Rhodesian Trypanosomiasis in a Splenectomized Patient

MARK A. MALESKER, DANIEL BOKEN, THOMAS A. RUMA, PHILLIP J. VUCHETICH, P. JAMES MURPHY, AND PHILIP W. SMITH

Alegent Health Immanuel Medical Center, and Department of Pharmacy Practice, Creighton University, Omaha, Nebraska; School of Medicine, Creighton University, Omaha, Nebraska; University of Nebraska Medical Center, Omaha, Nebraska

Abstract. We report the first apparent case of a splenectomized individual who developed severe trypanosomiasis with central nervous system involvement. The patient was a 41-year-old man who participated in an east African safari. Upon his return to the United States, the patient presented with an infection with Trypanosoma brucei rhodesiense that was treated successfully with suramin and melarsoprol. The onset of symptoms, laboratory studies, and disease progression did not differ from previously reported cases in the literature. The role of the spleen in trypanosomiasis is not well understood and the few reports available describe only animal models. This report suggests that asplenia had no apparent effect on the onset of symptoms and overall severity of illness. Further studies are necessary to ultimately define the role of the spleen in trypanosomiasis.

The acute form of African trypanosomiasis caused by Trypanosoma brucei rhodesiense occurs predominantly in east Africa, whereas the chronic form caused by T. b. gambiense occurs mainly in west and central Africa. Transmission is by the tsetse fly bite. The incubation period for acute trypanosomiasis (T. brucei rhodesiense) ranges from 6 to 28 days. Infected travelers frequently become ill during their trips or shortly after returning. Malaria also occurs commonly in Africa and the severity of presentation can be exacerbated by splenectomy. We report a case of infection with T. b. rhodesiense with central nervous system involvement in a splenectomized American traveler and discuss the treatment of trypanosomiasis and the potential impact of asplenia.

CASE REPORT

The case was a 41-year-old private investigator (height = 198 cm, weight = 92 kg) who recently returned from an African safari. His medical history included splenectomy in 1977 for Hodgkin’s disease now in remission, as well as mild asthma, migraine headaches, hypothyroidism, and occasional sinusitis.

He entered Africa on September 29, 1996 and hunted in Tanzania for cape buffalo where he sustained several painful tsetse fly bites. One bite on his left arm became moderately swollen several days later.

He returned to the United States on October 5, 1996. Five days later, he developed weakness, headache, fever, chills, and sweats. Anorexia and weight loss of approximately 5 kg was noted. A trial of trimethoprim/sulfamethoxazole for presumed sinusitis failed. His temperature reached 104.4°F (40.2°C) and he became progressively lethargic and confused. On October 15, 1996, 10 days after his return to the United States, thick and thin blood smears revealed numerous trypanosomes.

His admitting examination was remarkable for asthenia, fever, and a toxic appearance with moderate jaundice. On the left arm near the elbow there was a 3-cm, round, scaly, erythematous lesion with a small area of fluctuance in the center. Other healing insect bites were also noted. Regional lymphadenopathy was found in the left epididymal area.

Other laboratory test abnormalities (normal ranges in parentheses) included a platelet count of 3,000/mm³ (140–440 × 10³/mm³), a white blood count of 14,200/mm³ (4.5–11/mm³), and a hemoglobin of 15.3 g/dL (14–18 g/dL). A differential white blood cell count revealed 37% neutrophils, 59% bands, and 4% lymphocytes. The prothrombin time and urinalysis results were within normal reference ranges. A cerebrospinal fluid sample revealed xanthochromic fluid with a white blood count of 83/mm³ (89% lymphocytes), a red blood cell count of 6,600/mm³, and a protein level of 76 mg/dl (12–50 mg/dl). Trypanosomes were noted on the concentrated smear of the spinal fluid.

The serum creatinine level was 1.7 mg/dl (0.9–1.3 mg/dl). Electrolytes were within normal reference ranges. Liver function tests revealed an alkaline phosphatase level of 292 IU/L (43–122 IU/L), an aspartate aminotransferase level of 366 IU/L (14–50 IU/L), an alanine aminotransferase level of 461 IU/L (21–72 IU/L), and a lactate dehydrogenase level of 773 IU/L (313–618 IU/L). Routine cultures of blood, stool, and spinal fluid were negative and stool revealed no ova and parasites. A chest radiograph showed a possible infiltrate in the left base, and post-radiation changes from his Hodgkin’s lymphoma treatment.

Therapy began on October 17, 1996 with suramin, 100 mg intravenously, as a test dose, followed by suramin, 1 g intravenously, by slow infusion. Due to central nervous system involvement, melarsoprol was added. To administer the relatively caustic melarsoprol, a subclavian teflon catheter was used.

The melarsoprol was mixed with the patient’s blood in a glass syringe and injected through the teflon catheter. The patient tolerated three consecutive days of increased melarsoprol without any complications. He continued to recover in the hospital for the next week and was re-treated with a second three-day course of melarsoprol without complications. He was given concomitant prednisone to decrease his reaction to the melarsoprol.

His abnormal liver enzyme levels improved steadily throughout his hospitalization. An echocardiogram performed initially revealed global hypokinesis with an ejection fraction of 40–50% and a mild pericardial effusion. Repeat echocardiogram approximately 6 days later revealed resolution. The thrombocytopenia steadily improved after treatment with suramin and melarsoprol. The chest radiograph also returned to baseline findings.

