Editorials

Parasitic Infections: Do Not Neglect Strongyloidiasis

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See related article on page 277.

The article on neglected parasitic infections in this issue of *American Family Physician* reviews infections of increasing relevance to family physicians in the United States because of demographic changes and increased ability for or access to international travel.[1] Although the intestinal roundworm *Strongyloides stercoralis* is not on the Centers for Disease Control and Prevention's list of neglected parasitic infections, it deserves increased awareness. There are an estimated 30 million to 100 million infections from *S. stercoralis* worldwide and a prevalence in some U.S. communities ranging from 2% to 7% (and higher in immigrant and refugee populations)[2-4]; therefore, family physicians are more likely to care for patients with *S. stercoralis* than many other parasites. Chronic strongyloidiasis can transform into disseminated disease with a mortality rate of up to 70%; even more concerning is that disseminated strongyloidiasis is typically an iatrogenic complication.

S. stercoralis is a soil-transmitted helminth found in the tropics and subtropics (particularly Southeast Asia, sub-Saharan Africa, South America, and Oceania); however, there are foci of endemicity in the southeastern United States and Appalachia.[5] Outside of endemic areas, immigrants, travelers, and military personnel are at risk of strongyloidiasis if their countries of origin, travel, or deployment included areas where *S. stercoralis* is prevalent (e.g., veterans who served in Vietnam or the South Pacific). Outbreaks have also occurred in institutional settings such as nursing facilities and homes for people with intellectual disabilities.[6]

Humans become infected when exposed skin comes into contact with free-living *S. stercoralis* larvae in soil (e.g., while walking barefoot). The larvae penetrate the skin, enter the circulatory system, migrate to the lungs, and are expectorated and swallowed. The larvae subsequently reach the small intestine, where they mature into adult worms. Females can reach a length of longer than 2 mm. Acute infections can present with a rash (which can be papular, urticarial, or serpiginous), pruritus, abdominal pain, diarrhea, dry cough, or wheezing; patients may also be asymptomatic.

S. stercoralis can cause continuous reinfection (i.e., autoinfection) without leaving the host. Female worms in the duodenum asexually produce eggs that hatch into noninfectious larvae. These larvae are excreted in the stool or develop into infectious larvae, which reenter the circulation by penetrating the colon or perianal skin and then repeat the parasite's life cycle. Untreated infections can persist for the host's lifetime. Patients with chronic strongyloidiasis are often asymptomatic, although some have intermittent abdominal discomfort, migratory rashes (*larva currens*), urticaria, cough, or wheezing. Peripheral eosinophilia is common and may be the only indication of infection.

Stool examination for *S. stercoralis* ova and larvae is insensitive because of low parasite burdens and intermittent larval excretion. Therefore, serology (enzyme-linked immunosorbent assay for *S. stercoralis* immunoglobulin G) is the most common method of diagnosing strongyloidiasis.[7] Treatment is a two-day course of ivermectin (Stromectol; 200 mcg per kg per day).

S. stercoralis hyperinfection occurs when the immune system is impaired and the rate of autoinfection is accelerated. Hyperinfection can lead to disseminated strongyloidiasis in which larvae spread to multiple organs such as the liver, lungs, and central nervous system. Gram-negative sepsis (through translocation of enteric bacteria when large numbers of larvae migrate through the intestinal wall) is common. In contrast to localized infections, in disseminated strongyloidiasis, the larvae are readily identified in the stool. For some patients, the diagnosis is made when larvae are discovered in biopsies obtained to evaluate gastrointestinal bleeding. Disseminated strongyloidiasis is a medical emergency

and has a fatality rate of nearly 70%.[8] Treatment is daily ivermectin (commonly with albendazole [Albenza]) until larvae are no longer present in the stool for at least two weeks.

