

Travellers' diarrhoea in general practice

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Diarrhoea is an unfortunate reality of travel to developing countries.

Here is some advice GPs can give to intending travellers.

Diarrhoea is the most common problem affecting travellers.¹ Travellers' diarrhoea is generally defined as three or more loose bowel motions within a 24-hour period, with at least one other symptom such as fever, nausea, vomiting, abdominal pain or cramping, or blood or pus in the stool.

Pathology or other investigations are rarely undertaken until travellers return home. Assignment of the cause, therefore, often occurs after the event and immediate therapy. GPs can help prepare intending travellers for possible encounters with travellers' diarrhoea by advising them how to prevent it and how to manage it should it occur.

Incidence and causes

Up to 80% of travellers to high risk areas can expect to have at least one episode of acute diarrhoea.¹ High risk areas include developing countries in Latin America, Africa, the Middle East and Asia.

Enterotoxigenic *Escherichia coli* (ETEC) is the most common cause of travellers'

diarrhoea, and contaminated food is the usual mode of transmission. *Campylobacter* and *Shigella* are also common causes. Parasitic causes include *Giardia*, *Cryptosporidium*, *Blastocystis* and mixed amoebic species. *Cyclospora* (a coccidian protozoa previously named 'blue-green' algae) is associated with chronic relapsing diarrhoea. Although rotaviruses and Norwalk-like viruses may be acquired by travellers, their roles as causative agents are unclear.² Worms associated with diarrhoea include *Schistosoma* (bilharzia), *Strongyloides*, *Trichuris* (whip worm) and hookworm. GPs are likely to see a different spectrum of disease from that cited in published information from infectious disease units – some faecal pathogens detected over a six-month period by one laboratory are listed in Table 1.

Organisms with low infectious doses (such as *Giardia*) are more easily transmitted from person to person by faecal oral transmission than organisms with much larger infectious doses, such as *Salmonella*. The foodborne organisms require the food vector so they can multiply to the large number of bacteria needed to cause an infection. Salmonellae are usually inactivated by gastric acid and salmonella diarrhoea is therefore more common in people with acquired or medical achlorhydria, such as those undergoing antiulcer therapy.

There are numerous opportunities in developing countries for food to become contaminated. These include fertilisation of crops with human faecal material, inadequate storage and transport of food, unreliable refrigeration and unhygienic food handling practices. Although the eating of food bought from street vendors can enhance cross-cultural experiences, inadequate sanitation and refrigeration carries a risk of travellers' diarrhoea.

Contaminated water is a less likely cause of travellers' diarrhoea than contaminated food because there are generally lower concentrations of organisms in liquid than solid foods. Commercially



bottled water is generally safe. Carbonated beverages are generally too acidic to sustain enteric pathogens and are, therefore, safe to drink. The fermentation process involved in the brewing of beer usually ensures safety from bacterial contaminants, although promoting beer as the preferred beverage may pose other concerns. Travellers may also be exposed through washed food and utensils, ice, cleaning teeth and swimming in fresh water, and unpasteurised dairy foods.

Prevention Education

Applying the general rule of 'boil it, cook it, peel it or forget it' seems reasonable when choosing foods and drinks, but is often not practical. Few travellers are able to comply with strict dietary recommendations and some evidence has suggested no association between dietary mistakes and the incidence of travellers' diarrhoea.

Conscientious hand washing while travelling is important. Although soap and water are not always available, waterless hand disinfecting agents (e.g. alcohol hand wipes and premoistened towelettes) are convenient alternatives.

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Water purification

Water may be purified by heat, filtration or chemical disinfection. Boiling is the most effective way of producing water that is safe to drink. Bringing water to the boil will kill the common organisms that cause travellers' diarrhoea. If no other choices are available, tap water that is too hot to touch (>56°C) is also relatively safe to drink once it has cooled.

Filters that exclude particles greater than 0.2 x 10⁻⁶ m in diameter are effective against most bacteria and parasites but do not protect against viral pathogens. Therefore, water filtration using units without iodinated columns should, if possible, be followed by chemical

disinfection using chlorine-based or, preferably, iodine-based water purification tablets. Adding orange juice crystals or vitamin C to iodine-treated water may improve its often unpalatable taste.

