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DIARRHOEA AND VOMITING

This month's special feature includes two articles. The first looks at the possible causes of diarrhoea and vomiting and their management in the pharmacy. The second gives an overview of travellers' diarrhoea

MANAGEMENT OF DIARRHOEA AND VOMITING IN THE PHARMACY

By Pamela Mason, PhD, MRPharmS

Food poisoning is a growing public health problem and food-borne microbes, which are isolated in about 100,000 cases a year, represent only the tip of the iceberg. This article provides background information and practical guidance on diarrhoea and vomiting for community pharmacists

Diarrhoea is defined as an increase in the normal frequency of bowel movements with the passage of abnormally soft or watery faeces. In this context, it is important to remember that the frequency of bowel movements varies with the individual. Some healthy adults may have as many as three well-formed stools each day while others may have a bowel movement once every alternate day or even less frequently.

Diarrhoea may be either acute or chronic, and is sometimes accompanied by vomiting.

Acute diarrhoea Acute diarrhoea is usually self-limiting and is characterised by a sudden onset of abnormally frequent, watery stools. In addition to vomiting, it may also be accompanied by pain, weakness and sometimes fever. The associated discomfort, inconvenience, and social embarrassment in relation to faecal incontinence — either real or threatened — makes this an unpleasant condition, even though it usually lasts only for a short time.

The main causes of acute diarrhoea are viruses or bacteria, which gain entry through consumption of contaminated food

or drink (see Table 1). Food poisoning is a growing public health problem, and food-borne microbes, which are isolated in about 100,000 cases a year, represent only the tip of the iceberg. The Food Standards Agency estimates that in the United Kingdom there are about 4.5 million cases of food poisoning each year. The risk of food poisoning can be reduced by strict attention to food hygiene (see Panel 1).

Some bacteria (eg, enterotoxigenic *Escherichia coli* and *Staphylococcus aureus*) produce toxins that bind to the mucosal cells of the small intestine, causing hypersecretion of fluid and electrolytes, leading to a watery diarrhoea. Other bacteria (eg, invasive *Escherichia coli*, salmonella and shigella) directly invade the mucosal cells and cause an inflammatory reaction. However, these organisms often produce a less watery diarrhoea than the toxin-producing bacteria.

Acute diarrhoea can also be caused by protozoa such as *Giardia lamblia* and *Entamoeba histolytica*. Neither of these is a common infection in the UK, and they are more likely to occur in individuals who have been travelling in tropical countries (see article on travellers' diarrhoea, p917).

Panel 2: Drugs that can cause diarrhoea

- 1 Antacids — magnesium salts
- 1 Antibiotics
- 1 Antihypertensives (eg, guanethidine, methyldopa)
- 1 Beta-blockers
- 1 Colchicine
- 1 Digoxin
- 1 Iron preparations
- 1 Laxatives
- 1 Metoclopramide
- 1 Misoprostol
- 1 Non-steroidal anti-inflammatory drugs (NSAIDs)

Adapted from Blenkinsopp A, Paxton P. 'Symptoms in the pharmacy. A guide to the management of common illness'. 3rd edition, 1998, p106.

Various medicines, particularly antibiotics, can also cause diarrhoea (see Panel 2). All antibiotics can cause diarrhoea but the severity depends on the specific antibiotic and the dose and duration of therapy. Antibiotic associated diarrhoea may be caused by change in the gastrointestinal flora and consequent overgrowth of an antibiotic-resistant bacterial or fungal strain. *Clostridium difficile* is a common cause, but other organisms that tend to proliferate during antibiotic therapy include *Staphylococcus aureus*, *Pseudomonas aeruginosa* and *Candida albicans*.

