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Corynebacterial Pneumonia in an African Hedgehog

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ABSTRACT: A 3-mo-old, male African hedgehog (*Atelerix albiventris*) was anorectic and lethargic for a period of 3 days prior to death. Necropsy revealed lungs that were diffusely firm, dark red, and dorsally adhered by fibrinous tags to the pericardial sac. Histopathology revealed necrosuppurative bronchopneumonia with pulmonary abscesses and suppurative pericarditis and myocarditis. A *Corynebacterium* sp. was isolated from the lungs. We believe this is the first reported case of corynebacterial pneumonia in an African hedgehog.

Key words: African hedgehog, *Ateletrix albiventris*, case report, *Corynebacterium* sp., pneumonia.

In February 1996, a privately owned, 3-mo-old, male African hedgehog (*Atelerix albiventris*) was presented dead to the Animal Disease Diagnostic Laboratory (Purdue University, West Lafayette, Indiana, USA) for routine necropsy. The hedgehog was anorectic and lethargic for 3 days prior to death. At necropsy, the hedgehog weighed 200 g and had scant subcutaneous and intra-abdominal fat. The lungs were diffusely swollen, dark red, wet, and failed to collapse. The dorsal portion of the right lung was loosely adhered by fibrinous tags to the pericardial sac. On section, the pulmonary parenchyma had several, approximately 1.0 mm in diameter, scattered, gray foci. Other gross lesions were lingual erosions and hepatic congestion.

Sections of lung, heart, spleen, tongue, kidney, liver, small intestine, large intestine, pancreas, urinary bladder, brain, esophagus, trachea, thyroid glands, testis, adrenal glands, salivary gland, and stomach were fixed in 10% neutral buffered formalin, embedded in paraffin, sectioned at 5 μm, and stained with hematoxylin and eosin. Sections of lung also were stained with Brown and Hopps Gram stain (Luna, 1968). Histologically, there was necrosuppurative bronchopneumonia with pulmonary abscesses. Bronchioles, alveolar ducts, and alveoli contained neutrophils and histiocytes admixed with fibrin and proteinaceous edema fluid (Fig. 1). In areas of bronchopneumonia, alveolar septa were multifocally necrotic and obliterated by neutrophils. Amalgamated with the inflammatory cells and necrosis were colonies of Gram positive bacteria (Fig. 2). Also, within the pulmonary parenchyma were pulmonary microabscesses characterized by circumscribed foci of liquefactive necrosis that were partially to completely encapsulated by fibrous connective tissue.

Microscopic examination of the heart revealed suppurative epicarditis and myocarditis. This lesion was characterized by expansion of the epicardium with neutrophils, eosinophils, few mast cells, erythrocytes, histiocytes, and fibrin (Fig. 3). The inflammatory cellular infiltrate extended into the subjacent right atrial and ventricular myocardium. Other histologic findings were splenic extramedullary hematopoiesis, lingual erosions, and hepatic congestion.

Samples of lung, kidney, liver, and lymph node were incubated on blood and McConkey agar (Difco Laboratories, Detroit, Michigan, USA) at 37 C with 5% CO_2 for 24 to 48 hr. Isolated colonies were identified either by Vitek automatic identification system (Biomerieax Vitek Inc., Hazelwood, Missouri, USA) or manual biochemical tests. All specimens were negative for bacterial growth except for the isolation of a *Corynebacterium* sp. from the lung. The isolated bacteria were Gram positive, catalase positive, nitrate negative, urea negative, H_2S negative, glucose positive, maltose positive, nonhemolytic, nonmotile, short rods that fermented and oxidized Oxidation-Fermentation (OF) tubes.

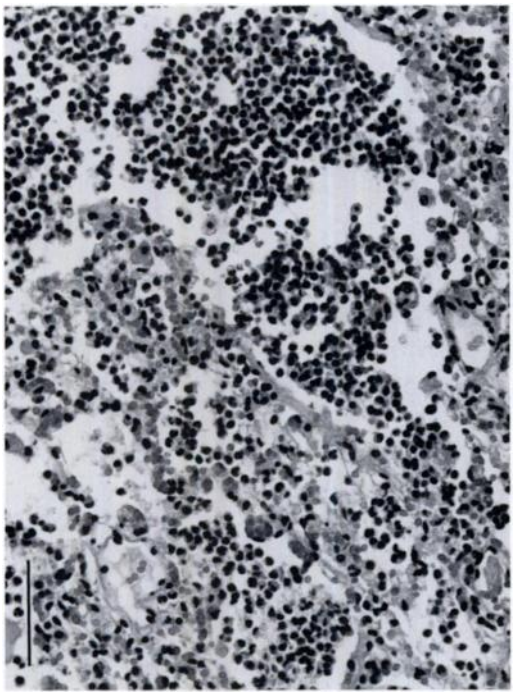

FIGURE 1. Lung from an African hedgehog with corynebacterial pneumonia. Alveolar ducts and alveoli contained neutrophils and histiocytes admixed with fibrin and edema. H&E stain. Bar = 75 μm.

