Mississippi State Department of Health

Mississippi Morbidity Report

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Chagas Disease in Mississippi

Introduction: The recent initiation of screening for Chagas disease by blood banks led to the detection of antibodies to the causative agent in 4 Mississippians. The following describes the disease and the Mississippi cases.

The infectious agent: Chagas disease, or American trypanosomiasis, is a zoonotic infection caused by the blood borne parasite *Trypanosoma cruzi (T. cruzi)*. Chagas disease is endemic in parts of Central and South America and Mexico, where an estimated 11 million people are infected, and an estimated 50,000 deaths occur annually. Previously, only 6 autochthonous or indigenously acquired cases had been reported in the United States. In 2007, the Mississippi State Department of Health identified two Mississippi residents with locally acquired infections.

Transmission: The vector for transmission of *T. cruzi* is the triatomine bug, commonly known as the kissing or reduviid bug. The bug becomes infected when it feeds on a parasitemic human or mammal reservoir and the parasites then multiply in the bug's gut. Transmission typically occurs when the feces of an infected kissing bug are deposited on the skin while the insect takes a blood meal. The bite wound can then become contaminated with the parasite laden feces, though the parasite can also enter through mucous membranes or conjunctiva. Other primary forms of transmission occur through blood transfusions, congenital transmission, organ transplant, and rarely by ingestion of contaminated food. Accidental laboratory infections occur on occasion.

Figure

The triatomine species in the United States responsible for Chagas disease transmission are *Triatoma sanguisuga* (Figure), with a range that stretches across the Southeast and into Maryland and Texas, and *Triatoma gerstaekeri*, found mainly in Texas and New Mexico. There is an active sylvan cycle in the United States and *T. cruzi* has been identified in more than 18 species, mainly opossums, armadillos and rural dogs. The triatomine bug thrives in conditions of poor housing where the bugs can easily live in the walls. They emerge at night while the household is asleep, biting the face or around the mouth (thus, kissing bug).

Clinical Course: There are two phases of Chagas disease: the acute and chronic phase. The acute phase may last from weeks to months, and is often asymptomatic. It may be associated with fever, lymphadenopathy, malaise and hepatosplenomegaly. An inflammatory nodule, or chagoma, can sometimes appear at the site of inoculation. Unilateral palpebral or periocular swelling, Romaña's sign, may occur as a result of conjunctival contamination with the vector's feces. Life threatening myocarditis or meningoencephalitis are potential complications during the acute phase, mainly in young children or immunocompromised persons.

Acute cases then resolve into the asymptomatic chronic phase of the disease. After years to decades of subclinical infection, 20-30% of infected persons develop clinical disease, predominately cardiac. Cardiac disease begins with conduction abnormalities and arrhythmias, which may be followed by potentially fatal dilated cardiomyopathy. Chronic intestinal tract involvement can lead to megaesophagus and megacolon. These chronic sequelae are irreversible. Persons in the chronic phase likely remain infectious for life, with low levels of persistent parasitemia.

Laboratory diagnosis: No single laboratory test is adequate to diagnose Chagas disease. Observation of the parasite in blood smears is sometimes made in the acute phase, when there are increased levels of parasitemia, but is difficult in the chronic phase. Immunofluorescence assays (IFA), indirect hemagglutinin (IHA) enzyme linked immunosorbent assays (ELISA) and radioimmune precipitation assays (RIPA) are available for serological diagnosis (through the Division of Parasitic Diseases at CDC). Diagnosis is made by at least two different serologic tests, and by considering clinical findings and exposure risk.

Treatment: Treatment with antitrypanosomal medication is recommended for all cases of acute infection (including congenital) and in chronic infection in children up to age 18. Increasing evidence suggests that treatment of persons with chronic infections can prevent progression of cardiac morbidity. Factors such as the patient's age, clinical status and overall health should be considered in the decision to treat chronic infections. The two drugs available for treatment, nifurtimox and benznidazole, cause considerable side effects and are only available in the U.S. from the CDC under investigational protocols.

Screening: In December 2006 the FDA granted a license for a new ELISA screening assay for detection of antibodies to *T. cruzi*. In addition to screening donors of whole blood, plasma and serum samples from cell, tissue and organ donors can also be screened. Specimens testing positive are retested with the screening ELISA, and repeat reactives then undergo further testing with RIPA. Those with a positive RIPA are considered confirmed positive. The laboratories that perform this screening test account for more than 65% of the total blood collected in the U.S., and as of 2/14/08 there have been 374 RIPA confirmed positive donations in the U.S.

