Montezuma’s Revenge, Aden Gut, Basra Belly... there is an almost endless list of names used to describe the syndrome referred to as travellers’ diarrhoea (TD). Of all the travel health hazards, a bout of diarrhoea is the most likely. It has been estimated that 30 to 50 per cent of travellers from industrialised nations who visit developing countries will suffer from an episode of TD, representing around seven million individuals a year. Although it is usually a self-limiting problem resolving within three to five days, there are some important considerations:

- Three to five days from a two week holiday could still represent a ruined itinerary, which could be particularly distressing if the trip was expensive. This becomes even more important if the holiday was only of a week’s duration
- For important business or political meetings, a bout of TD could inhibit performance to the extent that the trip be regarded as a failure
- Some travellers are at a potentially greater risk from the effects of TD, eg, the young, old or immunosuppressed
- A developing country gaining a reputation for a high incidence of TD can suffer a loss of vital revenue from tourism
- Persistent diarrhoea, continuing on return from abroad, can result in days lost from work and reduced performance

The high incidence of TD in developing countries is believed to be linked to problems concerning sanitation and food handling which, due to economic and other constraints, are not as well regulated as in industrialised nations. This has resulted in the concept that travellers should be educat-
ed in hygiene measures, about both food and water, in an attempt to reduce the incidence of TD. This will be dealt with in greater depth in the next article.

For the pharmacist, the most important issues are an understanding of both the potential role of prophylactic measures and the management of TD using oral rehydration, antimotility agents and antimicrobials. These aspects will be discussed in this article, together with other important considerations linked to the epidemiology, aetiology and symptoms of TD.

DEFINITION AND SYMPTOMS OF TRAVELLERS’ DIARRHOEA

A recognised working definition of the syndrome of TD is accepted as: 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
- faecal urgency

Some of the enteric symptoms, such as cramps, abdominal pain and urgency, will occur quite frequently. Vomiting and blood in the stools occurs in less than 10 per cent and fever in up to 30 per cent of cases.

Typically, TD is considered an acute problem and diarrhoea lasting longer than 14 days might be classified as a chronic or persistent diarrhoea, considered by some as a separate entity.1 However, there is some overlap in this classification in that organisms such as Giardia are listed as potential causes of TD; symptoms of infection with this organism can persist for many weeks or months if untreated.

There is also some difficulty in classifying the relative severity of a bout of TD. The following system has been proposed:1

- Mild — one to two unformed stools in 24 hours with tolerable symptoms
- Moderate — more than three unformed stools in 24 hours with distressing symptoms
- Severe — fever and/or blood in the stools, plus more than three unformed stools in 24 hours with incapacitating symptoms

There is a fine line between what symptoms an individual would consider to be tolerable or distressing. For instance, under which category might a person suffering just one or two massive bouts of diarrhoea which they find particularly distressing be placed?

The definition of severe diarrhoea is perhaps more helpful, implying a dysentery picture which would need further investigation with a view to specific antimicrobial therapy.

TD tends to occur towards the end of the first week of travel and over 90 per cent of cases occur within the first two weeks.4

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DIETARY HABITS

This will be dealt with in the next article, but one of the most important risk factors appears to be associated with eating out in restaurants.

It seems to make little difference if staying and eating in a five star hotel or budget accommodation.

OTHER ILLNESS AND MEDICATION

It has recently been found that those with reduced stomach acid are much more prone to TD. This is because many pathogens are removed by stomach acid to levels unlikely to cause TD. Therefore, travellers taking proton pump inhibitors (PPIs) and, to a lesser extent, longer acting H2 antagonists, may be at risk of TD.

In patients in whom acid suppression is essential, an H2 antagonist should be given in preference to a PPI and they should be warned about the risks. Possible consideration could be given to antimicrobial prophylaxis if visiting very high risk areas.

The effect of TD on drug absorption has not been widely studied, but a decrease in gastrointestinal tract transit time is theoretically possible. Many travellers to the tropics will be taking malaria prophylaxis and one study has shown that blood levels of proguanil (but not chloroquine) are reduced by TD.5 Travellers should therefore be aware of paying particular attention to precautions against biting insects if this is likely to be a problem. They should not take extra medication except on medical advice.

People who are immunocompromised, eg, those receiving chemotherapy or patients with AIDS who have a low CD4 count, would be at an increased risk of TD. This is especially true in the young and elderly there may be a greater potential for dehydration as a result of TD.

