Travelers' Diarrhea (TD)

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Have you ever held a condescending view of the adventurous eater who courts gastronomic disaster, only to be laid low yourself despite a religious adherence to “boil it, cook it, peel it, or forget it”?

Or are you the adventurous eater?

The old adage of boil, cook, peel, or forget it has persisted as the conventional wisdom since 1985 when the National Institutes for of Health issued the statement that “meticulous attention to food and beverage preparation can decrease the likelihood of developing Travelers’ Diarrhea (TD).” However, six of the seven studies that the NIH had available to them at that time, showed no correlation between the recommended food and water precautions and the likelihood of developing TD, so it is not surprising that the overall risk of acquiring TD has not decreased in 50 years. (Shlim, 2005).

TD afflicts 30%–70% of travelers to low and middle-income countries. It has stopped armies in their tracks, changed the outcome of Olympic events and made many a long bus ride unpleasantly memorable.

The definition of TD is a little soft. The wide range of percentages cited above is in part the result of differing definitions across studies. Most definitions describe an acute onset of 3 or more unformed stools in a 24-hour period for a traveler. Some definitions additionally stipulate at least one other GI symptom such as pain, nausea, cramping, fever, or blood in the stool. In general, the term TD is more descriptive than diagnostic. If it resolves within the usual 3–5 days, it remains TD. If symptoms last longer or cause more notable harm, then this condition starts to acquire additional labels based on the causative organism (shigella, typhoid, giardia), acuity (dysentery) and timeframe (persistent, chronic).

Causes

Understanding the causes and processes of TD can help inform our strategies for prevention and treatment as well as differentiate between an uncomfortable inconvenience and an emergency.

A number of studies explored the causes of TD in the 1970’s, many involving US study abroad students in Mexico. Some of the first evidence about causation came indirectly from studies on the effectiveness of antibacterial drugs in preventing TD. While some TD may be attributed to jet lag, fatigue, travel stress, toxins, and alcohol consumption, most TD is infectious, most often bacterial (60–80%), followed by viruses (10–20%) and parasites (5–10%). Food was determined to be the primary vehicle and enterotoxigenic E. coli (ETEC) was the most frequently identified bacteria.

Our immune system deals successfully with most ingested bacteria, until we hit a tipping point that results in TD. That’s why a group can share the same meal and some will develop TD symptoms while others do not.

Prevention Strategy

So what are the most effective strategies for avoiding TD? Minimizing pathogen intake is the single most important goal. Studies suggest that decisions about where to eat are more important than personal food
precautions in determining risk for TD. In low and middle-income countries, food contamination is common due to underdeveloped food regulation, health infrastructure, and torte law.

Food may become contaminated at the growing site if human waste is used for fertilizer. It might become contaminated when washed with untreated water. If stored improperly it may come into contact with other contaminated food, rodents, and insects. Your food preparer may not think twice about slicing your vegetables on a surface that recently hosted a raw chicken. And some things that may seem intuitive aren’t necessarily correct. While meat frequently is identified as a source of ETEC, avoiding meat isn’t always the safest choice depending upon where you are. Nor is the food appearing at your table piping hot food any guarantee of safety. As a Kenyan once explained to me at an upscale roadside restaurant, the hot dishes on the buffet were time bombs. They may or may not have been first prepared today. If they were saved from previous days, they were covered but not refrigerated. Bacteria grow as the temperature decreases and the bacteria generate toxins. When the dish is reheated again, the bacteria count goes down but the heat stable toxins remain. Furthermore, he pointed out that in restaurants where you can see the meat prior to cooking (a common practice in Kenya), you can see if it is red and fresh and if it has been exposed to flies.

Most often preparing your own food isn’t an option while traveling, and eating local fare is part of the pleasure of travel. However, even if you purchased, stored and prepared your own food while abroad, you will still need to make some adjustments. I’ve seen entire student groups down for the count with non-typhoidal salmonella after baking cookies. They ate the raw batter made with eggs that had never been refrigerated. So while baked cookies were safe, the batter was not.

