

Virtual Mentor

American Medical Association Journal of Ethics
April 2008, Volume 10, Number 4: 220-223.

CLINICAL PEARL

Cysticercosis: A Zebra in the Neighborhood

Jason Yeh and Jeanne S. Sheffield, MD

One of medicine's most quoted aphorisms is, "when you hear hoofbeats, don't look for zebras." This, of course, is a pithy reminder to physicians that they should be wary when tempted to diagnose a rare condition: it is far more likely to be a common disease than an uncommon one. But as medicine becomes, like trade and travel, more globalized, the proverbial zebra is much less rare.

Between 2000 and 2007, the immigrant population of the U.S. increased by more than 24 percent, with an average of 1.04 million immigrants per year [1]. Estimates project that by the year 2050, whites will be the minority, and 1 in 5 Americans will be foreign-born [2]. The growth of the immigrant population poses diagnostic challenges for physicians in all fields. The increasing immigrant population and ever-broadening scope of pathology force us to ask just how proficient each physician should become in recognizing medical zebras.

It is unrealistic to expect all physicians to become experts in recognizing and treating the rarest of diseases; doing so is an ineffective way to spend one's career. The medical community as a whole has the responsibility to educate physicians about changes in medicine. Compared to the physician in solo practice, large medical institutions have better vantage points from which to recognize gradual shifts in global pathology. Medical communities can shed light on these thematic changes through journal articles and conference presentations and can encourage physicians to apply new information in novel ways.

The compartmentalization of medical knowledge into specialties has also improved physician competence by allowing doctors to maintain greater expertise within their own fields, so that each has to be aware of a limited number of uncommon diseases.

At the same time, physicians have a duty to expand their medical knowledge so that they can anticipate the needs of the unnamed and unknown future patient. One way for professionals to approach this goal is to study the culture and characteristics of their particular patient populations.

Knowing One's Patients

Knowing the characteristics of a population—age, race, cultural traditions, and where they live—offers physicians clues about which medical conditions (common and uncommon) they are more likely to see. A thorough understanding of

demographic themes can guide one's study of medicine and allow each physician to make decisions about the specific type of medical knowledge he or she needs beyond what is required for board certification. A physician who understands the complexities of his or her patient population is more likely to recognize an extraordinary medical condition when it appears.

Cysticercosis

Cysticercosis is one example of a disease that has become more prevalent in certain areas of the U.S. as a result of recent population changes. As the Hispanic population grows in Texas, we at Parkland Hospital are caring for more people infected with cysticercosis.

The tapeworm that causes cysticercosis is endemic to many parts of the world including China, Southeast Asia, India, sub-Saharan Africa, and Latin America. Some studies suggest that the prevalence of cysticercosis in Mexico is between 3.1 and 3.9 percent [3]. Other studies have found the seroprevalence in areas of Guatemala, Bolivia, and Peru as high as 20 percent in humans, and 37 percent in pigs [4, 5]. It is crucial for the physician who deals with a substantial Hispanic or Southeast Asian population to be familiar with the symptoms and treatment of cysticercosis.

The infection starts in the gastrointestinal tract as a result of swallowed foodstuffs contaminated with the larva or eggs of the pork tapeworm, *Taenia solium*. Once in the gastrointestinal tract, the egg hatches and is able to penetrate the intestinal wall and spread to the bloodstream where it can consequently infect the skin, heart, eyes, skeletal muscle, and brain tissue. When the infection reaches the central nervous system, it is called neurocysticercosis. The immunomodulatory nature of the parasite allows live cysts to persist for up to 5 years before dying or causing symptoms in humans.

Symptoms of cysticercosis infection are generally mild, and infections of the muscle and skin are largely asymptomatic. In the eye, cysticercosis can cause blurry vision and, in more severe cases, swelling and detachment of the retina. Symptoms of brain infection depend on the location and size of the infection. Headaches and seizures are common, but other symptoms include confusion, personality changes, and disequilibrium.

Diagnosing neurocysticercosis is often difficult; lab tests are frequently inaccurate and neuroimaging findings are varied. Still, both CT and MRI are useful for diagnosis and also for monitoring treatment outcomes. The choice of therapy depends on many factors and typically combines the use of antiparasitic drugs, surgery, and medication for symptom control. Both albendazole and praziquantel are effective in treating parenchymal neurocysticercosis. At Parkland we use albendazole as the standard treatment because it costs less and has stronger cysticidal activity than praziquantel [6].

