oral rehydration solutions (ORS), which considerably upset the morbi-mortality. In case of failure of the rehydration by ORS, alternative is nasogastric tube or intravenous infusion. Prevention includes essentially the respect of hygienic rules and antirotavirus vaccine¹⁸. Even when a bacterial cause is suspected in an outpatient setting, antimicrobial therapy is not usually indicated among children because the majority of cases of acute diarrhea

are self-limited and not shortened by antimicrobial agents. Exceptions to these rules involve special needs of individual children (e.g., immune-compromised)^{19,20,21}. The decision to start antimicrobial therapy should always be taken after adequate hydration and individual evaluation of various factors, including the likelihood of extra-intestinal dissemination of the infection and its severity^{22,23}. The ultimate approach against diarrhea in developing countries rests on the need for improving sanitary conditions, maintaining exclusive breastfeeding until the sixth month of life and developing safe and effective vaccines for immune prophylaxis, along with systematic parental education²⁴.

AIM

1. Evaluate the risk factors associate with the incidence of gastroenteritis.
2. Assess the role of antibiotics ampicillin or ampicillin plus amikacin in the treatment of inpatient children with acute gastroenteritis.
3. Provide data about mother education and rational use of antibiotics in management of AGE.

METHOD

The study conducted in Kamal Odwan Hospital in Gaza between 1/7/2013 – 1/10/2013 designed as prospective study in which all children age 3 months-60 month were included in this study. The inclusion criteria age(mentioned above) diagnosed acute gastroenteritis, all patients was inpatient. All the mothers fill a questionnaire regarding their age, gender, type of feeding, mother education, night feeding and pecifier. The patients were allocated into two group's according to the medication prescribed by the physican. The patients in the first group received a fixed dose of (100 mg/kg/day) of ampicillin sodium, the second group received a fixed dose (100 mg/kg/day) of ampicillin sodium and 20 mg/kg/day of amikacin. Both groups received rehydration therapy 100 ml half saline (0,45% NaCl)/kg/day during treatment.

daily follow up for each patient include general condition, temperature and clinical picture was done. The total number of patients was 111. Sixty patient treated with ampicillin sodium and fifty one treated with ampicillin plus amikacin. The data collected were tabulated and analyzed with spss version 13. ANOVA test was used to compare between means and the value of $P < 0,02$ were considered statistically significant.

RESULTS

Gastroenteritis is an infection of the gastrointestinal tract with various aetiology. Most diarrheal episodes affecting children are due to viruses, parasites, chemical agents and food intolerance, none of which requires antimicrobial therapy. The first line in treatment is rehydration. Since most of the causes are viral, probiotics and antibiotics are of no value except if the case confirmed as bacterial such as *E.coli*. Most cases of acute diarrhea involve a self-limiting condition, requiring no more than supportive treatment with adequate hydration and nutrition that can be accomplished at home. The physician should make the patient's parents aware of warning signs that depict aggravation of the picture and the need for returning to the hospital for re-evaluation.

In this study we try to evaluate the risk factors associated with acute gastroenteritis and to assess the role of antibiotics prescribed by the physicians ampicillin and ampicillin plus amikacin in the outcome gastroenteritis and provide data about rational use of antibiotics in management of AGE.

Figure (1) show comparison of the incidence of gastroenteritis and age. The result show that small age group are more affected 58,5% below one year versus 41,5% older ages, this may be due to low immunity in small age children or due to lack of awareness of the mother of bad habits such as bottle feeding as will mentioned later.

Despite high percent of educated women in secondary and high schools (58%) look (figure 2,3), there was only 40.5% are breast feeding women and 13% weaned and the rest use bottle alone or mixed. Bottle feeding is associated with high incident rate of (AGE), also breast feeding provide immunity to the child and protection from (AGE). When asking about feeding per night 62% of women say yes figure (4), this increase the incidence of AGE because sleepy women do not clean their breast before feeding and if they use bottle the problem is more worse. Again back to the figures(2,3,4), it reflects poor knowledge about breast feeding and hygiene even if the mother is highly educated or the child is weaned. Figure (5) show that most of affected children are males, this may be due to most boys stay out door longer than girls after 1.5 year age. This expose them to bacterial and parasitic infection more than girls. The results also show that only 13.5% use pacifier. Pacifier use is associated with increased incidence of AGE among children.

Data analysis for antibiotic used (table 1) show that P-value 0.048 larger than (0,02) not statistical significance. This mean that both groups have the same outcome of treatment and improvement. Table (2) show that both strategies of treatment have nearly the same outcome in hospital stay. The percent of patients stayed less than 3 days was 33% in ampicillin group versus 35% in ampicillin plus amikacin and 56.3% versus 55.5% for those stayed less than 5 days and 10.7% versus 10.5% for those who stayed more than 5 have same outcome and the administration of amikacin without any role, keeping in mind that days respectively. The analysed data in tables (1 and 2) confirm that both strategies ampicillin is used to prevent secondary bacterial infection.