Patients with inflammatory bowel disease (IBD) may experience a worsening of the condition following TD.

AETIOLOGY

A number of non-infectious causes of TD have been proposed. The most important might include:2

- Changes in diet, eg, additives/food intolerance, high fat intake
- Changes in gut flora
- Alcohol
- Menstruation

These non-infectious causes appear to be supported by the observation that over 50 per cent of stool samples from TD patients prove negative for a pathological organism. However, in many studies, a response rate of over 95 per cent is observed with antimicrobial treatment. Therefore the current view

<table>
<thead>
<tr>
<th>Table 1: Incidence of Travellers’ Diarrhoea*</th>
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<tr>
<td>Travellers affected (per cent) for each country visited</td>
</tr>
<tr>
<td>&gt;7 per cent</td>
</tr>
<tr>
<td>US</td>
</tr>
<tr>
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</tr>
<tr>
<td>Middle Europe</td>
</tr>
<tr>
<td>Australia</td>
</tr>
<tr>
<td>New Zealand</td>
</tr>
</tbody>
</table>

* Travellers affected (per cent) for each country visited

Epidemiology

The risk of contracting TD has been linked to a number of factors:

- Destination
- The relative risk of TD for various destinations is summarised in Table 1. Under-reporting tends to occur in many of the studies which attempt to assess the scale of the problem and the figures in the higher range are probably more representative. Generally, TD is more likely if visiting countries in the summer months, perhaps reflecting an increase in the local fly population.

- Length of stay and prior travel
- There is a relationship between length of stay and a tendency to develop immunity to subsequent bouts of TD. This is supported by the observation that those travelling from one developing nation to another are at less risk than those travelling from industrialised countries.4 The risk to expatriates does fall as they become familiar with the local flora. However, the expatriates in this study showed a high level of pathogens present in normal stool samples. It is likely that tolerance can develop to enterotoxigenic E. coli (ETEC), but individuals remain susceptible to the other organisms responsible for TD. The important message is that longer term travellers should certainly not treat mild to moderate TD with antibiotics because some immunity should be allowed to develop.

- Immunity will be lost on returning home and frequent travellers from industrialised countries show the same incidence of TD as infrequent travellers.

- Other illness and medication
- It has recently been found that those with reduced stomach acid are much more prone to TD. This is because many pathogens are removed by stomach acid to levels unlikely to cause TD. Therefore, travellers taking proton pump inhibitors (PPIs) and, to a lesser extent, longer acting H2 antagonists, may be at risk of TD.

- Dietary habits
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is that the majority of cases of TD are infective in origin, even though a pathogen may fail to be detected by stool culture.

The most commonly quoted causative agent is enterotoxigenic E Coli (ETEC). This bacteria produces a toxin similar to that of Vibriocholerae, which disrupts sodium pump function in the bowel, resulting in a watery diarrhoea. The incidence of ETEC as the causative agent of TD varies in different parts of the world. It is highest in Latin America with a mean isolation rate of around 40 per cent, in comparison with 30 per cent in parts of Africa and just 16 per cent in Asia. However, those figures are mean values and there are large variations: for example, in Latin America studies show results of between 17 and 70 per cent.

The causative agent may also be influenced by the season. For instance, in Mexico, ETEC is more commonly implicated in the summer and rainy season but Campylobacter is more common in the winter.

A large range of organisms other than ETEC are known to be responsible for TD. Table 2 gives a crude indication of the risk of acquiring pathogens in different regions. Unfortunately, it is not always possible to ascertain the likely causative agents from clinical symptoms alone. For instance, although Shigella is more commonly associated with fever and blood in the stools, such symptoms can occasionally also be observed for ETEC. However, in general, ETEC is associated with a milder disease. Some of the important strains of organisms listed in Table 2 are described below.

**Bacteria**

Campylobacter has been implicated as a relatively common cause of TD in some areas of the world, in particular Thailand. It has been observed to be responsible for a higher proportion of cases of TD than ETEC in the winter months in both Mexico and Morocco.

Campylobacter tends to cause a longer lasting disease than ETEC and may be preceded by fever. Blood and mucus may be present in the stools, and symptoms of malaise and colic continue after the diarrhoea has resolved.

