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# *CLINICAL CHALLENGE*
# CASE 1

*History:* A 5-yr-old captive-bred female Micronesian kingfisher (*Halcyon cinnamomina*) with no known disease exposure and a history of reproductive success was examined for recurrent lethargy and abdominal distention. The bird was in good body and feather condition but remained unresponsive and became progressively weaker over a 30-day period. A contrast radiograph showed a large mass filling the ventral abdomen and compressing the entire gastrointestinal tract dorsally and caudally (Fig. 1). Transcoelomic aspiration of the mass suggested a solid tissue composition, and a small amount of red-brown fluid was recovered.

Please make your diagnosis before continuing.

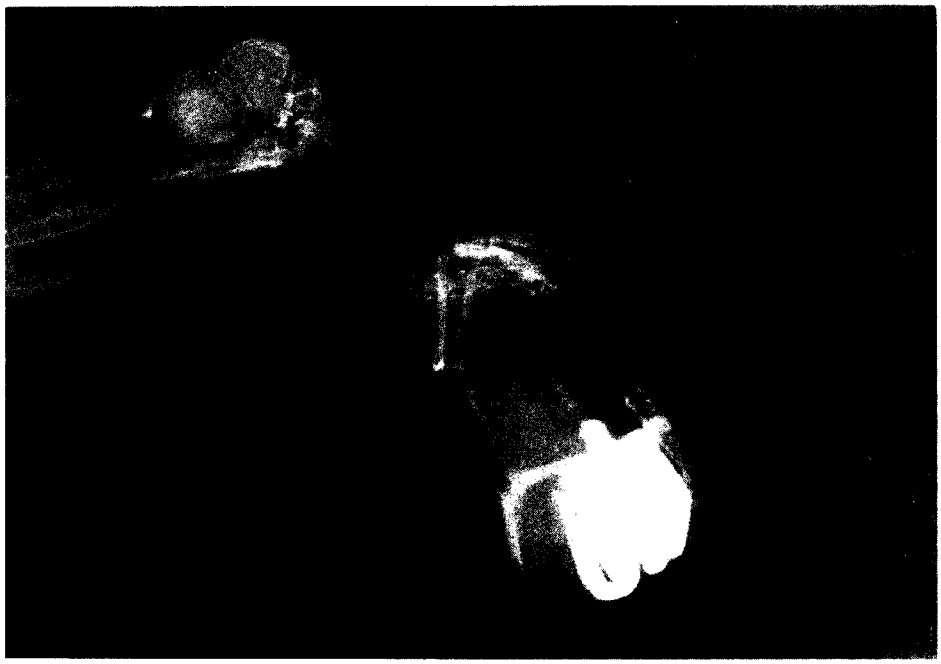

**Figure 1.** Lateral radiographic view of Micronesian kingfisher with abdominal distention after receiving barium sulfate.

**Figure 2.** Hepatomegaly in a Micronesian kingfisher with nontuberculous mycobacteriosis. Liver is swollen and pale but devoid of discrete foci or nodules.

*Diagnosis:* Hepatomegaly caused by nontuberculous mycobacteriosis.

*Discussion:* Ziehl-Neelson staining of the aspirate from the mass, which turned out to be the enlarged liver, showed numerous histiocytes containing dense aggregates of acid-fast bacilli. The bird was euthanized because of a poor prognosis and the high risk of transmission of avian mycobacteriosis. At necropsy, the liver was greatly enlarged, firm, and pale tan and completely filled the ventral abdominal cavity (Fig. 2); the spleen was also enlarged and pale. Distinct nodular lesions (tubercles) were not evident in liver and spleen or in any of the coelomic organs. Histopathologic examination of the liver revealed an extensive proliferation of histiocytes containing myriads of acid-fast organisms with marked displacement and atrophy of hepatic plates (Figs. 3, 4). Spleen and bone marrow were similarly involved, with fewer histiocytic lesions in the duodenum, thyroid, adrenal, gizzard, brain, ovary, oviduct, and lung. Typical granulomas with caseous necrosis were not evident in any of the organs.

Cultures of the liver from this kingfisher were positive for *Mycobacterium avium* serotype 1. In many species of birds, this serotype of *M. avium* usually results in tubercular lesions of the intestine, liver, spleen, and occasionally the bone marrow or lungs.[3] "Atypical" tissue reactions due to *M. avium,* however, have been reported in some passerine and other coraciine birds, resulting in nontubercular lesions.[1] Widely disseminated histiocytic mycobacterial infections similar to that of this kingfisher have been seen previously at the National Zoo in hoopoes (*Upupa epops*) and Gouldian finches (*Chloebia gouldiae*).[5] Morphologic differences in the lesions caused by *M. avium* serotype 1 are attributed to factors associated with the avian host response, including mechanisms of humoral and cell-mediated immunity and sensitivity and resistance to mycobacteria, which differ and have not