Acute diarrhoea can also be provoked by food intolerance. For example, in individuals with reduced activity of the enzyme lactase, there is a failure to hydrolyse lactose

Panel 1: General guidance on food hygiene

- 1 Wash hands thoroughly before food preparation and after handling raw foods such as meat, fish and poultry
- 1 Keep all kitchen work surfaces and utensils scrupulously clean; use separate knives for raw meat and cooked foods
- 1 Change dishcloths and teatowels every day
- 1 Keep pets away from food, work surfaces and cooking utensils and dishes
- 1 Thaw food (which requires to be thawed) thoroughly before cooking
- 1 Do not refreeze food (either cooked or raw)
- 1 Cook and/or reheat food thoroughly; never reheat food more than once
- 1 Follow carefully all cooking times and microwave instructions on packets
- 1 Store raw meat and poultry below other foods in the refrigerator (to avoid drips from raw meat)
- 1 Avoid putting warm food into the refrigerator
- 1 Put chilled and frozen food into the refrigerator/freezer as quickly as possible

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TABLE 1: TYPICAL ORGANISMS THAT CAUSE DIARRHOEA

Name	Symptoms	Onset	Typical causes
<i>Bacillus cereus</i>	Nausea, vomiting, diarrhoea, abdominal pain	1–16 hours	Rice dishes, custard, sauces
Campylobacters	Watery diarrhoea, abdominal cramps, vomiting is uncommon	2–5 days	Unpasteurised milk, untreated water. Raw or undercooked meat (especially poultry)
<i>Clostridium difficile</i>	Watery diarrhoea, abdominal pain, fever	Usually starts during antibiotic therapy, but can begin up to four weeks after antibiotic is discontinued	Antibiotics
<i>Clostridium perfringens</i>	Diarrhoea and abdominal pain, vomiting or fever is rare	12–18 hours	Cooked meat and poultry left to stand for a long time at room temperature
<i>Escherichia coli</i> 0157 Verocytotoxin producing E coli (VTEC)	Bloody diarrhoea, abdominal cramps, fever	1–6 days	Undercooked beef and beef products (eg, beefburgers, minced beef), milk that is raw, inadequately pasteurised or contaminated after pasteurisation
Rotaviruses	Acute watery diarrhoea, vomiting, nausea, fever. Coughs, colds, otitis media and tonsillitis may occur at the same time	12–48 hours	Faecal-oral spread. Particularly infects infants
Salmonellas	Diarrhoea, vomiting, fever	12–24 hours	Undercooked meat and poultry, meat products, raw or undercooked eggs, milk and milk products
Shigella	Bloody diarrhoea, nausea, vomiting	1–7 days	Contaminated vegetables or water
Staphylococci	Nausea, vomiting, watery diarrhoea	1–7 hours	Untreated milk, custard, cream, cold desserts, sausage, ham, poultry

*Note: Information derived from the Public Health Laboratory Service website, available at www.phls.co.uk, and the Food Standards Agency website, available at www.foodstandards.gov.uk