Aeromonas spp is a potential cause of TD, particularly in Asia. It has not been widely studied but can be associated with a persistent diarrhoea.

Food poisoning by Salmonella spp is a possibility in situations where hygiene is poor. It is therefore not surprising that this is a regular cause of TD, often associated with reported outbreaks in hotels. The symptoms can vary greatly in severity and duration, lasting from just one or two days to up to three weeks. Septicaemia and systemic invasion are potential complications.

Shigella is responsible for the condition often described as bacillary dysentery. The diarrhoea is usually of abrupt onset, accompanied by fever and vomiting. Mucus and blood may be observed in the stools and other enteric symptoms can be present. Symptoms may persist for two or three weeks.

**Parasites**

These organisms may be more of a concern to longer term travellers. In total, around 5 per cent of cases of TD are caused by parasites.

Entamoeba histolytica is an unlikely cause of TD, resulting in amoebic dysentery. It has a slower onset than bacillary dysentery and there is a more formed stool, which has an offensive smell and contains blood and mucus. Fever will be absent. Although symptoms may resolve after a few weeks, there is danger of relapse and complications such as perforation and haemorrhage of the gastrointestinal tract. In addition, organisms can travel from the gastrointestinal tract, resulting in abscess formation in the lung, liver or brain.

Giardia infection has been found more commonly among travellers to Nepal and some parts of Russia and Eastern Europe. It is a potential risk to trekkers and campers using a natural water supply. Recently, it has been identified as a cause of “Bushwalkers diarrhoea” in Tasmania. Infection is usually waterborne and it is believed that wild animals may be an important vector. As the organism can interfere with food absorption, a frothy offensive smelling diarrhoea may be produced, accompanied by a great deal of flatulence. The problem can persist for many weeks or months.

Cryptosporidium and Cyclospora are not common causes of TD. Cyclospora is a reported cause in Nepal and Cryptosporidium has caused problems in contamination of water supplies in recent years in the UK. Diarrhoea caused by these organisms can be persistent and quite severe.

**Others**

Viral disease may account for around 10 per cent of all TD, but cholera is extremely rare in travellers. However, news of cholera outbreaks is frequently enough to deter tourists from visiting particular destinations. This is largely unfounded as the massive fluid loss and sudden dehydration associated with classic cholera is now rarely seen in healthy individuals. It is a far more serious problem in a malnourished population, where it is more likely to claim the lives of the young or elderly. In the healthy traveller, cholera can have quite a mild course, with some sufferers perhaps remaining undiagnosed in the belief that they have had no more than a bout of TD.

**Prophylaxis**

As the majority of cases of TD respond to an antimicrobial, it might seem reasonable to use such agents prophylactically. The use of Streptotriad by the UK team during the 1960 Olympics in Rome won general admiration for the achievement of fewest cases of diarrhoea.

Agents that can be used for prophylaxis

Antimicrobials have been employed in the prophylaxis of TD for many years. Until the 1980s, sulphonamides were generally used. Owing to the development of world wide resistance to these agents, the success rate of these agents can only offer 60 to 70 per cent protection. In addition, the adverse drug reactions of the sulphonamides would make them largely redundant for this indication.

The quinolones are now considered the first choice, providing over 90 per cent protection. Some trials have shown lactobacillus acidophilus to be ineffective in the prevention of TD. One preparation containing lactobacillus casei GG has been examined in a few small scale trials and appears to provide a maximum 40 per cent protection. At this low level of protection it is important to address the potential for a false sense of security leading to complacency to dietary advice, which would still need to be followed.

The good side effect profile of lactobacillus may be an attraction to some travellers who are willing to pay for a product which may only provide partial protection. For the future, genetically modified lactobacillus may hold a potential for use as probiotics in the prevention of TD.

In the US, bismuth salicylate (Pepto Bismol) has been recommended for the pro-

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**Table 2: Organisms other than E Coli responsible for travellers’ diarrhoea**

<table>
<thead>
<tr>
<th>Organism</th>
<th>Asia</th>
<th>Latin America</th>
<th>Africa</th>
</tr>
</thead>
<tbody>
<tr>
<td>Campylobacter jejuni</td>
<td>+++</td>
<td>+</td>
<td>++</td>
</tr>
<tr>
<td>Salmonella spp</td>
<td>++</td>
<td>++</td>
<td>+</td>
</tr>
<tr>
<td>Shigella spp</td>
<td>+++</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Aeromonas spp</td>
<td>+++</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Rotavirus</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Entamoeba histolytica</td>
<td>++</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Giardia lambia</td>
<td>++</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Cryptosporidium</td>
<td>+</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Cyclospora</td>
<td>+</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Vibrio cholera (non01)</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