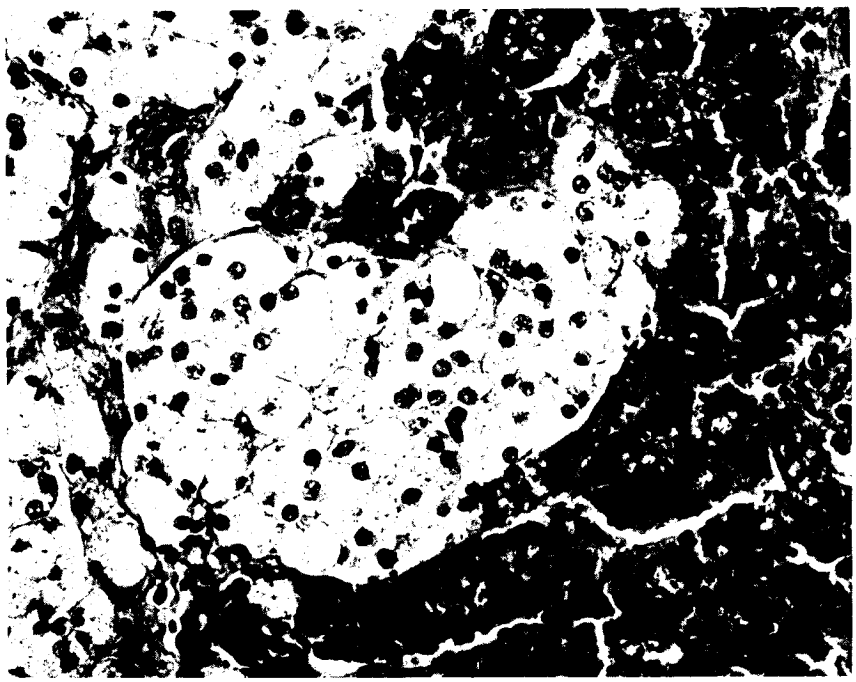

**Figure 3.** Liver section from the Micronesian kingfisher of Figure 2 shows heavy infiltrates of large foamy-appearing macrophages displacing hepatic plates. H&E, ×400.

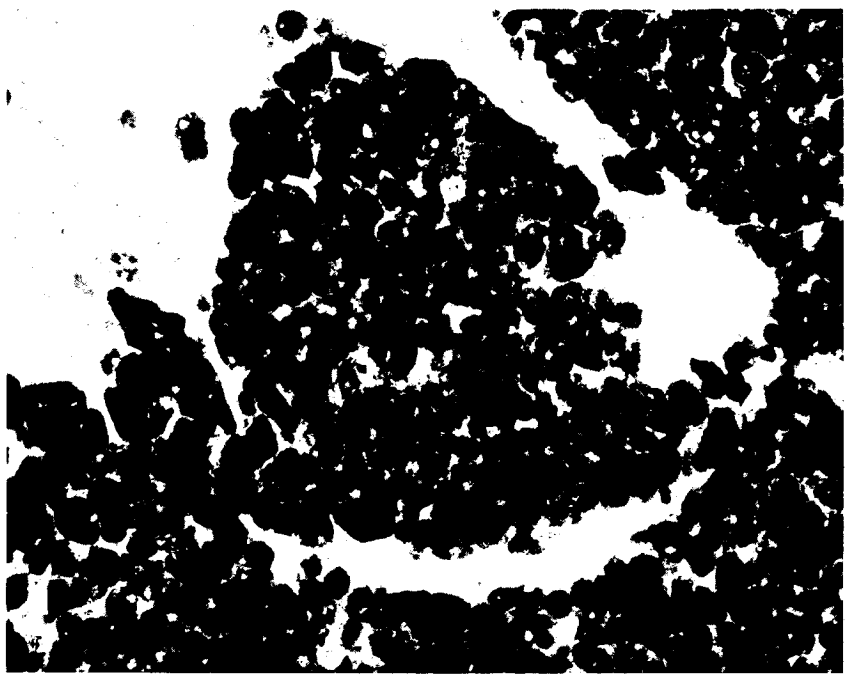

**Figure 4.** Field of liver from Figure 3 shows heavy acid-fast staining of histiocytes (all dark cells) due to massive cytoplasmic accumulations of *M. avium* bacilli. Ziehl-Neelson stain, ×300.

been clearly elucidated in most avian species.[2]

This case demonstrates the insidious nature of *M. avium* infection in exotic birds and emphasizes its widely variant pathologic manifestations that may be difficult to diagnose and may even be missed at necropsy. Despite widespread lesions and subtotal replacement of hepatic parenchyma, this bird showed only a relatively mild clinical course. By the time its infection was diagnosed, the bird's environment may have become heavily contaminated with mycobacterial organisms. Good management practices are therefore needed to control mycobacterial infections in zoo aviaries and should include strict sanitation procedures and restriction of bird movements.[4]

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