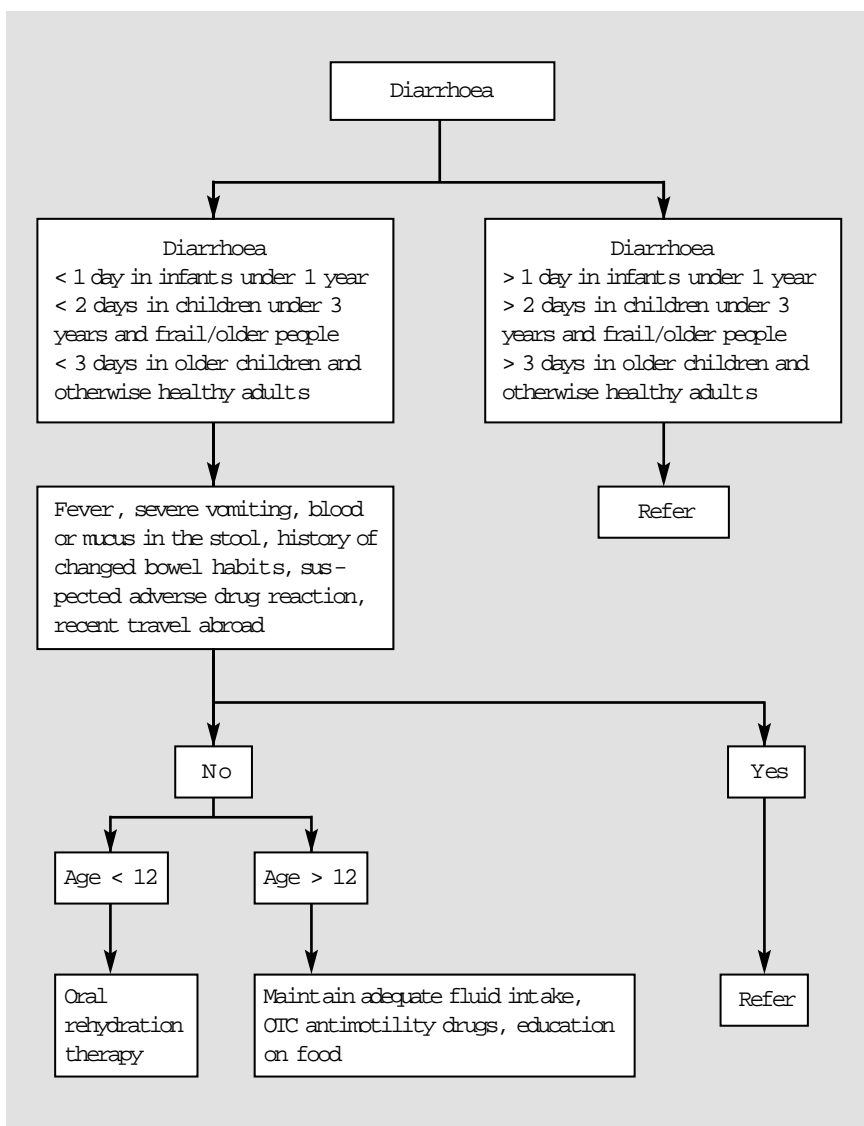


Figure 1: Evaluation and management of diarrhoea in the pharmacy

(the disaccharide in milk). As a consequence, lactose builds up in the intestine, ferments and by osmosis draws fluid into the intestinal lumen, resulting in diarrhoea. Acute infectious diarrhoea may result in reduced lactase activity and cause temporary milk intolerance.

Chronic diarrhoea Chronic diarrhoea may be caused by disease of the small or large intestine or the stomach. It may be due to irritable bowel syndrome (IBS), inflammatory bowel disease (eg, Crohn's disease, ulcerative colitis), a condition of malabsorption (eg, coeliac disease), diverticular disease, or more seriously, a bowel tumour.

Faecal impaction in the elderly can give rise to constipation and a so-called spurious or overflow diarrhoea. In this condition, faeces obstructs most of the width of the bowel lumen, but some fluid faeces may seep past the impacted mass, leading to a loose unformed stool which is produced in relatively small amounts. This condition should not be treated as diarrhoea because it will only lead to worsening constipation. The individual should instead be referred for rectal examination and disimpaction of the faeces.

Recurrent and persistent diarrhoea may also be secondary to some other condition (eg, diabetic neuropathy, hyperthyroidism, stress or laxative abuse). Patients with human immunodeficiency virus (HIV) and acquired immune deficiency syndrome (AIDS) are susceptible to many intestinal infections that cause diarrhoea. An estimated 80 per cent of AIDS patients will suffer a diarrhoeal infection at some time during their illness.

Management Management of diarrhoea depends on the age of the patient, symptoms and likely cause. This article focuses on the management in the pharmacy of acute, self-