The quantity of reported isolates in studies per cent: rarely reported (≤5 per cent), 5–10 per cent, 10–30 per cent, >30 per cent
Continuing Education

Phylaxis of TD. It must be taken four times a day to provide and 60 per cent protection. However, it would not be practical to carry sufficient liquid to cover a two-week trip and tablets are not available in the UK. In any case, in the UK, TD is not a licensed indication for Pepto Bismol.

In the near future, a vaccine against ETEC should be available, to offer at least partial protection against TD. Similarly, a new oral cholera vaccine seems to offer some cross protection against ETEC.

Indications Perhaps the strongest argument against chemoprophylaxis is that TD is invariably a self-limiting condition, which would hardly warrant the continuous use of expensive antimicrobial agents. A consensus development conference in the US ruled that prophylaxis against TD is not warrant-ed. Generally, the arguments against such use are:

- Adverse reactions — there is the added complication of developing a reaction without access to medical help. Also, there may be overgrowth of other organisms such as Candida and Clostridia.
- Cost
- Complacency — ciprofloxacin would not prevent against parasites or viruses and therefore food and water hygiene must still be observed
- Resistance — the use of these agents by travellers would probably have little impact on the overall level of resistance in the area visited if they were already being used by the local population. However, there is still the potential for travellers to develop and harbour ciprofloxacin-resistant organisms
- Treatment is more effective — as antimicrobials can potentially relieve symptoms within 24 hours, it is more realistic to use treatment courses if indicated

There may be a few indications for prophylaxis in high risk individuals, eg, those who are immunosuppressed, achlorhydric (as a result of taking PPIs) or who have IBD. The importance of a trip could be a consideration, although, as discussed below, if antimicrobials are to be used at all, self treatment with short courses is the preferred option.

Management of Travellers' diarrheoa

There are three approaches to the management of TD — antimotility agents, oral rehydration and antimicrobial therapy.

Antimotility agents The most useful agent in this class is loperamide, because of its specific effects on the gastrointestinal tract. Others, such as codeine and diphenoxylate/atropine, are no more effective than loperamide and carry a far higher risk of systemic side effects. Loperamide decreases large bowel motility and therefore, to some extent, promotes an increased reabsorption of fluid. However, it is always prudent to maintain fluid intake when using loperamide.

For mild to moderate TD, loperamide will improve symptoms such as faecal frequency and cramping, allowing the traveller some freedom to carry on with the planned agenda. It should not be used in children.

There are a few perceived drawbacks to using loperamide, which need to be addressed. Taking it at the maximum dosage for more than a day or so could well lead to a bout of constipation as the TD resolves. Indeed, because of changes in diet and inadequate fluid intake, constipation can be as much a problem for travellers as TD. Another theoretical drawback is that antimotility agents have been shown to prolong infection caused by Shigella, presumably because of retention of the organism. Recently manufacturers of loperamide have claimed that the product is perhapsunder-utilised, with an overemphasis being placed on rehydration alone.

In the case of TD, where the inconvenience of bouts of diarrhoea is an important consideration, loperamide does have a useful role.

An approach to using loperamide in TD might be to use it for mild to moderate TD where there is no fever or blood in the stools. It should preferably be reserved for use in situations where TD may affect travel plans and for not longer than 24 hours. It should be used in addition to maintaining good hydration.

Oral rehydration The use of oral rehydration solutions in the management of diarrhoeal illness has saved millions of lives in developing countries. The balance of salt and glucose (or other carbohydrate) allows the most efficient absorption of fluid. The addition of potassium and bicarbonate also helps to correct electrolyte imbalance. The use of oral rehydration solutions in diarrhoeal illness in the very young and elderly is well established. However, in otherwise healthy adults it has been suggested that they are unnecessary when managing TD, which is not usually a dehydrating disease in this age group. Simply maintaining fluid intake using sugary drinks and eating, for instance, salt crackers, should suffice in healthy adults.