Vaccination

It is important to offer vaccination against gastrointestinal diseases such as hepatitis A, typhoid and cholera where appropriate. Hepatitis A is the most common vaccine-preventable cause of travel-related disease, with typhoid less likely and cholera even less so for the average short term traveller.

Chemoprophylaxis

Chemoprophylaxis using antimicrobial agents is effective in preventing travellers' diarrhoea but has associated morbidity as well as the risk of increasing bacterial resistance. Prophylactic use of antibiotics should be considered only in short term travellers (travelling for a maximum of two weeks) who are at high risk, such as:

- those with an increased susceptibility to travellers' diarrhoea because of achlorhydria, gastrectomy or history of repeated severe travellers' diarrhoea
- those who are immunosuppressed

or have a chronic illness in which there is an increased risk of serious consequences from travellers' diarrhoea, e.g. those with chronic renal failure, congestive heart failure, insulin dependent diabetes mellitus or inflammatory bowel disease.

Prophylactic antibiotics may also be appropriate when a brief illness cannot be tolerated, e.g. for competing athletes and business or political travellers. They are not appropriate for children. Norfloxacin, doxycycline and trimethoprim/sulfamethoxazole are the recommended agents for ETEC, which is the presumed cause in 80% of travellers. There is little convincing evidence that *Lactobacillus* preparations are useful for the prevention of travellers' diarrhoea.

Management of diarrhoea while travelling

Rehydration

Although life-threatening dehydration is rarely seen in adults with travellers' diarrhoea, fluid replacement is still of primary importance in managing all cases, especially to avoid dehydration in children. The use of oral rehydration solutions is recommended – fluid absorption occurs in the presence of salt and sugars even if intestinal hypersecretion is occurring. If these solutions are not available, WHO oral rehydration salts (which are widely available in developing countries) or homemade solutions may be used instead. Recipes for two homemade solutions are given in Table 2.

Travellers who have bloody diarrhoea, fever above 39°C or persistent vomiting should receive antibiotics and immediate medical attention.

Antimotility agents

Antimotility agents are safe and effective if properly used. Loperamide (Gastro-Stop, Harmonise, Imodium) is the most effective antimotility agent available to reduce the severity of diarrhoea but should not be used if there is fever or blood in

Table 1. Relative occurrence of recognised faecal pathogens in 7286 faecal specimens*

| Organism | Frequency (%) [†] |
|---|----------------------------|
| <i>Campylobacter</i> sp. | 4.2 |
| Rotavirus | 2.4 |
| <i>Blastocystis hominis</i> | 2.4 |
| Mixed nonpathogenic amoebae, worms, ova, others | 2.1 |
| <i>Giardia lamblia</i> | 1.5 |
| <i>Salmonella</i> sp. | 1.3 |
| <i>Clostridium difficile</i> | 1.2 |
| <i>Cryptosporidium</i> sp. | 0.6 |
| <i>Entamoeba histolytica</i> | 0.5 |
| <i>Shigella</i> sp. | 0.2 |
| <i>Aeromonas</i> sp. | 0.1 |
| <i>Cyclospora</i> | 0.1 |
| <i>Pleisomonas</i> sp. | 0.1 |
| <i>Yersinia enterocolitica</i> | 0 |
| Specimens without detectable pathogens | 84.4 |

* Toxigenic *E. coli* strains are not detected by routine laboratory analysis. [†] Total adds up to more than 100% because of specimens with two or more isolates having all isolates included.

Table 2. Homemade oral rehydration solutions

Recipe 1

Mix together:
 240 mL (1 cup) fruit juice
 2.5 mL (1/2 teaspoon) honey (pasteurised)
 0.5 mL (1/8 teaspoon) salt
 1 mL (1/4 teaspoon) baking soda

Recipe 2

Mix together:
 1 L purified water
 5 mL (1 teaspoon) salt
 40 mL (8 teaspoons) sugar

Recommended antimotility agents and antibiotics

The severity of the symptoms of travellers' diarrhoea can be reduced by antimotility agents. Antibiotics can reduce the duration and severity of symptoms but should be used only in more severe cases.