Panel 3: Assessment of the patient — considerations for pharmacists

- 1 **Age** Particular care is needed in infants under the age of 12 months and older people, all of whom are at special risk of dehydration.
- 1 **Frequency of normal bowel movement** It is important to remember that the frequency of normal bowel movements varies with the individual.
- 1 **Symptoms** It is also important to ask about symptoms associated with the diarrhoea, such as vomiting, dizziness, fever and abdominal pain. Vomiting and fever in infants will increase the likelihood of severe dehydration. It is also worth checking whether or not any other members of the family have similar symptoms.
- 1 **Stool character** Pharmacists might consider asking about the character of the stool (ie, consistency, odour and colour) and whether it contains blood or mucus. Undigested food in the stool suggests small bowel irritation. Black, tarry stools may indicate upper gastrointestinal bleeding. Red stools suggest possible lower bowel or haemorrhoidal bleeding, medicine (eg, rifampicin), or perhaps simply the recent consumption of red food such as beetroot. A yellowish stool may indicate the presence of bilirubin and possibly serious liver disease.
- 1 **Onset** Was the onset sudden or gradual? The pharmacist should ask about food and drink intake to see whether the onset of the diarrhoea can be related to a specific food or meal. Binge drinking may also be a cause of diarrhoea.
- 1 **Duration** It is wise to refer infants with diarrhoea that has lasted more than 24 hours to a doctor (see also Panel 4). All cases of chronic diarrhoea or prolonged change in bowel habit should be referred.
- 1 **Degree of dehydration** The degree of dehydration can be difficult to judge. The most accurate method of assessing the degree of dehydration is body weight, but pre-illness body weight is not always accurately known. Signs and symptoms of mild dehydration include increased thirst and slightly dry mouth. Moderate dehydration is indicated by loss of skin elasticity, sunken eyes and dry mouth. A dehydrated baby may become limp, non-alert and have a sunken fontanelle; such an infant should be referred without delay. In severe dehydration the individual may show signs of shock, lethargy, confusion, rapid, deep breathing, postural hypotension, dizziness, faintness and cool, clammy skin.
- 1 **Previous history** Check whether the individual has had other episodes of diarrhoea in recent weeks or months; frequent attacks of diarrhoea could be indicative of more serious disease (eg, coeliac disease, inflammatory bowel disease, bowel cancer). Recent travel abroad should also be considered.
- 1 **Medication** It is important to check whether the individual has already tried anything for the diarrhoea and also whether they are taking any other prescribed or over-the-counter medicines, since the diarrhoea may be caused by drugs (see Panel 2).

limiting diarrhoea and will therefore not discuss the use of antibiotics and other prescription medicines.

There is considerable confusion as to the appropriateness of the different over-the-counter treatment options for acute diarrhoea and the role of fasting and resumption of solid food. A decision tree to aid management of diarrhoea in the pharmacy is shown in Figure 1.

Headings intended to help as an aide-memoire for pharmacists assessing individuals with diarrhoea are shown in Panel 3. Having acquired a history of the patient's present symptoms, the pharmacist can then go on to discuss management. In some cases, this may mean referral to a doctor (see Panel 4).

Oral rehydration solutions Oral rehydration solutions increase water absorption by stimulation of sodium-glucose transport in the small intestine. They are highly effective for treating dehydration and its consequences but they do not reduce the duration of diarrhoea. They are the treatment of choice for infants, young children and frail and/or older people.

Available in the form of powders or effervescent tablets and a variety of flavours, the products should be reconstituted with water (boiled and cooled for infants under 12 months) exactly according to the instructions on the packet. Fizzy or sugary drinks should not be used to make up these solutions.

The dose is dependent on fluid loss, but in adults is usually 200–400ml after each loose motion. Infants under 12 months should be given one to one and a half times the usual feed volume and children, 200ml after each loose motion.

Antimotility drugs Some authorities decry the use of antimotility drugs on the basis that diarrhoea is a defence mechanism, which should be left to run its natural course. However, some recent guidelines¹ suggest that this concept is outdated. Moreover, patients often request symptomatic treatment for social reasons, and OTC loperamide is an effective symptomatic treatment for use in adults and children over 12 years old. It reduces bowel motility and studies have shown it to be effective in reducing the duration of diarrhoea. Attention to fluid intake is important, and in

adults, this may be achieved by the consumption of any liquids containing glucose (eg, lemonades, sweet sodas, fruit juice) or soups rich in electrolytes.

Adsorbents Adsorbents such as kaolin, pectin and charcoal have been constituents in traditional diarrhoea remedies for many years. Although the public still asks for them, they serve little useful purpose, and in children, their use has been superseded by oral rehydration therapy.

