Traveller's diarrhoea

BACKGROUND There has been little if any change in the incidence of traveller's diarrhoea over the past 20 years.

OBJECTIVE This article aims to provide a basic understanding on why travellers are more likely to experience diarrhoea during travel.

DISCUSSION In a 20 minute pretravel consultation time is precious, and providing information on traveller's diarrhoea often has a low priority over prescribing the necessary vaccinations and discussing antimalarials. Travellers do not follow the rules of eating and drinking safely, and diarrhoea is common. 'What to do in the event of illness' is an important consideration. Presumptive treatment should be offered to all travellers whose itinerary and activities put them at risk.

Case history

JS, aged 26 years, is a backpacker travelling in India. Yesterday she and her travelling companions had visited a local restaurant where they enjoyed the local cuisine. One of the dishes had been very 'hot' and spicy, and she had absentmindedly drunk from the water container on the table. There was no cap on the container, nor was it internationally labelled. It is now 3 am and JS has already had three watery bowel actions and has stomach cramps. She feels very much alone and is concerned about her 12 hour bus trip at 8 am.

Traveller's diarrhoea (TD) is the commonest health problem facing travellers to less developed countries of the world. It is costly to both the traveller (time lost) and the host country (eg. cancelled activities).

Definition

Classic TD is described as three or more loose bowel actions with at least one of the following accompanying symptoms: nausea, vomiting, abdominal cramps or pain, fever or blood in the stools. Lesser degrees (moderate or mild) of TD are also described. Severity is usually defined by the number of bowel actions per 24 hour period (severe >6). According to the World Health Organisation, symptoms lasting less than 14 days may be defined as 'acute diarrhoea', and those lasting more than 14 days 'persistent diarrhoea'.[1]

Between 30 and 50% of travellers will be affected in a 2 week overseas stay, with approximately 12% presenting after returning home.[2] In high risk regions (eg. central America and North Africa) up to 80% will be affected. Add a Nile cruise to the itinerary in Egypt and the risk may be higher still! Travel to industrialised countries is not without risk, albeit low. Traveller's diarrhoea is most likely to present in the first week of travel (>60%) with peak onset between the second and third day. An episode of TD generally lasts 3–4 days. Ten percent of people have symptoms longer than a week, with a minority (1–2%) experiencing illness lasting more than a month. The incidence of TD has remained unchanged over the past 20 years despite good progress on the identification of aetiological agents and individual risk factors whether they are at the personal level or in the environment.

What causes TD?

Aetiology varies both geographically and seasonally, however, TD is the same illness whether it is called 'Bali belly', 'Delhi belly', 'Montezuma's revenge', 'Mexican two step', 'Turista' or the 'Rangoon runs'. The cause may be different, but the symptomatology and

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outcomes are very much the same.

Most cases of TD result from ingesting contaminated food or water. Travellers who have not grown up in areas of poor environmental sanitation lack immunity to many of the common causative agents and are thus more prone to infection. Many studies have confirmed this observation.[2,3] Children in developing countries have high rates of morbidity and mortality as they gain this immunity. Many travellers may also be taking medications (eg. proton pump inhibitors) that reduce the first barrier to infection: stomach acid.

Pathogens

In the early 1980s a causative agent could be identified in less than 25% of cases. A change of diet, temperature or travel fatigue was often mentioned as the possible cause for the diarrhoea. Today, an agent can be identified in almost 80% of cases. Bacterial pathogens predominate as the aetiologic agent,[4] and include *Enterotoxigenic E coli* (ETEC), campylobacter, shigella, salmonella, and the vibrios (*Vibrio parahaemolyticus, Vibrio cholerae*). *Enterotoxigenic E coli* is implicated in up to 40% of all TD cases.[4] Aeromonas hydrophilia and yersinia are occasionally isolated. Viral and parasitic agents are much less common. A viral pathogen is often identified in a cruise ship outbreak of gastroenteritis while there is considerable regional variation with parasites. Giardia and cryptosporridium are commonly found in returned travellers from Russia and other regions of the old Soviet Union, and much less in southeast Asia and South America. The prevalence of *Blastocystis hominis* is high in less developed countries, and is commonly found in the stools of returned travellers. Whether it is causally related to a diarrhoeal episode is debatable. Where it is found in high concentration and no other pathogen identified, then it should be considered the causative agent. It has been associated with bloating, flatulence and fatigue.[5]