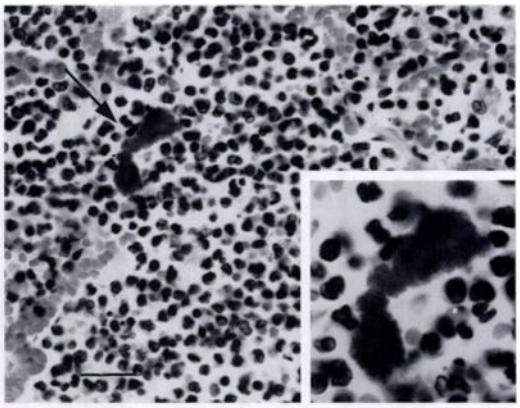

FIGURE 2. Lung from an African hedgehog with corynebacterial pneumonia. Admixed with inflammatory cells in alveoli were colonies of bacteria (arrow). H&E stain. Bar = 50 μm. Insert shows higher magnification of the bacterial colonies.

This species of *Corynebacterium* was biochemically different from *C. pseudotuberculosis, C. renale, C. equi,* and *C. kutscheri.* Its biochemical response was most similar to *C. xerosis* except that our isolate was nitrate negative. Further diagnostic testing to better characterize the bacteria was not available in this case.

Diagnosis of corynebacterial pneumonia was based upon histopathologic lesions within the lungs, histochemical staining results, and isolation of a *Corynebacteria* sp. from the lungs. *Corynebacteria* spp. have been associated with pneumonia and pulmonary abscesses in domestic and wild mammals. This is the first reported case of corynebacterial pneumonia in an African hedgehog.

Pneumonia in hedgehogs is typically caused by bacterial or parasitic pathogens. *Bordetella bronchiseptica* has been associated with contagious rhinitis and bronchopneumonia in a colony of captive hedgehogs (Wallach and Boever, 1983). *Pasteurella* sp. including *P. multocida* have been isolated from both the lungs of healthy hedgehogs and hedgehogs with bronchopneumonia and pulmonary abscesses (Smith, 1968; Isenbugel and Baumgartner, 1993). Other bacteria that have been isolated from hedgehog lungs are *Haemophilus* spp. and hemolytic streptococci (Smith, 1968). In our case, a *Corynebacteria* sp. was isolated from the lungs of a hedgehog with bronchopneumonia and pulmonary microabscesses.

Lungworm infections also have been associated with bronchopneumonia in hedgehogs (Hoefer, 1994). *Crenosoma striatum, Spiroptera erinacei, Physaloptera orientalis,* and *Capillaria aerophila* are nematode parasites known to infect the lungs of hedgehogs (Smith, 1968; Isenbugel and Baumgartner, 1993; Hoefer, 1994). *Bordetella* sp. bronchopneumonia is commonly associated with *C. striatum* infection in wild hedgehogs (Gregory, 1991), and a large percentage of wild European hedgehogs (*Erinaceus europaeus*) are infected with *C. striatum* (Isenbugel and Baumgartner, 1993). There was no histologic evidence of verminous pneumonia in this hedgehog.

Hedgehogs are sensitive to changes in

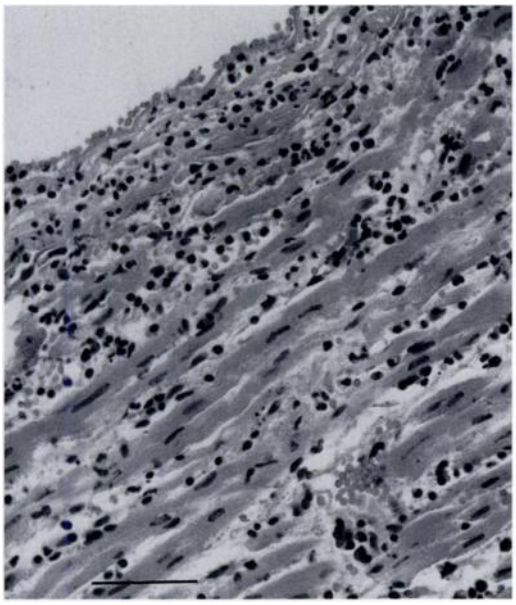

FIGURE 3. Heart from an African hedgehog with corynebacterial pneumonia. The epicardium and myocardium of the right atrium were infiltrated by inflammatory cells admixed with erythrocytes and fibrin. H&E stain. Bar = 75 μm.

environmental temperatures, and when exposed to unfavorable environmental conditions, they are predisposed to developing pneumonia. Ambient temperatures should normally be kept at 25 to 30 C (Smith, 1992). Hedgehogs kept at temperatures below 25 C are particularly susceptible to developing respiratory infections. The use of clean, absorbent bedding also is important to help reduce the incidence of pneumonia. The housing conditions for the hedgehog in this case were unreported, but temperature regulation of its enclosure was not provided during the winter month in which the pneumonia occurred.

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