

Therapy of acute gastroenteritis: role of antibiotics

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Abstract

Acute infectious diarrhoea remains a very common health problem, even in the industrialized world. One of the dilemmas in assessing patients with acute diarrhoea is deciding when to test for aetiological agents and when to initiate antimicrobial therapy. The management and therapy of acute gastroenteritis is discussed in two epidemiological settings: community-acquired diarrhoea and travellers' diarrhoea. Antibiotic therapy is not required in most patients with acute gastroenteritis, because the illness is usually self-limiting. Antimicrobial therapy can also lead to adverse events, and unnecessary treatments add to resistance development. Nevertheless, empirical antimicrobial therapy can be necessary in certain situations, such as patients with febrile diarrhoeal illness, with fever and bloody diarrhoea, symptoms persisting for >1 week, or immunocompromised status.

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Introduction

Acute infectious diarrhoea remains a very common health problem, even in the industrialized world. Recent data from Germany indicate that 0.95 episodes of acute gastrointestinal illness occur per person per year in adults [1]. A similar rate was reported in the USA [2]. One of the dilemmas in assessing patients with acute diarrhoea is deciding when to test for aetiological agents and when to initiate antimicrobial therapy. The aim of this article is to review the management of acute gastroenteritis in adults in industrialized countries, with a special focus on the role of antibiotics. The management of persistent and chronic diarrhoea, nosocomial diarrhoea and acute gastroenteritis in children in resource-restricted countries is beyond the scope of this article. The management and therapy of acute gastroenteritis will be discussed in two epidemiological settings: community-acquired diarrhoea, and travellers' diarrhoea.

Diarrhoea is usually defined as the passage of three or more unformed stools per day or the passage of >250 g of unformed stool per day, often accompanied by symptoms of nausea, vomiting, or abdominal cramps [3]. On the basis of duration, diarrhoea can be divided into acute (<14 days), persistent (14–29 days), or chronic (≥30 days) [4].

Epidemiology

Community-acquired diarrhoea

In Europe, the leading causes of bacterial diarrhoeal illness include *Campylobacter*, enteropathogenic *Escherichia coli*, and enteroaggregative *E. coli* (EAEC) [5,6]. In 2012, *Campylobacter* infections were reported more frequently than infections caused by non-typhoidal *Salmonella* (68 per 100 000 vs. 22 per 100 000) [5]. Furthermore, the number of salmonellosis cases has decreased over the past 5 years, most likely because of the implementation of veterinary control programmes against *Salmonella* species, especially in poultry [5]. EAEC has also been recognized as an important agent for community-acquired diarrhoea in industrialized countries [7]. In addition, *Clostridium difficile* has emerged as a cause of community-acquired diarrhoeal illness, with many patients lacking typical risk factors [8,9]. Foodborne transmission of *C. difficile* has been

hypothesized as a possible source of community-associated infections; however, the evidence needed to confirm or refute this hypothesis is incomplete [10,11]. Other less common pathogens include *Yersinia* species, non-cholera *Vibrio* species and Shiga toxin-producing *E. coli* (STEC) strains. In 2011, there was a nationwide outbreak of STEC O104:H4 in Germany, resulting in >4000 infections and >900 cases of haemolytic–uraemic syndrome (HUS) [12,13]. The outbreak was traced back to contaminated sprouts [12]. In 2012, STEC cases were reported at a rate of 1.5 cases per 100 000 in the EU [5].

Travellers' diarrhoea

Between 20% and 50% of travellers from industrialized countries to resource-restricted nations experience travellers' diarrhoea, depending on the destination [14,15]. It is most often acquired in the first 2–3 weeks of travel, through the ingestion of contaminated foods and, less often, drinks [16]. A meta-analysis concluded that the incidence of diarrhoea was very similar in travellers who followed the advice 'boil it, cook it, peel it, or forget it' and those who engaged in more adventurous eating habits [17]. The majority of travellers have self-limiting illnesses; <1% require hospitalization [18]. Bacterial enteropathogens account for 80% of the cases of travellers' diarrhoea [16]. Enterotoxigenic *E. coli*, enteroinvasive *E. coli* and EAEC are implicated in the majority of cases, followed by *Campylobacter*, *Salmonella* and *Shigella* [16]. Parasitic agents are uncommon causes of acute travellers' diarrhoea, but should be suspected in the case of a subacute and chronic illness [19].

Management of acute gastroenteritis

Most patients with acute diarrhoea are able to manage their illness, and do not seek medical attention. In patients with significant diarrhoeal illness, i.e. profuse, dehydrating, febrile or bloody diarrhoea, the first step for the attending physician consists of obtaining a thorough history, including epidemiological and clinical information. Relevant clinical features include onset of illness, the frequency of bowel movements, the presence of dysenteric symptoms (fever, tenesmus, or blood or mucus in the stool), symptoms of volume depletion, and associated symptoms such as nausea, vomiting, or abdominal pain [4]. Important epidemiological information includes previous international travel, treatment with antibiotics, chemotherapy, underlying immunosuppressive conditions, work at a day-care centre, and consumption of unsafe foods (e.g. raw meats, eggs, and shellfish). A directed physical examination is aimed at exploring the patient's hydration status and abdominal tenderness.

The determination of the precise cause of diarrhoea is not necessary in most cases of non-severe illnesses [3]. However,

any diarrhoeal illness lasting for >1 day accompanied by fever, recent use of antibiotics, duration of symptoms of >1 week, hospitalization, immunosuppression, diarrhoea in elderly patients or symptoms of dehydration (defined as dry mucous membranes, decreased urination, tachycardia, symptoms of postural hypotension, or lethargy) should prompt evaluation of faecal specimens for *Salmonella*, *Campylobacter* species, and *Shigella* species [4]. In cases with bloody stools, testing for STEC should be added to the panel of stool examinations [4]. Testing for *C. difficile* is recommended if the patient has a history of antibiotic intake, chemotherapy, or hospitalization [4]. It should be kept in mind that community-acquired cases of *C. difficile* infection in the absence of typical risk factors do occur [6,8,20]. In the majority of cases, the bacterial pathogen is detected in the first or second sample that is submitted [21], so performance of multiple cultures is not useful. Although the bacterial yield of stool cultures is quite low (1.5–3%) [22], the information obtained is important for both the individual patient and public health purposes.

In the past 10 years, PCR-based diagnostic methods have evolved as novel tools, often detecting multiple enteropathogens in a single test [23,24]. These techniques offer the advantages of high sensitivity and, in the case of automated multiplex systems, of a very short turnaround time as compared with conventional culture [6]. However, detection of a pathogen's nucleic acid does not automatically implicate this pathogen as the causative agent of clinical symptoms. The patient could be an asymptomatic carrier, or the pathogen's nucleic acid may be detected although the pathogen is no longer viable. Combined approaches of PCR-based methods followed by culture in cases of positive results to detect resistance patterns could be a useful strategy in the future. It should be kept in mind that the patient's history and symptoms rather than laboratory results alone constitute the determining factor regarding when to initiate antimicrobial therapy.

Additional diagnostic evaluations, such as serum chemistry analysis, complete blood count, and blood cultures, may be necessary in patients who have fever or symptoms indicative of systemic inflammatory response syndrome [3].

Therapy

The initial treatment of acute diarrhoeal illnesses must include rehydration, which can be achieved with oral electrolyte solutions or intravenous fluids. Antibiotic therapy is not required in most patients, because the illness is usually self-limiting. Any consideration of antimicrobial therapy must be carefully weighed against unintended and potentially harmful consequences [4]. Nevertheless, empirical and specific antimicrobial

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