At risk behaviour

While poor personal hygiene and low levels of environmental sanitation are seen as the root cause of TD, many foods have been identified as 'high risk'. These include seafood, particularly shellfish (mussels, oysters, clams), salads, cold meat and peeled fruit. Drinking local water and using ice in beverages are well recognised 'big mistakes'. Studies have shown that 98% of travellers ignore the rules of eating and drinking safely while overseas[6,7] and hence education of travellers, while mentioning general concerns, should focus on the 'big mistakes', particularly mentioning a higher risk during day trips away from higher quality accommodation.

Presumptive management

The management of TD while overseas is often quite different to that in Australia. Rarely is there opportunity to identify the organism responsible and time 'lost' is a precious commodity, particularly for the holiday or business traveller. Traveller's diarrhoea is common and all travellers should have a clear understanding of what to do in the event of illness (*Figure 1*). An understanding of the pathogenesis is important, but most likely logistics will determine management. Letting the illness 'run its course' may not be very pleasant, particularly when on a 12 hour bus trip in India. The basis of any form of management is fluid replacement. In mild or moderate TD the use of oral rehydration salts has not been found to be superior to the use of fluids of any type in patients also using loperamide.[8] An antisecretory agent such as loperamide has been shown to reduce fluid loss as well as to provide symptomatic relief.[9] Both the number of bowel actions and fluid lost may be reduced. As most episodes of TD are self limiting no further management may be required.

Bloody diarrhoea and fever

Antisecretory agents are not advised where there is fever or bloody diarrhoea. Instead, an antibiotic should be used with extra fluids as first line therapy. Antibiotic agents are often provided on the basis that the length of the illness may be reduced from days to hours,[10,11] but the choice of antibiotic may be limited by local antibiotic resistance patterns. In southeast Asia, many campylobacter are resistant to the commonly used quinolones (eg. norfloxacin) and another medication such as azithromycin may be necessary. Where bloating or light coloured, foul smelling stools are part of the presentation, a diagnosis of giardia may be considered and treatment with tinidazole commenced. Commonly used medications are shown in *Table 1*.

Prevention

The incidence of TD remains the same despite a plethora of information on 'eating and drinking safely' while overseas. The adage of 'boil it, cook it or forget it' is universally accepted and it is most unlikely that individuals travel without some knowledge of

