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Traveller's Diarrhoea – Prevention and Treatment in the Mountains

Intended for Doctors, Interested Non-Medical Persons
and Trekking or Expedition Operators

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Introduction

Traveller's diarrhoea is one of the most important medical problems for trekkers and expedition mountaineering. Although the detail of the data are still in discussion there is no question that the loss of body water and electrolytes impairs the physical and mental capacity significantly and dehydration increases the risk of Acute Mountain Sickness (AMS), thrombosis / thromboembolism, frostbite and other altitude- or cold related health risks. Therefore it is a "must" for any mountaineer to avoid traveller's diarrhoea as much as possible and to treat symptoms consequently. In contrast to the "normal" travellers diarrhoea experienced at sea level, the consequences of significant diarrhoea can cause an additional increased risk in a high altitude environment, therefore treatment should be started earlier and more "aggressively" than would be the case for "normal" traveller's visiting resorts or national parks at low altitude.

For water hygiene / disinfection see UIAA MedCom Recommendation No. 6!

Germ to induce traveller's diarrhoea

There are many species which can induce diarrhoea and these species fall into at least four different categories: viruses, bacteria, protozoa, and helminths. Therefore there is no "one-and-only prophylaxis" for traveller's diarrhoea. While there are vaccinations against some of them (e.g. hepatitis A, polio, salmonella typhi), for most of them different techniques of personal and group hygiene present the only chance to minimize the risk. But even in the best setting >75% of the visitors make significant mistakes in (food) hygiene.

Risk determining factors

Several factors are important for the individual risk: age <30y., the region visited (e.g. traveller's diarrhoea in the Alps ca. 4%, in Nepal up to 80%), rainy season, duration of sojourn, type of travelling ("adventure travel", mountaineering), reduced gastric acid (H₂-Blockers, acid absorbing drugs etc.), reduced immunocompetence, diabetes or previous stay in a developing country for >6 months. But it should be mentioned here that the individual risk for traveller's diarrhoea is highly variable. Some observations indicate, that a permanent stay in a developing country for >6 months decreases the chance of getting diarrhoea, possibly because the bowel gets "conditioned".

Persons who have one or more of these risk factors should get individual advice by a physician experienced in travel medicine.

Special attention and education should be given to any person – traveller or local staff – who handles food. Hygiene of hands (washing before food handling!), cleaning surfaces or equipment (dishes, spoons, knives...) which get in contact with food is essential. It is a good idea to separate any meat products away from vegetables, fruits, or eggs – Keep separate any food/s which may be contaminated with pathologic microorganisms.

Risk checklist for travellers

1. Food

Safe	Relatively safe	Unsafe or less Safe
Hot, well done (barbequed, cooked, or roasted)	Dried products	Salad
Industrial processed and packed	Hyperosmolar food (e.g. jam, syrup)	Sauces and "salsas"
Cooked vegetables and fruits which need to be peeled	Washed vegetables or fruits	Uncooked seafood or undercooked or cold meat (e.g. salami), unpeeled fruits, non-pasteurized milk products, cold desserts

2. Beverages

Safe	Relatively safe	Unsafe or less safe
Carbonated soft drinks	Fresh citrus juice	Water from springs or wells (not disinfected)
Industrial produced carbonated mineral water	Bottled water (locally produced)	Tap water
Boiled water, coffee, or tea	Ice, industrial processed and packed	Ice-cubes or crushed ice for drinks
Disinfected water (see UIAA MedCom Standard No. 6)		Non-pasteurized or unsterilized milk?

3. Setting

Safe	Relatively safe	Unsafe or less safe
Well-known restaurants of international standard	Private homes, restaurants recommended as "high class" in international guidebooks	Street vendors, public markets, restaurants recommended in guidebooks as "cheap"

Prevention of traveller's diarrhoea

- Maintain strict hygiene with respect to water management and managing any human waste (see also UIAA MedCom Recommendation No. 6)
- Maintain strict personal hygiene
 - Especially washing hands before handling any kind of food, water or beverage
- Drink only beverages from safe water sources (cooked or treated for disinfection) or safe industrial beverages
 - - dental hygiene is also important!
- No non-cooked milk or milk products
- Meat must be well done
- No salad
- Peeled fruits only
 - Peeled by yourself, otherwise the problem may not be solved
 - Be careful: Some fruits are dangerous, even if they are peeled! Melons, for example, are sold by weight. If you inject water at the stipe or at the dried rest of the flower, the fruit will be heavier and therefore more expensive, but if the injected water was unsafe, the water and sugar containing fruit is an optimal incubator for bacteria, especially if the fruit is stored in the sun!
- No cold sauces or products made from fresh eggs without cooking
- Clean dishes, cutlery, pans and pots always with safe water
 - At least the final cleaning. If safe water is a problem, unsafe water can be used for basic cleaning.
 - The member who is ill with diarrhoea may not be able to climb. Do not ask him/her to prepare food or work in the kitchen so that food is ready on return for those who continue to climb!