Mississippi Cases: In Mississippi, statewide screening of blood donors began in March 2007. To date, four confirmed positive blood donors have been reported to the Mississippi State Department of Health. Two of the positives were natives of endemic countries and were considered imported cases. However, after investigation, the other two donors were felt to represent indigenously acquired infection. Both cases, white males living in Mississippi, are avid outdoorsmen and hunters. They both reported exposure to potential mammalian vectors on their property and through hunting activities, including armadillos, raccoons, and opossums. One remembered seeing the vector before. Neither has extensive travel outside of the U.S., nor mothers of Hispanic origin or with significant travel history. Both live in well made housing, and reported no infestations of triatomines. Only one had received a previous blood transfusion, and the original donors were negative by ELISA. A dead kissing bug that was positive for *T. cruzi* by PCR was found at the boyhood home (100 yards from current dwelling) of one patient. A live bug was found in the barn of the second, and was negative by PCR. All family members and outside dogs tested were negative for *T. cruzi.* A look back at the previously donated blood and recipients did not reveal evidence of transmission.

Discussion: The low incidence of indigenously acquired *T. cruzi* infections in the United States is generally attributed to the lack of a suitable habitat for the bugs in most U.S. homes, a preference for animal hosts, and delayed defecation of triatomines found in the U.S. Most cases of Chagas disease in the U.S, therefore, represent infections acquired in endemic countries. It is estimated that up to 100,000 legal immigrants currently living in the U.S. and Canada are unknowingly infected with *T. cruzi.* As a result, concerns have been raised about the potential for transfusion and organ transmitted Chagas disease. To date, seven cases of transfusion transmitted *T. cruzi* and five cases of infection from organ transplantation have been documented in the U.S. and Canada.

Cases of Chagas disease likely will be increasingly identified as a result of screening blood donors for *T. cruzi* infection. Most identified cases will probably represent chronic infections that were acquired years earlier. The CDC is preparing guidance for the clinical evaluation, staging, management and treatment of patients identified with Chagas disease.

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References available on request.

Mississippi
Provisional Reportable Disease Statistics
February 2008

		Public Health District									State Totals*			
		I	II	III	IV	V	VI	VII	VIII	IX	Feb 2008	Feb 2007	YTD 2008	YTD 2007
Sexually Transmitted Diseases	**Primary & Secondary Syphilis**	2	2	1	0	0	0	0	0	1	8	9	16	17
	Total Early Syphilis	4	5	2	0	3	0	0	2	5	21	35	40	71
	Gonorrhea	**	**	**	**	**	**	**	**	**	**	668	**	1444
	Chlamydia	**	**	**	**	**	**	**	**	**	**	2047	**	3982
	HIV Disease	7	2	6	0	13	3	5	4	7	47	49	108	118
Myco-bacterial Diseases	**Pulmonary Tuberculosis (TB)**	0	0	1	0	2	0	1	2	0	6	6	6	9
	Extrapulmonary TB	1	0	1	0	0	0	0	0	0	2	0	3	1
	Mycobacteria Other Than TB	1	0	1	0	2	1	0	0	5	10	18	39	31
Vaccine Preventable Diseases	**Diphtheria**	0	0	0	0	0	0	0	0	0	0	0	0	0
	Pertussis	0	0	0	0	0	1	0	0	0	1	2	15	7
	Tetanus	0	0	0	0	0	0	0	0	0	0	0	0	0
	Poliomyelitis	0	0	0	0	0	0	0	0	0	0	0	0	0
	Measles	0	0	0	0	0	0	0	0	0	0	0	0	0
	Mumps	0	0	0	0	0	0	0	0	0	0	0	0	0
Viral Hepatitis	**Hepatitis A (acute)**	0	0	0	0	0	0	0	0	0	0	1	0	1
	Hepatitis B (acute)	0	0	0	0	0	0	1	0	0	1	1	2	3
	Hepatitis C (Non-A, Non-B)	0	0	0	0	0	0	0	0	0	0	2	0	3
Enteric Diseases	**Salmonellosis**	0	2	1	0	4	1	0	2	0	10	26	49	54
	Shigellosis	3	0	0	0	4	3	3	1	1	15	17	83	28
	Campylobacter Disease	0	0	0	0	1	1	0	1	0	3	4	12	12
	E. coli O157:H7/HUS	0	0	0	0	0	0	0	0	0	0	1	1	1
Other Conditions of Public Health Significance	**Meningococcal Infections**	0	1	0	1	0	1	0	0	0	3	1	3	4
	Invasive *H. influenzae* b Disease	0	0	0	0	0	0	0	0	0	0	0	0	0
	RMSF	0	0	0	0	0	0	0	0	0	0	0	0	0
	West Nile Virus	0	0	0	0	0	0	0	0	0	0	0	0	0
	Lyme Disease	0	0	0	0	0	0	0	0	0	0	0	0	0
	Animal Rabies (bats)	0	0	0	0	0	0	0	0	0	0	0	0	0

*Totals include reports from Department of Corrections and those not reported from a specific District.
**Temporarily not available