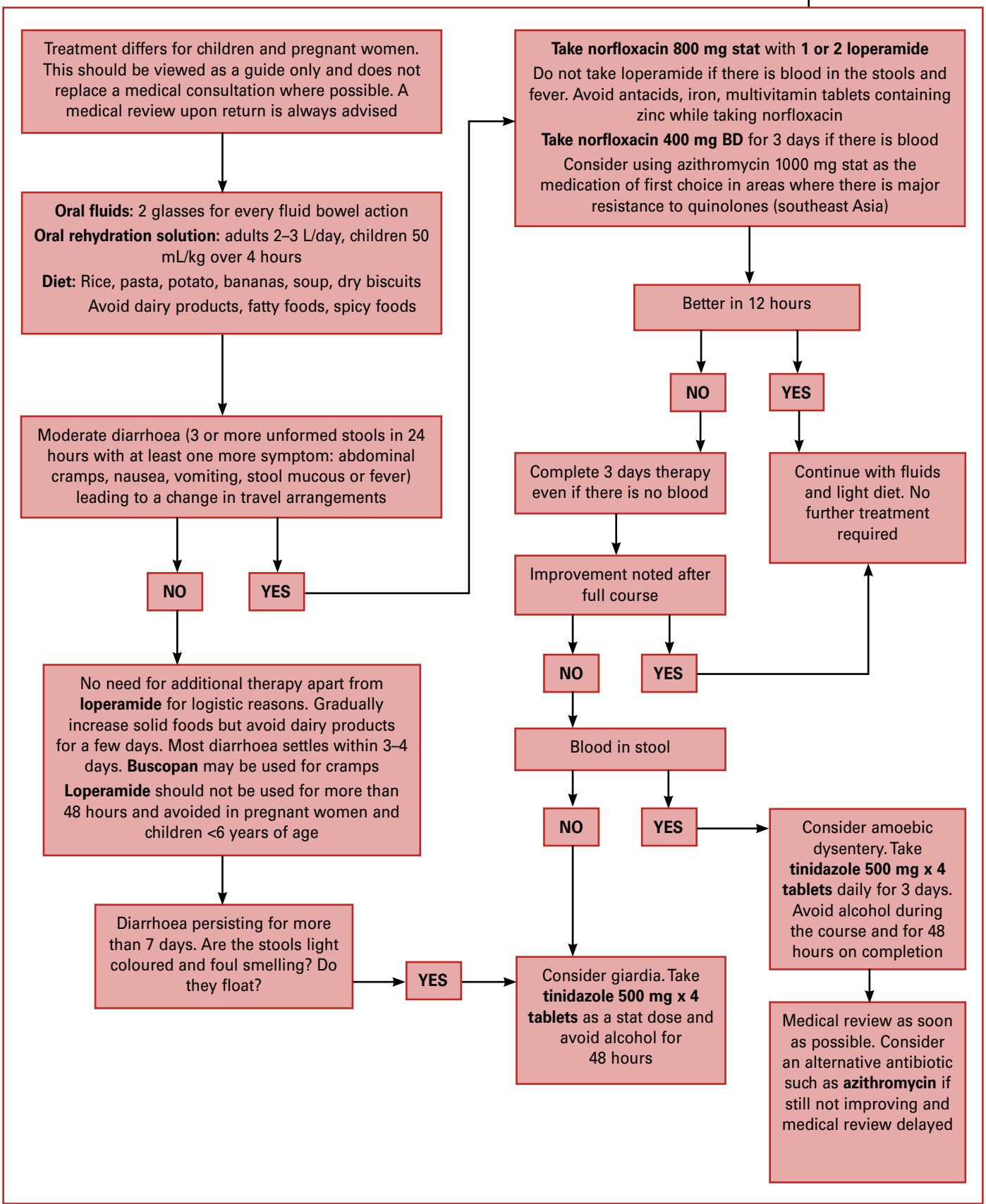

Figure 1. Self therapy for acute traveller's diarrhoea

Table 1. Medications for self treatment of acute traveller's diarrhoea

Medication	Adult dose	Paediatric dose	Other consideration
Norfloxacin	400 mg twice daily for 3 days, or 800 mg as a stat dose	Contraindicated	First line treatment
Ciprofloxacin	500 mg twice daily for 3 days, or 750 mg as a stat dose	Not recommended in prepubertal children	
Trimethoprim-Sulfamethoxazole	1 DS tablet (320 mg TMP and 1600 mg SMX) twice daily for 3 days, or 2 DS tablets stat	(5 mg/kg TMP and 25 mg/kg SMX) twice daily for 3 days	Resistance very common Caution in the elderly Contraindicated in sulfa allergy
Erythromycin	500 mg twice daily for 5 days	10 mg/kg/dose PO every 6 hours for 5 days	Campylobacter
Azithromycin	500 mg daily for 3 days, or 1000 mg as a stat dose	Loading dose 10 mg/kg/day (max 500 mg) followed by 5 mg/kg/day for 2 days	Preferred as first line medication in regions with high campylobacter presence and major quinolone resistance (southeast Asia)
Tinidazole	2 g as a stat dose (giardia), or 2 g daily for 3 days (amoebiasis)	50 mg/kg PO as a stat dose (giardia) (max 2 gm), or daily for 3 days (amoebiasis)	Giardia or amoebiasis