Note! The slogan “peel it, boil it, cook it, or forget it” does not guarantee safe food! Because some germs produce toxins, the quality of the food which will be cooked is very important, independent from the kind of processing. Or, as an African physician tells the villagers: “If you cook shit, you’ll eat cooked shit!” (citation from a course for public health). **Ensure the quality of any food eaten (processed or not) is of a good quality.** Or remember a five star hotel can have a zero start kitchen if there are no hand washing facilities for the staff. **Ensure that any person who is involved in the handling or preparation of food regularly washes his/her hands before touching food or kitchen equipment and before eating!** There will be many situations where safe water is sparse. Here hygienic towels with disinfectant may be used for hands, cutlery, and dishes (after a rough cleaning with unsafe water).

Symptoms of traveller's diarrhoea

- Onset: in most cases occurs on the 3rd day after arrival (incubation period 6 hrs to some days)
- Duration of symptoms (untreated): 3 -4 days
 - 10% >1 week
 - 1% chronic diarrhoea (>3 weeks)
- Course of the disease
 - Gastroenteritis / enterocolitis (most cases)
 - Watery, in some cases mucous diarrhoea
 - Diffuse abdominal pain
 - Vomiting
 - Body temperature up to 38.5°C
 - **Note:** Burping with disgusting taste, stinking flatulence, abdominal pain, bloating and nausea may indicate **Giardia infection** (relatively common especially in India and Nepal). Therapeutic options [1]: metronidazole 750-1000mg/d for 5 days (3x 250mg) or tinidazole 2g single dose for adults. For children ≥6y. 15-30 mg/kg/day in 2-3 dosages for 7 days). There is no single drug available which is able to treat all patients with Giardia effectively. If symptoms persist try another one.
 - Dysentery (about 10% of patients)
 - Purulent or ensanguined stool
 - Tenesmen
 - Fever up to >40°C
 - Most cases are self-limiting!

Therapy of traveller's diarrhoea

- Rehydration!
 - Start early to limit the consequences!
 - About ¼ l per defecation (= 2 glasses) for adults (children: 1 glass)
 - Except in case of minimal symptoms use electrolytes for rehydration (Oral Rehydration Solution (ORS), see table 1). **Note:** some commercially available products are for adults only!
- Moderate symptoms
 - Rehydration plus
 - Loperamide
 - 1st dosage 4 mg (2 capsules)
 - Then 1 capsule for every liquid defecation (not more than 12 mg/day or longer than for 48 hours)
 - For patients >8 years only (special dosage for 2-8 years)
- Severe symptoms
 - Rehydration plus

- Loperamide (see above) plus chinolon (e.g. ofloxacin, 400 mg/d, or ciprofloxacin, 500 mg/d)
- **Note:** *Camphylobacter* is a common cause of traveller's diarrhoea in Nepal. Here (and in other regions of south-east Asia) Azithromycin is recommended (500 mg 1x/d for 3 days).
- Contact a physician in case of the following situations:
 - Fever >39°C
 - Vomiting, which doesn't stop for >2 d
 - Dysentery (see above)
 - Symptoms >5 days
 - Pregnancy
 - Small child (<6-8 y, or so)
 - Elderly person (>65 y, or so)
- No further ascent until the symptoms have been cured and the patient is completely rehydrated!

Ingredient	WHO recommendation	Home made mixture
Table salt	3.5 gr.	1 teaspoon of table salt
Sodium bicarbonate	2.5 gr.	½ teaspoon of baking powder
Potassium chloride	1.5 gr.	Eat 1 banana
Glucose	20.0 gr.	4 teaspoons
or normal sugar	40.0 gr.	8 teaspoons

Table 1: Ingredients to prepare 1 litre of oral rehydration solution (ORS) using sterilised water. Dosage (after each diarrhoeic defecation): ½ teapot for preschool children (2-5 yrs.), child (6-12yrs.) 1 teapot, adolescents and adults 2 teapots

References

1. Adachi, J.A., H.D. Backer, and H.L. DuPont, *Infectious diarrhea from wilderness and foreign travel*, in *Wilderness Medicine*, P.S. Auerbach, Editor. 2007, Mosby Inc.: St. Louis (Missouri, USA). p. 1418-1444.

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History of this recommendation paper

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