Neurocysticercosis can cause seizures in pregnant women. There are even case reports of neurocysticercosis having been confused with eclampsia [7, 8]. Distinguishing between these conditions is tricky at best, and the complexity of each illustrates why identifying the populational themes of our patients is important.

Alternatively, presumptive knowledge about a population can complicate the diagnostic process. Medical literature reports an unlikely outbreak of neurocysticercosis in an orthodox Jewish population from New York City [9]. Among this group of people with no history of pork consumption, the source of the infection was not dietary. Instead, the infection was found to have resulted from improper sanitation practices by Hispanic laborers in the community. As this story illustrates, physicians must avoid the rigid application of cultural stereotypes to a population. An overreliance on such assumptions endangers patient safety and risks the breakdown of what should be an objective diagnostic process.

Final Thoughts

Understanding the cultural characteristics of a specific population does not in itself guarantee better patient care. It is merely one method of realistically approaching the ideal of becoming a fully knowledgeable and capable physician. Achieving our goals as healers and physicians demands that each of us absorb and react to many things, from current events to subtle changes in local demographics. It is an endless pursuit, but ignoring the medical needs of a diversifying patient population is easily a violation of our promise to first, do no harm.

References

1. Camarota SA. *Immigrants in the United States, 2007: A Profile of America's Foreign-Born Population*. Washington, DC: Center for Immigration Studies; 2007. <http://www.cis.org/articles/2007/back1007.pdf>. Accessed February 22, 2008.
2. Passel JS, Cohn D. *U.S. Population Projections: 2005–2050*. Washington, DC: Pew Research Center; 2008. <http://pewhispanic.org/files/reports/85.pdf>. Accessed February 22, 2008.
3. Flisser A, Gyorkos TW. Contribution of immunodiagnostic tests to epidemiological/intervention studies of cysticercosis/taeniosis in Mexico. *Parasite Immunol*. 2007;29(12):637-649.
4. Sorvillo FJ, DeGiorgio C, Waterman SH. Deaths from cysticercosis, United States. *Emerg Infect Dis*. 2007;13(2):230-235.
5. Carrique-Mas J, Iihoshi N, Widdowson MA, et al. An epidemiological study of *Taenia solium* cysticercosis in a rural population in the Bolivian Chaco. *Acta Trop*. 2001;80(3):229-235.
6. Del Brutto OH, Roos KL, Coffey CS, Garcia HH. Meta-analysis: cysticidal drugs for neurocysticercosis: albendazole and praziquantel. *Ann Intern Med*. 2006;145(1):43-51.
7. Kurl R, Montella KR. Cysticercosis as a cause of seizure disorder in pregnancy: case report and review of literature. *Am J Perinatol*. 1994;11(6):409-411.

8. Grondin L, D'Angelo R, Thomas J, Pan PH. Neurocysticercosis masquerading as eclampsia. *Anesthesiology*. 2006;105(5):1056-1058.
9. Schantz PM, Moore AC, Munoz JL, et al. Neurocysticercosis in an Orthodox Jewish community in New York City. *N Engl J Med*. 1992;327(10):692-695.

Jason Yeh is a fourth-year medical student at the University of Texas Southwestern Medical School at Dallas, and a graduate of the Plan II Honors Program from the University of Texas at Austin. His interests include cross-cultural medicine and infectious diseases of pregnancy. He will continue his medical training in the field of obstetrics and gynecology at Duke University Medical Center in Durham, North Carolina, and plans to pursue fellowship training in maternal-fetal medicine.

Jeanne S. Sheffield, MD, is an associate professor of obstetrics and gynecology at the University of Texas Southwestern Medical Center at Dallas. She is the director of the maternal-fetal medicine fellowship program and specializes in infectious diseases in pregnancy.

Related in VM

[Nonemergency Medical Care for Illegal Immigrants in Texas](#), April 2008

The viewpoints expressed on this site are those of the authors and do not necessarily reflect the views and policies of the AMA.

Copyright 2008 American Medical Association. All rights reserved.