avoidance measures. Why travellers don't comply is an important consideration and it may come down to the reasons why people travel; to sample local cultures that inevitably includes the local cuisine. In a recent multicentre study of 67 000 travellers to India, Jamaica, Kenya, and Brazil, more than 96% did not follow recommended practices.[6] A prospective study of tourists to Sri Lanka did however show a strong correlation between dietary mistakes and the incidence of diarrhoea.[7] While the do's and don'ts of eating and drinking should always be mentioned (*Table 2*), it is probably more important to provide written material on the management of a diarrhoeal episode.

Table 2. Dietary considerations

Dietary items (high risk)
- Raw or undercooked meat, fish
- Salad vegetables (particularly from small family based restaurants)
- Raw or undercooked eggs
- Unpasteurised dairy products
- Sauces, mayonnaise, potato salad
- Smorgasbords
- Peeled fruit
- Tap water, ice
- Fruit juices (from street vendors)
- Noncarbonated bottled water

Dietary items (considered safe)
- Cooked food (steamed, stir fried, soups)
- Food in cans or sealed packs
- Bread (unless multiple handling has taken place)
- Fruit that can be peeled
- Food prepared by yourself
- Boiled or internationally labelled bottled water
- Coffee, tea, alcohol

The future

Attempts to reduce the burden of illness through behavioural change have largely been unsuccessful and much research is now being directed toward new vaccines against ETEC and antibiotics for treatment. The cholera vaccine Dukoral shows promise for its anti-ETEC activity, as does the nonabsorbable antibiotic rifamixin for treatment.[12–15] Dukoral is currently licensed in Australia as a cholera vaccine only. However in New Zealand, Canada, and a number of other countries, it can be prescribed for the prevention of some forms of ETEC related traveller's diarrhoea. Dukoral has good protection against the heat labile ETEC toxin (LT) but would have major limitations in areas where the heat stable (ST) toxin predominates. This may explain the poor results in recent efficacy studies for new ETEC vaccines. Given this limitation, it is still likely that

Dukoral may prevent 3–5% cases of diarrhoea. Cost is a significant issue given the broad range of vaccines currently being recommended for travellers, and true efficacy should always be discussed with the patient.

Rifamixin is derived from rifamycin. It is not currently available in Australia but has been shown to be as effective as ciprofloxacin for the treatment of traveller's diarrhoea.[16] An adult dose of 400 mg twice per day or 200 mg three times per day for 3 days is currently being recommended. Rifamixin is well tolerated and less likely to promote antibiotic resistance.

Conclusion

While traveller's diarrhoea is usually self limiting, it does cause considerable morbidity. Health education before travel still remains very important, but until there are major attempts to improve practices in food and water safety at host country level, it is unlikely we will see any great changes in incidence. Unlike most community acquired diarrhoea in industrialised countries, traveller's diarrhoea is mostly bacterial. Current management during travel includes the use of fluids, antimotility agents and antibiotics. New ETEC vaccines and nonabsorbable antibiotics such as rifixamin offer major advances in the not too distant future.

Summary of important points

- Most cases of TD result from ingesting contaminated food or water. Despite this, the majority of travellers ignore the rules, ie. eating and drinking safely overseas ('boil it, cook it or forget it').
- Bacterial pathogens predominate with ETEC implicated in up to 40% of cases.
- Presumptive management for mild to moderate TD includes fluid replacement and an antisecretory agent such as loperamide.
- Patients with more severe symptoms, fever or bloody diarrhoea usually require antibiotics and norfloxacin is usually appropriate for initial presumptive treatment.
- Loperamide should not be used in patients with fever or bloody diarrhoea.

Conflict of interest: none declared.

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