Even though food is the primary source for agents that cause TD, you still need to pay attention to water. I have vivid recollections of the consequences of guzzling water at the Sri Lankan parliament after a big night out thirty years ago. Water may contain bacteria, viruses and parasites. Carbonated drinks are safe owing to their acidity. Non-carbonated bottled water may or may not be safe, depending upon where it comes from—keep in mind that plastic bottles also contribute to pollution in countries where there is no recycling capacity. And you need to be aware of all the variations on bottled water scams from resealing caps on tap-filled water bottles to the old street scam of the seller seeming to remove a sealed cap as part of their service. Bringing water to a boil kills all pathogens and there are various personal filtering, chemical and UV treatment options available. Is ice in your alcoholic beverage OK? You’d probably need to let it sit about 24 hours for it to be safe. Tooth-brushing with tap water? Probably a reasonable risk in that you aren’t likely to get a tipping point dose of anything, but that’s not what I tell people (students) for whom I am responsible. I recommend no ice in drinks and brushing their teeth with bottled water.

While everyone agrees that minimizing the intake of pathogens is a good idea, we cross into more controversial territory when considering prevention measures beyond Pepto–Bismol, such as non-standard vaccines or medications. Let’s review these options.

First, Pepto-Bismol (Bismuth subsalicylate) may cut TD risk in half if you chew eight tablets a day. It will likely turn your tongue and stool black and it will mean you need to limit aspirin use to avoid overdose, but it is relatively safe and inexpensive.

Second, there are a number of vaccines under development for various causes of TD including shigella, salmonella, norovirus, rotovirus, and amoebas. However, the vaccine that generates the most discussion is Dukoral which is licensed in over 50 countries for protection against cholera, although not in the U.S. as of yet.
Many of its advocates believe that it also works well against ETEC, but conclusive evidence is still being sought.

Third, probiotics are another option that in theory should work. In practice, results are variable. However, for those folks who feel better taking probiotics to maximize their normal gut bacteria, they are safe to use and relatively inexpensive.

Fourth, antibiotics have been shown to be effective as a preventative measure. Now you might not want to take antibiotics for a lengthy period of time due to side effects, but people routinely take doxycycline for months as a preventative measure against malaria. The primary reason not to use them may be less about personal health and more about community health. Irresponsible use of antibiotics permits the development of drug resistance, thus this becomes an ethical question. The CDC and WHO do not recommend antibiotics as chemoprophylaxis except perhaps for pre-existing conditions, such as immuno-compromised persons or those who cannot tolerate dehydration. However, there are other perspectives. At a recent conference of the International Society of Travel Medicine, a speaker summed up the prevailing European approach that antibiotics are not recommended for prevention because overuse contributes to existing antibiotics no longer being effective for local children. It is worth noting that doxycycline and Bactrim/Septra (Trimethoprim/sulfamethoxazole) used to work quite well for TD prevention and for treatment. However, neither is recommended anymore due to bacterial resistance. Another viewpoint comes from Charles Ericsson, an American and co-author of Travelers’ Diarrhea. Ericsson has stated that he doesn’t think that travelers’ use of antibiotics has any significant impact on local bacteria resistance, and he presents it to his clients as a viable option if they have a strong need to avoid TD.

Treatment Strategy

So... you are traveling and you have that uh-oh moment, sometimes accompanied by a wave of nausea and a sudden cold sweat. Suddenly, you have diarrhea.

Perhaps you start thinking about probable causes. You review your recent eating, drinking, and activities, and at the same time start reviewing your upcoming schedule. Do you have any long bus rides or critical presentations scheduled for the next day or two?

TD usually self-resolves in 3–5 days without any treatment. Significant dehydration is generally not an issue for healthy adults. When your symptoms start however, you don’t know if this is a typical case of TD or not. What if you have TD and your itinerary requires travel to a remote area – how should you manage this situation? When should you see a doctor? When is it an emergency? What about symptomatic treatment? When do you need Oral Rehydration Salts (ORS)? What about antibiotics? As with most “what if” questions, the answer is in part that “it depends”.