Bismuth subsalicylate is claimed to possess adsorbent properties, and some studies have shown it to be effective in treating diarrhoea. However, large doses are required, and it should be avoided by individuals sensitive to aspirin.

Morphine Morphine has been included in anti-diarrhoeal remedies for many years on the basis that, like codeine (which is also an ingredient in some OTC products), it reduces gastrointestinal motility. However the doses used in OTC products are unlikely to produce such an effect. In addition, these products can be addictive.

Dietary advice Both breast and bottle fed babies should continue to be fed normally during episodes of diarrhoea. Formula feed should not be diluted.

In adults with acute diarrhoea, consumption of solid food should be guided by appetite. There is no need to fast unless the diarrhoea is associated with nausea and vomiting. Heavy, fatty, spicy foods are best

Panel 4: Diarrhoea — when to refer

- 1 Infants under the age of 12 months with diarrhoea that has lasted more than a day
- 1 Infants under the age of three years and frail or older people (>75 years) with diarrhoea of longer than two days' duration
- 1 Infants with signs of moderate to severe dehydration (eg, limp, non-alert babies)
- 1 Older children and adults with diarrhoea that has lasted longer than three days
- 1 Individuals (usually older people) with signs of faecal impaction (eg, constipation with overflow diarrhoea)
- 1 Presence of blood or mucus in the stools
- 1 Diarrhoea accompanied by severe vomiting and/or fever
- 1 Previous history of diarrhoea
- 1 Prolonged change of bowel habit
- 1 Recent travel abroad

Adapted from Blenkinsopp A, Paxton P. 'Symptoms in the pharmacy. A guide to the management of common illness'. 3rd edition, 1998, p106.

avoided but small light meals can be recommended. Maintenance of fluid intake is crucial but drinks containing caffeine are best avoided, and avoidance of lactose-containing foods (eg, milk) may help in the case of more prolonged episodes of acute diarrhoea.

Products containing probiotics (live microbial supplements) are frequently promoted for diarrhoea. There is some evidence to suggest they are useful in rotaviral diarrhoea (which usually occurs in infants) and in preventing antibiotic associated diarrhoea, but there is little evidence for benefit of probiotics in acute, self-limiting diarrhoea in adults.

VOMITING

Vomiting has several possible causes and is often associated with diarrhoea in both adults and children. In infants less than 12 months old, it may occur due to infection, feeding problems or more rarely to obstruction such as pyloric stenosis. In pyloric stenosis, blockage is caused by thickening of the muscular wall surrounding the outlet to the stomach and this can be cured by a simple operation. The condition usually

becomes symptomatic within a few weeks of birth and can be distinguished from the more common causes of infantile vomiting by the projectile nature of the vomiting; large quantities are forcibly expelled and travel some distance from the infant.

Vomiting should be differentiated from regurgitation. In the latter, food is effortlessly brought up from the stomach, rather than being forcibly expelled. It is common in babies and known as "possetting" and it may also occur in adults where it is associated with oesophageal disease.

In adults, as in children, vomiting is commonly caused by gastroenteritis. Nausea and vomiting are common in pregnancy and may also be associated with migraine and travelling. Inner ear problems may also cause vomiting and if there is a history of dizziness and vertigo as well, this could point to inner ear disease as the cause.

Various medicines may cause sickness (eg, doxycycline, aspirin, non-steroidal anti-inflammatory drugs, corticosteroids, oestrogens) and this can sometimes be prevented by taking the medicine with food. Vomiting may also be a sign of digoxin toxicity and any patient with such symptoms who is taking

digoxin should be referred immediately to a doctor.

Management Infants and children under the age of two years who are vomiting should be referred because of the risk of dehydration. Any adult who has been vomiting for longer than two days should also be referred as should anyone presenting with a history suggesting chronic nausea and vomiting. Vomiting with blood should be referred as it may indicate serious disease (eg, peptic ulcer, gastric cancer).