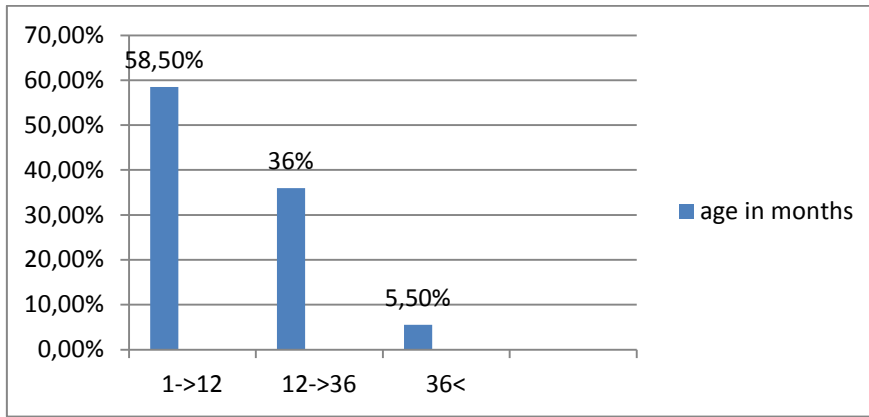


Figure 1. Represent the incidence of AGE among different age groups.

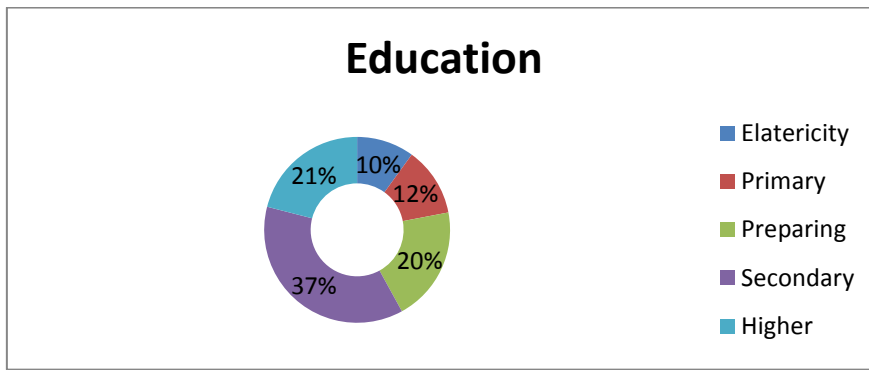


Figure 2. Represent the education level of the mother.

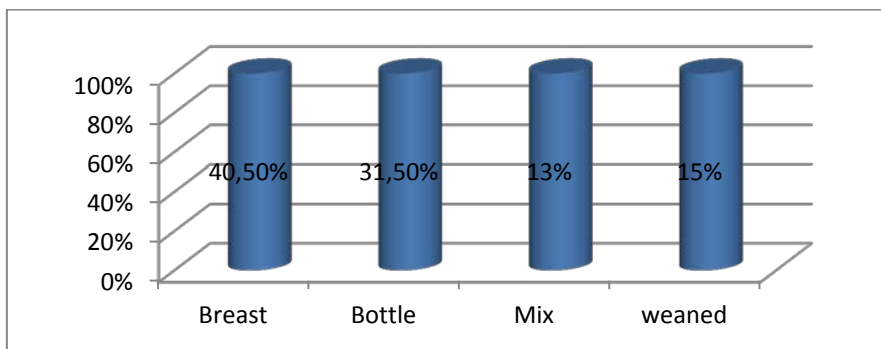


Figure 3. Shows the mode of feeding among patients.

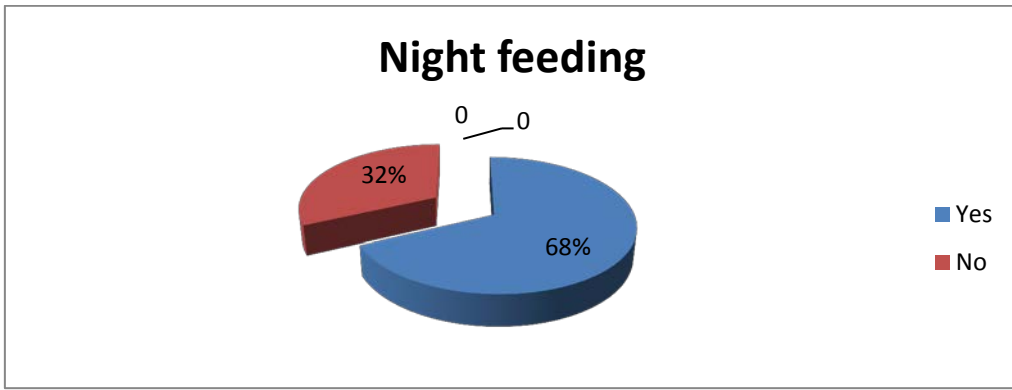


Figure 4. Shows the percent of mother that feed their children in the night.

