| TABLE 103-1 PROTOZOAL INFECTIONS | | | | | |
|--|--------------------------------|-------------------------------|--|--|---|
| PROTOZOAN | SETTING | VECTORS | DIAGNOSIS | SPECIAL CONSIDERATIONS | TREATMENT |
| ENDEMIC IN THE UNITED STATES | | | | | |
| Babesia microti | New England | Ixodid ticks, transfusions | Thick or thin blood smear | Severe disease in asplenic persons | Quinine and clindamycin |
| Giardia lamblia | Mountain states | Humans, small mammals | Microscopic examination of stool or duodenal fluid | Common in homosexual men, travelers, children in daycare centers | Quinacrine, nitazoxanide, or metronidazole |
| Toxoplasma gondii | Ubiquitous | Domestic cats, raw meat | Clinical; serologic confirmation | Pregnant women, immunosuppressed host (AIDS) | Pyrimethamine and sulfadiazine |
| Entamoeba histolytica | Southeast | Human | Microscopic examination of stool or touch preparation from ulcer | Common in homosexual men, travelers, institutionalized persons | Metronidazole |
| Cryptosporidium species | Ubiquitous | Human | Acid-fast stain of stool | Severe in immunosuppressed hosts (AIDS) | Nitazoxanide |
| Trichomonas vaginalis | Ubiquitous | Human | Wet preparation of genital secretions | Common cause of vaginitis | Metronidazole |
| PRIMARILY SEEN IN TRAVELERS AND IMMIGRANTS | | | | | |
| Plasmodium species | Africa, Asia, South America | Anopheles mosquito | Thick and thin blood smears | Consider in returning travelers with fever | Dependent on regional resistance pattern (see text) |
| Leishmania donovani | Middle East | Sandfly | Tissue biopsy | Consider in immigrants with fever and splenomegaly | Sodium stilbogluconate |
| Trypanosoma species | Africa, South America | Reduviid bugs, transfusion | Direct examination of blood or CSF | Very rare in travelers, transfusion associated | Dependent on species and stage of disease |

AIDS, Acquired immunodeficiency syndrome; CSF, cerebrospinal fluid.

temperate climates. Immunosuppression associated with various conditions, particularly HIV infection, leads to more severe manifestations. Of all protozoal diseases, malaria causes the most deaths globally, approximately 1 million people each year.

Protozoal Infections in the United States

Giardiasis

Giardiasis is a common cause of nonbloody diarrhea in returning travelers. *G. lamblia* and *Giardia intestinalis* are found worldwide, including in the United States. However, giardiasis is most commonly diagnosed in travelers returning from Latin America, Southeast Asia, or the Middle East. Transmission is by the fecaloral route in the setting of contaminated food or water or public swimming areas, or by person-to-person contact in certain risk populations such as men who have sex with men. It is usually a self-limited diarrheal illness that lasts 2 to 4 weeks but may persist longer. Rarely, individuals have associated fevers, nausea, or vomiting. The diagnosis is made by microscopic examination of stool for cysts or trophozoites or by an antigen detection test. Treatment options include metronidazole, tinidazole, or nitazoxanide.

Amebiasis

Amebiasis is another diarrheal illness that occurs in travelers. Like *Giardia, Entamoeba histolytica* is found worldwide, and transmission is by the fecal-oral route. However, most infected individuals (80%) are asymptomatic. The presentation in those acutely infected includes bloody or watery diarrhea with abdominal cramping lasting up to 4 weeks. In immunocompromised individuals, a severe invasive infection can occur with risk of necrotizing colitis or bowel perforation. Extraintestinal amebiasis can occur as well, particularly liver abscesses. The diagnosis can be made by microscopic examination of stool for ova and parasites or by antigen detection tests of stool or serum. Treatment is with metronidazole or tinidazole in symptomatic individuals, followed by paromomycin or iodoquinol.

Protozoal Infections Common in Travelers and Immigrants

Leishmaniasis

Leishmaniasis is transmitted by the sandfly and can manifest with cutaneous, mucocutaneous, or visceral involvement. The skin finding is a persistent ulcer with raised edges in a traveler returning from the Middle East (Old World: *Leishmania major, Leishmania tropica*) or Latin America (New World: *Leishmania braziliensis, Leishmania peruviana,* others). Diagnosis is by tissue biopsy. Visceral leishmaniasis can have hepatic, splenic, or bone marrow involvement and is more commonly identified in immigrants from Asia (*Leishmania donovani*) or South America (*Leishmania chagasi*). Diagnosis is by tissue biopsy or culture of the involved organ.

Treatment varies based on severity of presentation and resistance characteristics. Most cutaneous lesions are self-limited, but treatment options include sodium stibogluconate (Pentostam) or paromomycin. For visceral involvement, treatment includes sodium stibogluconate, amphotericin B, or a combination of these two agents.

African Trypanosomiasis

African trypanosomiasis, or African sleeping sickness, is a protozoal infection caused by *Trypanosoma rhodesiense* (East Africa) or *Trypanosoma gambiense* (Central and West Africa), which is transmitted by the tsetse fly. Presenting symptoms include fever, headache, and central nervous system involvement. The disease is rarely reported in travelers returning from sub-Saharan Africa