Once vomiting is established, there is no effective OTC treatment, although rehydration therapy can be initiated if the individual can keep it down. The doctor may prescribe an anti-emetic if appropriate.

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TRAVELLERS' DIARRHOEA

By Larry Goodyer, PhD, MRPharmS

It has been estimated that between 30 and 50 per cent of travellers from industrialised to developing countries will suffer from travellers' diarrhoea.

In this article the author gives a brief overview of the condition

There is little doubt that for travellers the most commonly encountered health problem is that of an episode of diarrhoea, usually lasting no more than two or three days but in some case resulting in weeks or even months of illness. This condition is termed as "travellers' diarrhoea" (TD).

SYMPTOMS

The defining characteristics of TD consist of three to four unformed stools in 24 hours and at least one of the following (enteric) symptoms: abdominal pain, nausea, vomiting, fever, cramps, blood or mucus in the stools and faecal urgency.

Symptoms that do not meet these criteria might be termed simply as "loose motions". If symptoms last more than 14

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days the term persistent diarrhoea is used, and if lasting more than 30 days it is referred to as chronic diarrhoea. Extreme morbidity requiring admission to hospital is rare, although an episode of diarrhoea could well ruin an itinerary. It has been estimated that anywhere between 30 and 50 per cent of travellers from industrialised to developing countries will suffer from TD.

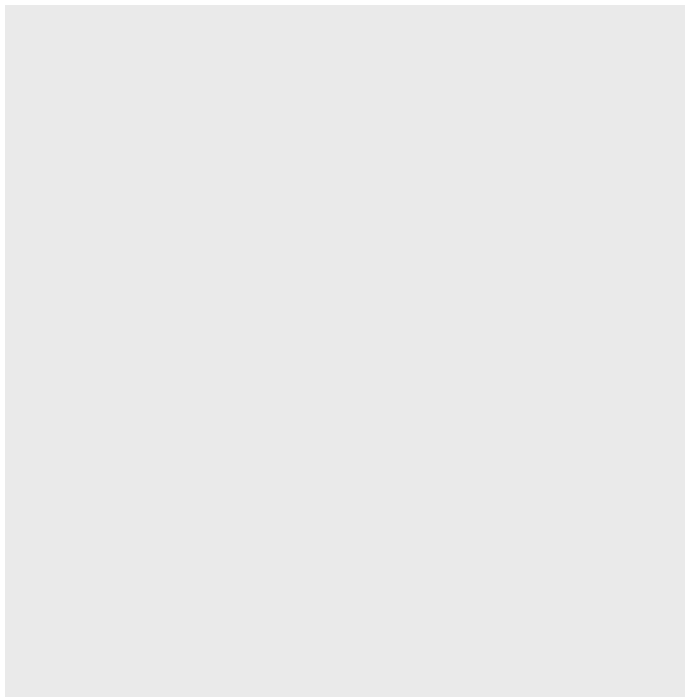
CAUSES

The cause of the problem is related to the ingestion of the causative organisms in food and drink. In about 30 per cent of cases the organism will be enterotoxigenic *Escherichia coli* (ETEC), which results in watery diarrhoea of usually no more than five days' duration. Other bacteria may induce more severe and prolonged diarrhoea, examples being *Shigella* spp and campylobacter. Parasites such as *Entamoeba histolytica* and *Giardia lamblia* are less common agents, responsible overall for about 5 per cent of cases and often causing a chronic diarrhoea. The type of organism does determine to an extent the presentation of the diarrhoea. *Shigella* spp for instance tends to result in dysentery, ie, blood and pus in the stools, and fever. *Giardia lamblia* is notorious for causing a great deal of flatulence and bloating, with a foul smelling loose motion.