The patient received his third and fourth course of melar-
soprol on November 4, 1996 and November 11, 1996. He was given four courses of four-weeks duration because of his body size and the need to reach a cumulative dose of 20 mg/kg. During the third course, he complained of a visual aura that was thought to be consistent with his history of migraine headaches and not meglarsoprol. The aura resolved after treatment with acetaminophen.

The patient tolerated the therapy remarkably well. Residual complaints included only occasional shakiness of the right hand and mild blurred vision. The patient subjectively noted a loss of sensation in the dorsal aspect of both feet for 2 months after the last injection that resolved without treatment. He resumed work as a private investigator after his second course of therapy. A lumbar puncture at the end of therapy demonstrated 5 white blood cells (0–8/mm³), no red blood cells, a mildly elevated protein level of 76 mg/dl (12–60 mg/dl), and a normal glucose level of 53 mg/dl (45–75 mg/dl), suggesting resolution of the central nervous system inflammation. He refused serial lumbar punctures, which were to be performed at 3-month intervals for 2 years. He is now more than 2.5 years postinfection, and is planning another trip to Tanzania.

**DISCUSSION**

The most recent published case of African trypanosomiasis in the United States involved a 67-year-old man who was hunting in Tanzania. The number of cases of trypanosomiasis in the United States has doubled from 5 cases from 1967 through 1977 to 10 cases from 1978 through 1987. This is consistent with the increased incidence of travel to this area. Most previous American travelers in east Africa who developed trypanosomiasis were involved in photographic or hunting safaris. While African trypanosomiasis occurs rarely in American travelers compared with malaria and diarrheal illnesses, accurate risk assessment remains difficult. Safe and effective chemoprophylaxis for east African trypanosomiasis is not available. The typical course and treatment for trypanosomiasis in humans has been well described elsewhere.

In humans, the role of the spleen in sepsis has been well described. Looareesuwan and others have studied the role of the spleen in another blood parasite infection (malaria). They suggested that the spleen may protect against human malaria by mediating humoral or cellular immune response or by clearing both rhesus and immunologically altered host erythrocytes. Unfortunately, it is difficult to generalize data regarding erythrocytic malaria infection to a free-living parasite such as *T. brucei rhodesiense*. The role of the spleen in trypanosomiasis is not well understood and the few reports available describe conflicting outcomes only in animal models. Poltera and associates evaluated the pathologic features of 14 cases of human trypanosomiasis in Uganda. They noted the spleen was enlarged in a majority (9 of 12) of cases, but did not discuss the role of the spleen in the disease.

Anemia and thrombocytopenia may be observed in human trypanosomiasis. The prevalence of thrombocytopenia in trypanosomiasis is not well described and the mechanism is not understood. Potential mechanisms include platelet consumption as a part of disseminated intravascular coagulation or normal or immunologically damaged platelets excessively removed by the reticuloendothelial system. The presence of thrombocytopenia in our splenectomized patient and the frequent occurrence of thrombocytopenia and splenomegaly in patients with African trypanosomiasis suggests that both a consumptive process and sequestration may contribute to the thrombocytopenia seen in this disease. The recovery of our patient’s thrombocytopenia was consistent with normal megakaryocyte recovery and coincided with his improvement in mental status, liver function, and renal function.

We were concerned that splenectomy shortened the time course from exposure to illness in our patient. However, unpublished data from the Centers for Disease Control and Prevention (CDC) (Atlanta, GA) indicate that this patient had an average onset of illness comparable with other recent cases in healthy individuals.

Conlon has suggested that before traveling abroad to areas where the risks of some infections are increasing, all patients with potentially impaired immunity should be evaluated on an individual basis in terms of the risks and benefits involved in travel and available prophylactic measures. The spleen can remove bacteria/antibody complexes and damaged or parasitized red blood cells. It is recommended that the asplenic patient avoid tick and mosquito bites and receive malaria prophylaxis prior to traveling.

In conclusion, our patient, both splenectomized and previously treated with chemotherapy, contracted a severe, life-threatening infection due to *T. b. rhodesiense*. We speculated that his splenectomy may have predisposed him to a more rapid or severe infection, but a comparison with historical cases suggests that his course was not altered by the absence of his spleen. We conclude that the absence of a spleen has no effect on the time course of infection with *T. b. rhodesiense*. Fortunately, although treatment is potentially toxic, this patient responded well with no significant adverse effects attributable to therapy.

Acknowledgments: We thank Drs. Anne Moore and Deb Levy (Centers for Disease Control and Prevention) for assistance in the management of this patient and in providing medication. We also acknowledge Randy Smith (Alegent Health Immanuel Medical Center) for generous assistance in the publication of this manuscript.

Authors’ addresses: Mark A. Malesker, Alegent Health Immanuel Medical Center and Department of Pharmacy Practice, Creighton University, 2500 California Plaza, Omaha, NE 68178. Daniel Boken, Infectious Disease and Epidemiology Associates, 4239 Farnam #710, Omaha, NE 68131. Thomas A. Ruma, Alegent Health Immanuel Medical Center, 6001 N. 72nd Street, Omaha, NE 68122. Philip J. Vuchetich, Department of Pharmacy Practice, Creighton University, 2500 California Plaza, Omaha, NE 68178. P. James Murphy, Internal Medicine Department, Section of Pulmonary Medicine, University of Nebraska Medical Center, Omaha, NE 68198. Philip W. Smith, Infectious Disease and Epidemiology Associates, 4239 Farnam #710, Omaha, NE 68131.

Reprint requests: Daniel Boken, Infectious Disease and Epidemiology Associates, 4239 Farnam #710, Omaha, NE 68131.

**REFERENCES**