A case may still be made for some travellers to carry electrolyte sachets for emergency use as the more intrepid traveller may not have suitable soft drinks or foods readily to hand. It may also be necessary for such travellers to make up their own solution using salt and sugar; a suitable formula is half a teaspoon of salt and eight level teaspoons of sugar in one litre of clean water. Honey could be substituted if sugar is not available.

Children and the elderly should use commercial rehydration sachets (eg, Dioralyte, Rehidrat). Although these are readily available overseas, they usually contain the higher sodium content World Health Organisation (WHO) formulation, which can be less palatable.

Maintaining fluid intake can also help to improve general symptoms and well-being, although faecal fluid output can actually increase with aggressive rehydration therapy.

Whether or not electrolyte solutions offer any benefit to adults over simply increasing fluid intake has not been studied.

More recently, a starch based product (Dioralyte Relief) has been marketed and claimed to be more efficient than glucose formulations. An additional advantage is that the starch based product would form a more solid stool. Whether this product offers any specific advantages to sufferers of TD needs further study.

Antimicrobial therapy Self treatment of TD with antimicrobials can be very successful. Whether or not travellers should be supplied with such agents is a contentious issue.

At one time, co-trimoxazole was considered the antimicrobial of choice for the empirical treatment of TD. This has now been replaced by the quinolones which have been shown in a number of trials to be highly effective. When a quinolone is supplied to travellers for self treatment at the first sign of diarrhoea, both severity and duration of the illness are reduced. The regimens employed vary. It has been demonstrated that a single 500mg dose of ciprofloxacin

<table>
<thead>
<tr>
<th>Organism</th>
<th>Antimicrobial of choice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Campylobacter jejuni</td>
<td>Macrolide</td>
</tr>
<tr>
<td>Salmonella spp</td>
<td>Quinolone</td>
</tr>
<tr>
<td>Shigella spp</td>
<td>Quinolone</td>
</tr>
<tr>
<td>Aeromonas spp</td>
<td>Quinolone</td>
</tr>
<tr>
<td>Entamoeba histolytica</td>
<td>Metronidazole</td>
</tr>
<tr>
<td>Giardia lamblia</td>
<td>Metronidazole</td>
</tr>
<tr>
<td>Cyclospora</td>
<td>Co-trimoxazole</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Group</th>
<th>Severity of diarrhoea</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mild</td>
</tr>
<tr>
<td>Travellers not carrying antimicrobials</td>
<td>Fluid replacement (loperamide if required)</td>
</tr>
<tr>
<td>Travellers carrying an antibiotic</td>
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</tr>
<tr>
<td></td>
<td>Loperamide and quinolone (single dose/ short course)</td>
</tr>
<tr>
<td></td>
<td>Quinolone 3-5 days and metronidazole if longer than 14 days</td>
</tr>
</tbody>
</table>

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</tr>
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<tbody>
<tr>
<td></td>
<td>Moderate</td>
</tr>
<tr>
<td>Travellers not carrying antimicrobials</td>
<td>Fluid replacement and a short course of loperamide</td>
</tr>
<tr>
<td>Travellers carrying an antibiotic</td>
<td>Loperamide and quinolone (single dose/ short course)</td>
</tr>
</tbody>
</table>

Table 3: Antimicrobial treatment of travellers' diarrhoea

Table 4: Management of travellers' diarrhoea

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will reduce the mean duration of TD to under 24 hours. If symptoms should persist on the second day, after single dose therapy, a three to five day course (500mg twice a day) might be advisable.

There are some important considerations when supplying such therapy to travellers. As has been mentioned, TD is not a licensed indication for ciprofloxacin. Also, the regimens usually employed are not those covered by the product licence for infective diarrhoea, the usual length of therapy being five to seven days.

As shown in Table 3, ciprofloxacin is effective against many, but not all, of the responsible pathogens. Campylobacter may respond to a quinolone, but treatment failures and recurrence have been reported and erythromycin is the usual drug of choice. Cyclospora is only sensitive to co-trimoxazole and Cryptosporidium responds to no available agents. For Giardia or amoebic dysentery, metronidazole or tinidazole is required.

Therapy should certainly be avoided for the first bout of diarrhoea in long term travellers in order to allow some immunity to develop.