When to see a doctor?

Five or fewer loose stools in a day won’t be that alarming to most of us. We might eat a couple bananas or some cheese and keep the water bottle nearby, but other than a little discomfort, we’re fine. There appears to be no benefit to a restricted diet for TD being treated with antibiotics (Huang et al, 2004). However, diarrhea plus a low-grade fever is of greater concern. As the number of symptoms increases, the likelihood that intervention will be needed increases as well. A high fever, blood in the stool, abdominal tenderness, or
diarrhea lasting more than a few days are all factors that would indicate that it’s time to see a health professional. The greater the number of personal or situational risk factors, the greater the urgency.

When is it an emergency?

A useful way to think about the term “emergency” in a health context is that it is serious enough to incur additional risk, both for the patient and for other caregivers. This includes traveling at night in places where that’s dangerous, or calling for air evacuation. It is usually not an emergency if the patient is awake, alert, paying attention to their surroundings, eating, drinking, and maintaining bowel and bladder functions. The degree to which these things are not happening is the degree to which it may be an emergency. Short of an emergency, suspicion that it could turn into an emergency in the very near future would suggest that incurring significant inconvenience if necessary to evacuate the patient would be prudent.

Should your student travel to a more remote area?

Your itinerary has the group heading away from access to health services. This would be a good time to get a health professional’s opinion either by calling your advisory clinician back home or finding one in country. What is the probability that this isn’t typical TD? What resources do you carry with you and what resources are there to be found where you are going? What’s the worst case scenario and is the student, the program, and the student’s family willing to accept the projected level of risk?

Symptomatic Treatment

Pepto-Bismol has value for alleviating TD symptoms, but the most effective symptomatic treatments are anti-motility drugs such as loperamide (Imodium). Intuitively it seems that if our bodies are trying to jettison whatever the infectious agent is so that it can restore equilibrium, then inhibiting that process would be a bad idea. There is little evidence to support this belief in adults. Nevertheless, the WHO does not recommend anti-motility medications, and they shouldn’t be used if there is blood in the stool or a fever. For simple TD, anti-motility drugs are effective and safe in reducing symptoms. If you have a flexible schedule and are logistically well situated, it may be prudent to forego loperamide. But if you’re facing a ten-hour bus ride, the maximum recommended dose may save you considerable misery.

Oral Rehydration Salts

Rehydration therapy, including oral rehydration salts (ORS), is critical for the elderly, children, immuno-compromised persons and persons with severely dehydrating conditions such as cholera. A number of methods are available to administer fluids, and it is critical to achieve a balance of electrolytes. Since most TD does not engender significant dehydration, ORS are not usually necessary. ORS can encourage students to drink more fluids if they associate brightly colored drinks with sweetness. However, a discerning palate would find the taste of most ORS solutions as something akin to sweat.

Antibiotics

Antibiotics are the only “cure” for most TD, but they generally aren’t needed because most TD is self-limited. The concern for drug resistance and the creation of a ‘super-bug’ is raised whether antibiotics are being used for prevention or treatment. Studies have demonstrated that antibiotics, especially when taken with anti-motility
drugs, shorten the duration of travelers’ diarrhea. That is appealing when afflicted with TD, and it becomes even more appealing when you have a busy schedule or a long bus ride ahead of you. Additionally there are studies suggesting that some long-term GI disorders can originate from an initial case of TD which would change the ethical equation from risking antibiotic resistance in order to minimize discomfort to risking resistance in order to prevent serious disease.

Conclusion

TD is by far the most common affliction of travelers. The available strategies for prevention and management go well beyond “boil it, cook it, peel it, or forget it” and the now-outdated reliance on a BRAT diet (bananas, rice, applesauce and toast). Understanding the ways in which TD is acquired and the various options for prevention and treatment will allow informed travelers to avoid being part of the 30–80% of travelers who develop diarrhea. The single most important step is to reduce pathogen intake, primarily bacteria in food, through the judicious selection of eating establishments. More research is needed to inform the various approaches to TD.