A question sometimes asked by travellers is that if the cause of TD is ingestion of contaminated food and water, why does the local population not suffer from the same incidence of diarrhoea as the traveller? The answer lies in the observation that the incidence of TD in some destinations is similar to the incidence of diarrhoeal illness in children that are living in that country. Furthermore, it has been found that travellers who normally live in a developing country will have less diarrhoea than those from industrialised countries. The poor sanitation and hygiene that exists in some developing countries allows the widespread contamination of food and water, severely affecting babies and children, resulting in a high incidence of mortality. Those who survive develop a degree of resistance in adulthood. However, travellers should not assume that if they suffer one or two episodes of diarrhoea during their trip that they will develop immunity. It was found in a large study among expatriates living in Nepal that the incidence of diarrhoea due to ETEC did not fall until after three months of residence. One curious finding, that no one has been able to explain, is that those travelling from the UK have a significantly higher incidence of diarrhoea than those people travelling from other industrialised nations.

PREVENTION

To reduce the risk of contracting TD it is recommended to avoid contaminated food and water. Unfortunately there is little strong evidence that those who do follow such advice actually suffer fewer bouts of diarrhoea, probably because it is hard to stick completely to the recommendations throughout a trip. None the less it is appropriate to try to avoid the riskiest situations, if only to reduce the likelihood of contracting one of the more severe or chronic forms of TD. The advice "Boil it, peel it or forget



Escherichia coli: In about 30 per cent of cases the organism will be enterotoxigenic Escherichia coli, which results in watery diarrhoea of usually no more than five days' duration

it" should be followed, where in general it is safest to only eat freshly cooked and hot food, or raw fruit and vegetables that have been peeled. In addition travellers should be aware of the risks from poorly cleaned cutlery and cups. Water is also best boiled or sterilised with a halogen such as chlorine or iodine. Alternatively bottled water is often easily obtained. However there is a danger that such bottles might have been simply filled with "counterfeit" water from a tap.

MANAGEMENT

TD is not thought of as a clinically dehydrating condition in healthy adults. So, providing an adequate fluid intake is maintained, with most moderate bouts of diarrhoea dehydration should not occur. For this reason the use of oral electrolyte solutions is not strictly necessary, other than in the very young or elderly. Hydration is adequately maintained by ordinary drinks while continuing to eat reasonably bland foods; the combination of sugary drinks with salt crackers has been claimed to be ideal. It is best to avoid fruit and cola drinks, which

may contain more fructose exerting an osmotic effect holding fluid in the bowel. Despite this I still often recommend that some travellers carry a supply of rehydration salts, because in some situations access to suitable drinks and food may be limited. One drawback to the aggressive use of electrolyte salts is that a fluid diarrhoea is still produced adding further to the inconvenience of the problem. In this respect Dioralyte Relief seems to offer a potential solution because, being starch rather than glucose-based, this formulation is claimed to form a bulkier stool.

There has been reluctance among health professionals to recommend the use of antidiarrhoeals for TD. This is based on the fear that the offending organism and any associated toxins are held in the bowel, prolonging the course of the diarrhoea. There is no evidence that this is a danger, except possibly in the presence of dysenteric symptoms. Therefore, a short course of loperamide can usually be recommended for adults to relieve the symptoms of diarrhoea, particularly when they might otherwise disrupt travel plans. It would be prudent to ensure a good level of hydration even if taking loperamide.

The other somewhat contentious issue is whether or not to use antibiotics. Just a single dose of 500mg ciprofloxacin has been shown to reduce the duration of TD to under 24 hours, although TD is not a licensed indication for this antibiotic. Some would argue that since TD is a self limiting condition the use of antibiotics is not warranted. On the other hand for those on short important trips, eg, business or political, the duration of the illness may be critical. Those with protozoal infections would require metronidazole. There are few indications for prophylactic antimicrobial therapy.

In summary the following course of action might be recommended for the self management of TD in healthy adults:

- 1 Mild TD with only one or two loose stools in 24 hours would require no particular treatment, provided the person remains hydrated
- 1 For mild-to-moderate diarrhoea, loperamide could be used, perhaps adding an antimicrobial if the symptoms worsen or are distressing. A single dose is sufficient, but if symptoms persists longer than 24 hours or there are dysenteric symptoms a full three-day course may be required, eg, ciprofloxacin 500mg twice daily
- 1 For severe dysenteric symptoms a full course of an appropriate antimicrobial should be taken.

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