The most common trigger for *S. stercoralis* hyperinfection is corticosteroid use, and disseminated disease can occur within several days of use.[8,9] There is no minimum dose or treatment duration; even short courses of prednisone for asthma or chronic obstructive pulmonary disease have resulted in disseminated strongyloidiasis. Concern regarding corticosteroid-induced hyperinfection is especially pertinent during the COVID-19 pandemic because there have been reports of disseminated strongyloidiasis precipitated by dexamethasone used to treat patients with the virus.[10,11]

Approximately 14% of U.S. residents are foreign-born, many of whom come from *S. stercoralis* endemic regions.[12] Therefore, it is essential that physicians recognize risk factors for strongyloidiasis and screen individuals who are at risk. According to the Centers for Disease Control and Prevention, clinicians should consider screening for *S. stercoralis* in immigrants from endemic countries (regardless of the time since immigration) and in people with human T-lymphotropic virus 1, hematologic malignancies, persistent or unexplained eosinophilia, a history of travel to endemic areas, and in people who are expected to receive corticosteroids or other immunesuppressing therapies.[13] Physicians should also maintain a high index of suspicion for disseminated strongyloidiasis in patients receiving corticosteroids. Experts advocate that patients with COVID-19 who are candidates for dexamethasone or who have unexplained gram-negative sepsis or meningitis after treatment with dexamethasone receive empiric treatment with ivermectin as a treatment for strongyloidiasis (not COVID-19) if they have risk factors.[14] To prevent the iatrogenic complication of hyperinfection and avoid delays in recognizing disseminated strongyloidiasis, family physicians should become familiar with this often silent parasitic infection.

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References

1. Cantey PT, Montgomery SP, Straily A. Neglected parasitic infections: what family physicians need to know—a CDC update. *Am Fam Physician*. 2021;104(3):277-287. Accessed September 15, 2021. https://www.aafp.org/afp/2021/0900/p277.html
2. Singer R, Xu TH, Herrera LNS, et al. Prevalence of intestinal parasites in a low-income Texas community. *Am J Trop Med Hyg*. 2020;102(6):1386-1395.
3. Schär F, Trostdorf U, Giardina F, et al. *Strongyloides stercoralis*: global distribution and risk factors. *PLoS Negl Trop Dis*. 2013;7(7):e2288.
4. Gyorkos TW, Genta RM, Viens P, et al. Seroepidemiology of *Strongyloides* infection in the Southeast Asian refugee population in Canada. *Am J Epidemiol*. 1990;132(2):257-264.
5. McKenna ML, McAtee S, Bryan PE, et al. Human intestinal parasite burden and poor sanitation in rural Alabama [published correction appears in *Am J Trop Med Hyg*. 2018;98(3):936]. *Am J Trop Med Hyg*. 2017;97(5):1623-1628.
6. Jones JM, Hill C, Briggs G, et al. Notes from the field: strongyloidiasis at a long-term-care facility for the developmentally disabled – Arizona, 2015. *MMWR Morb Mortal Wkly Rep*. 2016;65(23):608-609.
7. Krolewiecki A, Nutman TB. Strongyloidiasis: a neglected tropical disease. *Infect Dis Clin North Am*. 2019;33(1):135-151.
8. Buonfrate D, Requena-Mendez A, Angheben A, et al. Severe strongyloidiasis: a systematic review of case reports. *BMC Infect Dis*. 2013;13:78.
9. Fardet L, Généreau T, Poirot J-L, et al. Severe strongyloidiasis in corticosteroid-treated patients: case series and literature review. *J Infect*. 2007;54(1):18-27.
10. Lier AJ, Tuan JJ, Davis MW, et al. Case report: disseminated strongyloidiasis in a patient with COVID-19. *Am J Trop Med Hyg*. 2020;103(4):1590-1592.
11. Marchese V, Crosato V, Gulletta M, et al. *Strongyloides* infection manifested during immunosuppressive therapy for SARS-CoV-2 pneumonia [published online September 10, 2020]. *Infection*. Accessed February 7, 2021. https://link.springer.com/content/pdf/10.1007/s15010-020-01522-4.pdf
12. United States Census Bureau. American community survey 1-year data (2005-2019). Accessed February 7, 2021. https://www.census.gov/data/developers/data-sets/acs-1year.html
13. Centers for Disease Control and Prevention. Parasites – strongyloides. Resources for health professionals. Accessed January 24, 2021. https://www.cdc.gov/parasites/strongyloides/health_professionals/index.html
14. Stauffer WM, Alpern JD, Walker PF. COVID-19 and dexamethasone: a potential strategy to avoid steroid-related *Strongyloides* hyperinfection. *JAMA*. 2020;324(7):623-624. ■