Antimotility agents

Mild, moderate and severe diarrhoea

Loperamide (Gastro-Stop, Harmonise, Imodium)

- 4 mg initially and then 2 mg after each loose stool (maximum 16 mg daily)
- contraindicated in pregnancy, breast-feeding and children under 12 years
- precautions include fever, bloody diarrhoea and use for more than 48 hours

Antibiotics

Moderate to severe diarrhoea where Gram-negative infection is presumed

Norfloracin (Insensye, Norfloxal, Noroxin)

- 800 mg single dose or 400 mg twice daily for five days
- contraindicated in pregnancy and children under 16 years, although benefits when used for one to three days in children with severe travellers' diarrhoea far outweigh its risks
- an alternative recommended fluoroquinolone is ciprofloxacin (C-Flox, Ciproxin)

Azithromycin (Zithromax)

- 1000 mg single dose or 500 mg (5 to 10 mg/kg in children) daily for five days
- is an alternative for use against quinolone-resistant bacteria

Trimethoprim plus sulfamethoxazole (Bactrim, Cosig Forte, Resprim, Seprin)

- 320 mg trimethoprim plus 1600 mg sulfamethoxazole single dose or 160 mg trimethoprim plus 800 mg sulfamethoxazole twice daily (8/40 mg/kg per day for children) for three days
- resistance is widespread

Giardiasis

Tinidazole (Fasigyn, Simplotan)

- 2 g as a single dose

Metronidazole (Flagyl, Metrogyl, Metronide)

- 2 g daily (30 mg/kg per day for children) for three days

the stools (see the box on this page).

We do not recommend the use of diphenoxylate in travellers because it has been associated with toxic megacolon in patients with bacterial dysentery.

Antibiotics

Fluoroquinolones are currently the drugs of choice for the empirical treatment of travellers' diarrhoea in those cases needing antibiotic treatment. Both norfloxacin and ciprofloxacin (C-Flox, Ciproxin) have effectiveness worldwide against *E. coli* and common Gram-negative causes of diarrhoea such as *Salmonella* and *Shigella*, and will reduce the duration of diarrhoea, relieve associated symptoms such as cramps and reduce the number of liquid stools passed. The single dose regimens of fluoroquinolones advocated in some countries often provide equivalent relief compared to the longer regimens but may not be effective against *Shigella*- and *Campylobacter*-induced disease.

Fluoroquinolone resistance among *Campylobacter* is now common. In countries where almost all *Campylobacter* species are resistant, such as Thailand, azithromycin (Zithromax) is a more effective alternative.

In places where *Cyclospora* species are prevalent, such as Nepal during the summer months, and symptoms are suggestive of this infection (i.e. a chronic relapsing diarrhoea), a more rational choice for empiric antimicrobial therapy for travellers' diarrhoea might be trimethoprim plus sulfamethoxazole.

A new medication, rifaximin is currently being developed in the USA to treat bacterial diarrhoea. It has advantages over currently used antibiotics, including a low likelihood of spread of resistance.³

Rehydration remains the hallmark of treatment in younger children. Antimotility agents should be avoided because of an increased risk of serious side effects. Antibiotics can be used in teenagers once more serious disease has been excluded by a medical practitioner.

Travellers are recommended to carry a single dose or longer course of antibiotic as well as loperamide (see the box on this page) and also a thermometer.

Investigation of causes after return

As mentioned earlier, pathology or other investigations are rarely undertaken until travellers return home. Faeces is a challenging specimen for the laboratory because there are large amounts of normal bacterial flora and many potential pathogens. Travellers' diarrhoea caused by toxigenic *E. coli* strains are not detected by routine laboratory analysis but over 90% of other significant bacteria are isolated on the first faecal specimen submitted to the laboratory (Table 1). Three faecal specimens are still appropriate when looking for ova, cysts and parasites because of their intermittent excretion.

Testing for protozoa and other parasites is more useful in the returned traveller with bowel disturbance than in those with acute gastroenteritis. Travellers with persistent diarrhoea for more than one to two weeks should be investigated. Infections in returned travellers will be considered in detail in an article to be published in a future issue of *Medicine Today*.

References

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Further reading

1. Baird RW. Gastroenteritis in adults. New aspects of diagnosis and treatment. *Aust Fam Physician* 1999; 28: 324-328.
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