COMMON AND EMERGING DISEASES OF REPTILES: VIRAL INFECTIONS

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HERPESVIRUS

Herpesvirus infections are particularly common in tortoises. Argentine, desert, spur thigh, Russian, and red footed tortoises seem to be most commonly affected although sporadic cases are seen in others. Typically affected animals present with necrotizing Stomatitis and rhinitis. Histologically, mucous membranes have mucosal necrosis with inclusions. Visceral necrosis may also be seen, with inclusions in endothelial and epithelial cells of the liver, spleen, and kidney. Diagnosis is made histologically in most cases. Electron microscopy, viral isolation, and PCR with gene sequencing are also useful.

Herpesvirus infections also occur in marine turtles. Fibropapillomatosis is an important neoplastic disorder of wild green, loggerhead and hawksbill turtles. Affected turtles have papillomas covering skin that can impair vision and swimming ability.

Visceral fibroma and fibrosarcoma may also be components of this disease. A putative herpesvirus is the cause for this condition, based on electron microscopic demonstration of viral particles in the lesions, and presence of herpesvirus gene sequences in affected tissues. The virus has not been cultured, but the disease can be transmitted using affected tissue homogenates.

Grey Patch disease is a disease of young green turtles, characterized by patchy skin lesions. Lung, eye and trachea Disease (LET) is a disease of older green turtles, and has respiratory, conjunctival lesions.

ADENOVIRUS

Adenovirus infection is perhaps most important in young bearded dragons. Clinically these animals have a brief episode of lethargy or are found dead. Necropsy may reveal no lesions or hepatomegaly. Histologically, affected animals have necrotizing hepatitis with intranuclear inclusions. Inclusions in enterocytes also are common, but usually there is little or no enteric inflammation or necrosis. Electron microscopy is helpful in confirming that the inclusions are caused by adenovirus, although histologic changes in conjunction with history and signalment usually are sufficient. The epizootiology of this condition is not well understood, adults may carry this infection and transmission may be vertical.

Sporadic adenovirus infections are seen in other reptiles, and it appears that an adenovirus is emerging as an important cause of chronic gastritis in snakes.

PARAMYXOVIRUS

Paramyxovirus infection in snakes is one of the first well described viral infections of reptiles. This condition affects a broad spectrum of different species, is highly contagious, and frequently is fatal. Thus is can be devastating for serpentariums in zoos, venom laboratories, or private breeding facilities. Outbreak often can be traced to a breach in quarantine procedures. Clinical signs include respiratory difficulty, oral or nasal discharge, star gazing or found dead. Necropsy reveals reddened lungs. Histologically affected animals may have proliferative pneumonia, dysplasia and necrosis of the pancreatic, salivary or biliary ducts, and sometimes may have encephalitis. Secondary bacterial pneumonia is common in affected snakes. Diagnosis is best made by histologic examination of a comprehensive tissue set. It is best to have a combination of compatible lesions, to reduce the possibility of a misdiagnosis. Viral culture immunohistochemistry and electron microscopy can be useful ancillary diagnostic techniques but may not be practical, financially feasible or readily available.

Recently paramyxovirus infections in iguanas, caiman lizards and spiny tailed lizards have been diagnosed or formally documented.

INCLUSION BODY DISEASE

Inclusion body disease has been formally documented in boids and palm vipers.

Affected animals present with wasting, CNS signs, secondary infections, and metabolic disease. Histologically, eosinophilic globular cytoplasmic inclusions are seen in various cell types in most tissues. This disease may be capable of vertical and horizontal transmission, and has been diagnosed in neonates of affected dams. The etiology of this condition is not known. Early reports of retrovirus infection in affected animals suggest a viral etiology, but viral particles have not been found in the inclusions. Morphologically the condition more closely resembles a storage disease, although the epizootiology is more consistent with an infectious process. It is possible that a infectious agent may be affected cell metabolism, resulting in excessive storage of cell byproducts. This disease is a major problem in serpentariums that house or breed susceptible species. Currently the most affected method of control is test and cull, as no treatment is available. Hepatic biopsy appears to be a very sensitive screening method. Cytology can be helpful in raising the index of suspicious but should not be relied upon for definitive diagnosis due to the possibility of false positive and false negative results.

INTRANUCLEAR INCLUSION DISORDER OF MORELIA

This is a disease primarily of carpet pythons and appears to be rare. Affected snakes have been adults and present with CNS signs. Histologically, snakes have myenteric ganglioneuritis and encephalitis. Glial cell intranuclear inclusions of filamentous material are prominent and numerous. These inclusions are likely viral and most closely resemble paramyxovirus filaments.

POXVIRUS

Poxvirus infections are not common in reptiles. Cutaneous poxvirus infections are occasionally seen in lizards and crocodilians, and these usually are self-limiting. Chameleons have a form of poxvirus infection that affects circulating blood cells. Histologically, poxvirus infection is characterized by proliferative changes in the epidermis, intracellular edema, and formation of intracytoplasmic large eosinophilic inclusions referred to as “Bollinger bodies”. Diagnosis usually is made by histopathology, although electron microscopy is a useful ancillary technique to confirm that the inclusions contain poxvirus.

PAPILLOMATOSIS

Cutaneous papilloma occasionally is seen in turtles, iguanas, bearded dragons, and alligators. We have not seen these lesions in snakes. The lesions have morphologic
features typical of papillomas caused by herpesvirus or papillomaviruses in other species. The lesions are solitary or multicentric in the skin or oral mucous membranes, and can spontaneously regress. The lesions are comprised of papilliform proliferations of epidermal or mucosal epithelium sometimes with large basophilic cells “koilocytes”. Rare

intranuclear inclusions may be seen in these lesions. Few reports document morphologic evidence of viral particles in the lesions. It is our experience that epizootiology and histopathology support viral etiology, but demonstration of viral particles or gene sequences in the lesions is very difficult.