General approach to management of travellers’ diarrhoea

There is no internationally accepted consensus on the place of antimicrobials in treating TD. If an antimicrobial is to be used, then travellers may be supplied with a course of ciprofloxacin and instructed to use them as described in the bottom half of Table 4. In the US, bismuth salicylate would also be considered as an option for mild TD, as around 60 per cent of cases may improve with such treatment. This approach is generally not followed in the UK, where the regimen described in the top half of Table 4 would be considered more appropriate for most travellers. The instructions given are therefore to seek medical attention if there is blood in the stools, fever is present and/or the diarrhoea persists for more than five days. This assumes that such help is available and that the appropriate antimicrobials can be easily obtained. For the minority of travellers on longer trips to developing countries, this may not be the case and, in my opinion, antimicrobials should be carried; both ciprofloxacin and metronidazole may be needed.

The advice should always be to use such medication under medical supervision. In comparatively rare circumstances, ie, when travelling to very remote regions, individuals might need to be instructed on self medication, particularly if a more severe or persistent diarrhoea develops.

For young children, the recommended approach to treating acute diarrhoea of any cause should be followed, with an emphasis on oral rehydration.

Dietary restriction is not necessary in adults or children, but given a tendency for certain foods to increase gastrointestinal motility, eating more bland foods (eg, bread, potatoes, bananas) may help with symptoms.

A more difficult question relates to the demands of a businessman or politician on an important trip, where time is critical. There is evidence that combining a single 500mg dose of ciprofloxacin with loperamide after the first loose stool will resolve TD more quickly, particularly if caused by ETEC. Although ciprofloxacin is not licensed for this regimen, there may occasionally be circumstances when it is prescribed. The argument

Summary of main points

● Travellers’ diarrhoea usually has an infective origin; ETEC is the most common organism but a number of others may be responsible
● Most cases of TD will not last longer than three days and it is therefore generally considered a self limiting condition
● Prophylaxis with antimicrobials is usually not recommended
● Maintaining fluid intake and the occasional use of loperamide are the mainstays of treatment for adults
● Self treatment with antimicrobials is not commonly advocated and self treatment is not a licensed indication for the quinolones
● A case could be made for some long term travellers or those on very important trips to carry antimicrobial self treatment, ideally for use under medical supervision

Continuing Education
for antimicrobial treatment can be justified on pharmacoeconomic terms, where cost of therapy would be less than the cost of the time lost on the trip. It is also of interest to note that it may well be the treatment of choice for those in the medical profession; 25 per cent of microbiologists attending a conference overseas were found to be carrying antimicrobials for TD.

**PERSISTENT DIARRHOEA**

In about 3 per cent of cases, symptoms persist for longer than 14 days and inevitably the returning traveller will seek medical help. Such cases should of course always be referred when presented at a pharmacy.

There are a number of reasons for persistent diarrhoea; giardiasis is one of the most important, although the other parasites listed in Table 2 may also be responsible. Bacterial infections can also cause a persistent diarrhoea, especially Shigella and Aeromonas spp. Occasionally, *E. coli*, particularly the enteropathogenic forms, can cause a longer lasting diarrhoea.

The aetiology is somewhat complicated by non-infectious causes of persistent diarrhoea. Repeated GIT infection can lead to disruption of gut function, contributing to malabsorption syndromes such as tropical sprue (a severe malabsorption syndrome accompanied by diarrhoea). Another potential scenario is a bout of diarrhoea causing disruption of gut flora which then takes some time to resolve. It is possible that this sort of post-diarrhoeal syndrome is actually made worse by repeated courses of antibiotics. There have also been cases where TD has unmasked a latent IBD.

On presentation of the patient to a GP, a stool sample would usually be taken. The presence of an organism in the stool does not necessarily mean that it is the responsible organism, eg, Entamoeba cysts may be present even in the absence of clinical dysentery. Likewise, despite a negative stool sample, an infective organism may still be responsible.

Empirical treatment may therefore be indicated if negative results are obtained and, in some circumstances, the physician will wish to commence such treatment while awaiting results. Suitable empirical treatment would begin with a full five day course of ciprofloxacin. If this should fail, then metronidazole or tinidazole could be used to deal with Giardia. Further investigations should be carried out for other causes of persistent diarrhoea; in particular Entamoeba infection should be excluded.

If a positive culture is obtained then the identified organism should guide therapy as indicated in Table 3.

Entamoeba infection can be hard to eradicate, resulting in recurrence of symptoms, so a course of the amoebicide diloxanide furoate should be given, following treatment with metronidazole.

**REFERENCES**