History

A 6-year-old female baboon was a part of a cohort of 12 female baboons purchased from a biomedical research institution. The baboon had been born at the institution. The cohort arrived at the Mayo Clinic, Rochester, Minn, in December 2005 and was quarantined for 6 weeks. During the period of quarantine, each baboon underwent 3 tests for infection with *Mycobacterium tuberculosis*, all of which yielded negative results. Baseline values of clinicopathologic variables were obtained. Samples of serum were submitted for serologic testing. All baboons in the cohort were positive for herpesvirus papio 2 and simian agent 11-rotavirus (group A). Ten of the 12 animals, including the 6-year-old baboon, were positive for simian T-lymphotropic virus-1. Physical examinations performed during the quarantine period did not indicate any clinical abnormalities in any member of the cohort. In September 2006, a cutaneous lesion on the fourth digit of the right hand of the baboon was detected.

Clinical and Gross Findings

Visual examination of the baboon revealed a raised, cutaneous, ulcerated lesion on the fourth digit of the right hand; the lesion was in the region of the distal interphalangeal joint (Figure 1). The baboon was sedated, and a physical examination, blood sample collection, radiography of the hand, and biopsy of the lesion were performed. The baboon's weight and body condition were considered normal. Physical examination did not reveal any other raised, cutaneous lesions or additional abnormalities. No abnormalities were detected via auscultation of the heart and lungs. Results of clinicopathologic analyses were within reference limits. Radiography of the hand revealed soft tissue swelling without bone involvement in the region of the distal interphalangeal joint.

Formulate differential diagnoses from the history, clinical findings, and Figure 1—then turn the page.
Histopathologic Findings

A tissue biopsy specimen was fixed in neutral-buffered 10% formalin, embedded in paraffin, and sectioned. Sections were mounted on glass slides and stained with H&E, Gomori methenamine silver, or McMannus periodic acid–Schiff stain. Histologic examination of the sections revealed pyogranulomatous inflammation and infection with a yeast-type organism. The yeast and pyogranulomatous inflammation extended to the borders of the submitted tissue specimens, suggestive of incomplete excision. Based on the initial histologic examination, the veterinary pathologist recommended amputation of the digit because the lesion was not healing and potentially posed a zoonotic risk to the clinic’s personnel. The baboon was anesthetized, and the digit was amputated. The digit was submitted for routine fungal culture, the results of which were negative for any fungal organism, including *Histoplasma* spp. Sections of the initial biopsy specimen were submitted to the Armed Forces Institute of Pathology for examination. The histomorphologic features of the yeast were consistent with *Histoplasma capsulatum var duboisii* (the causative agent of African histoplasmosis). The organisms were 8 to 15 µm in diameter and often arranged in short chains; because of single narrow-based budding, the organisms occasionally had an hourglass-like appearance (Figure 2).

Morphologic Diagnosis

Diffuse, severe, ulcerative, pyogranulomatous dermatitis with myriad intrahistiocytic and extracellular yeast, consistent with *H capsulatum var duboisii* infection.

Comments

*Histoplasma capsulatum var duboisii* is indigenous to Africa. In baboons, infection with this organism typically results in the development of discrete, raised, cutaneous lesions. These lesions develop most commonly in skin surfaces that contact the ground, such as the hands, feet, tail, and nates (gluteal region), but may also appear on the face, ears, and scrotum. Although *H capsulatum var duboisii* is endemic in the region between the Sahara and Kalahari deserts, infection with this organism in laboratory-born baboons in Texas has been reported, which suggests possible transmission of the organism via environmental contamination or contact with baboons imported from Africa. The baboon of this report was born in the United States and group housed prior to arrival at our facility. Therefore, the baboon most likely came into contact with the organism either during interactions with other baboons or via environmental exposure. At the biomedical research institution from which the baboon was obtained, an epizootic of *H capsulatum var duboisii* had previously occurred in the baboon colony. Over a 4-year period, 21 baboons were infected; 9 of those baboons developed a solitary ulcerative, cutaneous granulomatous lesion on either a digit or the tail. However, on the basis of information received from the biomedical research institution, the clinical history of the baboon of this report did not include cutaneous lesions or histoplasmosis.

In the parasitic yeast form of *H capsulatum var duboisii*, extracellular proteolytic enzyme activity breaks down the proteinaceous components of the host tissue, resulting in the ulcerative and necrotic lesions that are
typically associated with infections. There have been other case reports of *H. capsulatum* var *duboisii* infection in baboons. In one of the earliest reports, superficial lesions on the gluteal region, tail, and hands of a female baboon from Gambia were described. Bone erosion was evident in the tail and the proximal interphalangeal joint of that baboon. Another case report involved a male baboon that had been purchased from a wild animal preserve in Dallas. Infections have also developed in multiple animals in a colony of research baboons in San Antonio, Tex. Similar to the clinical findings in the baboon of this report, many of those affected animals had an ulcerative granuloma on a digit and the results of clinicopathologic analyses did not indicate any abnormalities. Also, in the reported epizootic, most of the affected baboons were female. Unlike the baboon of this report, many of the previously described cases involved osteolytic lesions, especially in the fingers and other parts of the hands. Some of the affected baboons had disseminated disease as evidenced by detection of fungal organisms in specimens of bone marrow, superficial lymph nodes, retroperitoneal lymph nodes, lung pleura, testes, and liver. Other than the lesion on the digit, the baboon of this report did not have any further clinical complications attributable to infection with *H. capsulatum* var *duboisii*.

The reason that fungal culture of the amputated digit yielded negative results may have been an absence of organisms in the surgically excised bone. However, *H. capsulatum* var *duboisii* grows very slowly in culture; even if growth does occur, the organism cannot be distinguished from *Histoplasma capsulatum* var *capsulatum* on the basis of culture characteristics. Results of fluorescent antibody testing or PCR assay may have been helpful in supporting the diagnosis of infection with *H. capsulatum* var *duboisii* in the baboon of this report. Typically, histomorphologic and staining features of the organism are generally considered adequate to identify the variant of the yeast. The paucity of information on the prevalence of *H. capsulatum* var *duboisii* infection in regions in which the organism is endemic, sources of infection, mechanisms of organism transmission, and incubation period warrants further investigation.

References