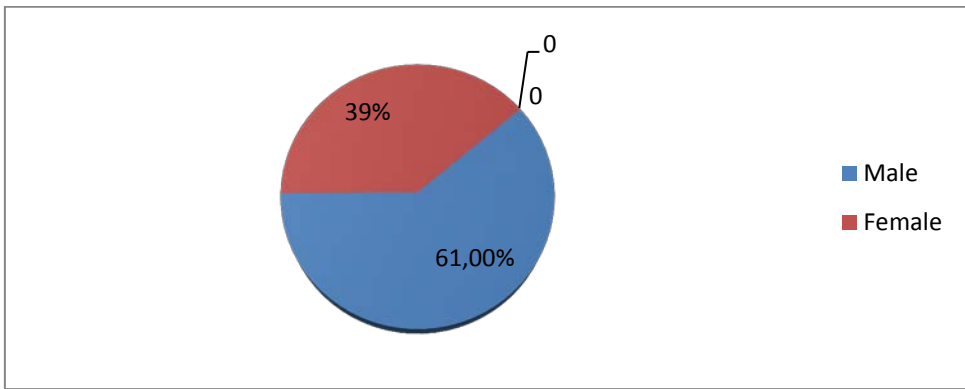


Figure 5. Show the incidence of diarrhea depend on gender.

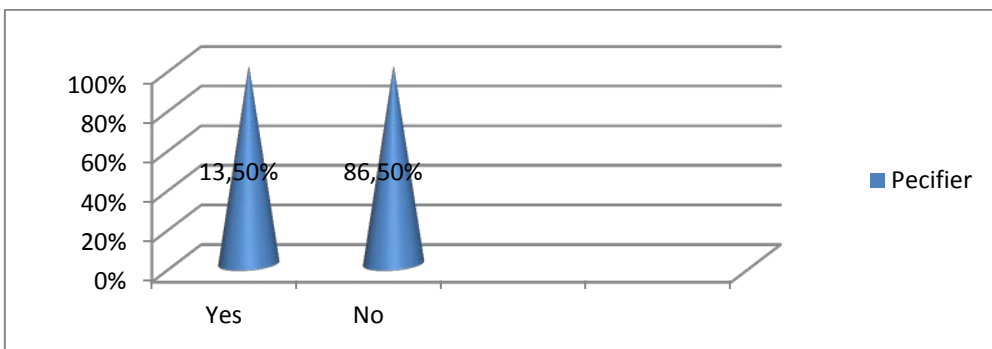


Figure 6. Represent pacifier use among children.

Table 1. Comparison between ampicillin and ampicillin plus amikacin in management of AGE using ANOVA test.

	Sum of squares	df	Mean square	F
Between groups	1,364	2	0.628	3,117
Within groups	23,627	108	0.219	
Total	24,991	110		

P-value=0,048

Table 2. Comparison between ampicillin versus amikacin in hospital stay.

Treatment	Hospital stay	Valid percent	Cumulative percent
Ampicillin	1->3	33	33
	3->5	56,3	89,5
	5-7	10,7	100
Ampicillin +Amikacin	1->3	35	35
	3->5	55,5	90,5
	5-7	10,5	100

DISCUSSION

Acute gastroenteritis affects most of children, it is preventable disease if the mother obey satisfactory hygiene rules. The parents should also be informed about the routes of transmission of enteropathogens and about preventive measures. Family education is of great value in prevention and treatment of AGE in children, this including encourage breast feeding and improve hygiene and sanitation. We reinforce the need for careful consideration of the use of antibiotics in the setting

of acute diarrhea in children. The decision to start antimicrobial therapy should always be taken after adequate hydration and individual evaluation of various factors, including the likelihood of extra-intestinal dissemination of the infection and its severity. This because viruses (e.g., rotavirus, astrovirus, enteric adenovirus, norovirus, and sapovirus) are the predominant cause, the routine

use of antimicrobial agents for treating diarrhea wastes resources and might lead to increased antimicrobial resistance. Antimicrobial therapy should be reserved for severe, prolonged or potentially complicated case. So we recommend the following

1. Considering mother education about breast feeding and prevention of gastroenteritis as a corner stone in treatment and prevention of gastroenteritis.
2. Considering hydration alone the main treatment in AGE except in some cases which need special care.
3. Antibiotic should not be used except in special cases e.g. infection dissemination extra intestinal, immune compromised patients and confirming specific pathogen like parasite or bacteria.
4. Considering administration of zinc oxide in case of AGE to improve outcome as recommended by WHO.

ACKNOWLEDGMENT

I would like to express my deep thanks and appreciations to Dr. Ahmed Basal the head of pediatric team in Kamal Odwan hospital and all the physicians in the department.

Mrs. Intesar Nassar the head of pediatric nursing team in Kamal Odwan hospital and all the nurses in the department.

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Geliştarihi/Received on :01.03.2014
Kabul tarihi/Accepted on: 10.04.2014