



# Pathology in Practice

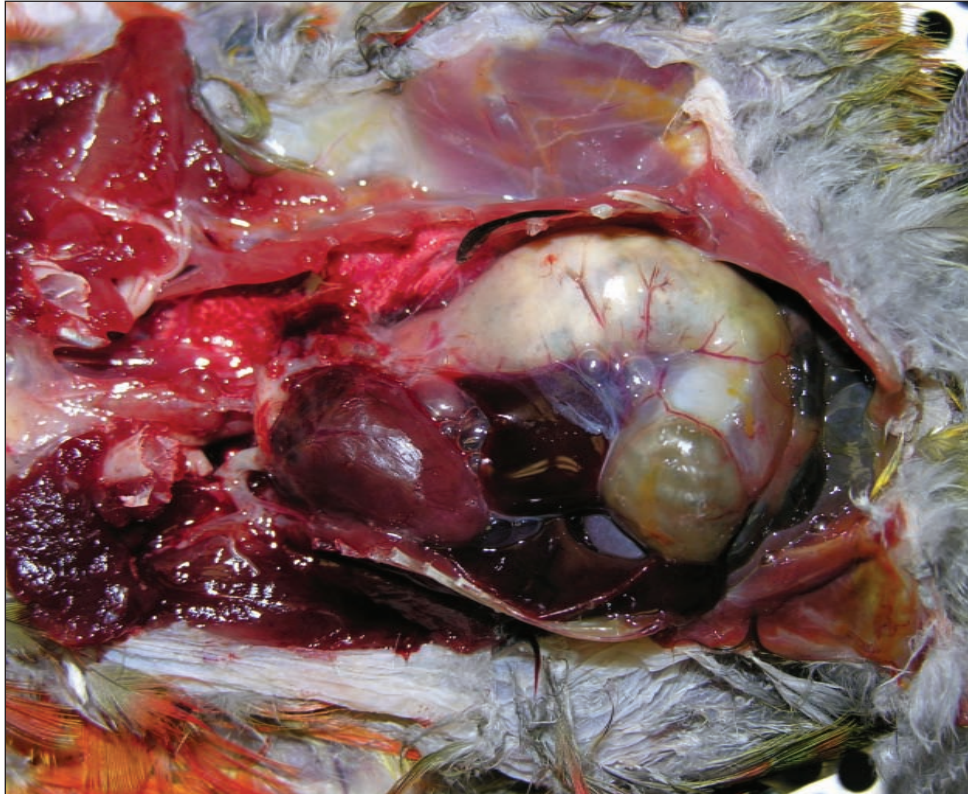


Figure 1—Photograph of the coelomic cavity of a Jenday Conure (*Aratinga jandaya*) that was evaluated because it was semicomatose, generally unresponsive to stimuli, dehydrated, and in poor musculoskeletal condition. The bird died shortly after initiation of supportive treatments. Notice that the proventriculus and ventriculus are filled with large amounts of undigested food and occupy almost a quarter of the coelomic cavity. In a clinically normal bird undergoing necropsy, the proventriculus is usually hidden from view by the liver.

## History

An evaluation was performed on a 6-year-old female Jenday Conure (*Aratinga jandaya*) that was in semicomatose condition and generally unresponsive to stimuli. The bird was dehydrated and in very poor musculoskeletal condition. According to the owner, the bird had no history of vomiting, diarrhea, coughing, sneezing, or abnormal behavior. Initial treatments included oxygen therapy,

SC administration of fluids, and heat support. The patient died within 15 minutes of initiation of treatment, and necropsy was performed.

## Clinical and Gross Findings

At necropsy, the bird weighed 89.9 g (0.2 lb) and was in fair body condition with moderate atrophy of the pectoral muscles. The proventriculus and ventriculus were markedly large (Figure 1). The proventriculus, ventriculus, and intestinal tract were filled with large amounts of undigested seeds.

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

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## Histopathologic Findings

Sections of various tissues were examined histologically. The ganglia and nerves of the crop, proventriculus, ventriculus, and intestines were effaced and expanded by inflammatory infiltrates of moderate numbers of lymphocytes admixed with fewer plasma cells (Figure 2). Mild perivascular infiltrates were also observed in the tunica muscularis of the ventriculus, and the proventricular mucosa contained a focal heterophilic infiltrate. Perivascular cuffing composed of 2 to 5 layers of lymphocytes and plasma cells was evident throughout the brain (Figure 3). Multiple lymphoplasmacytic infiltrations were present in the adrenal

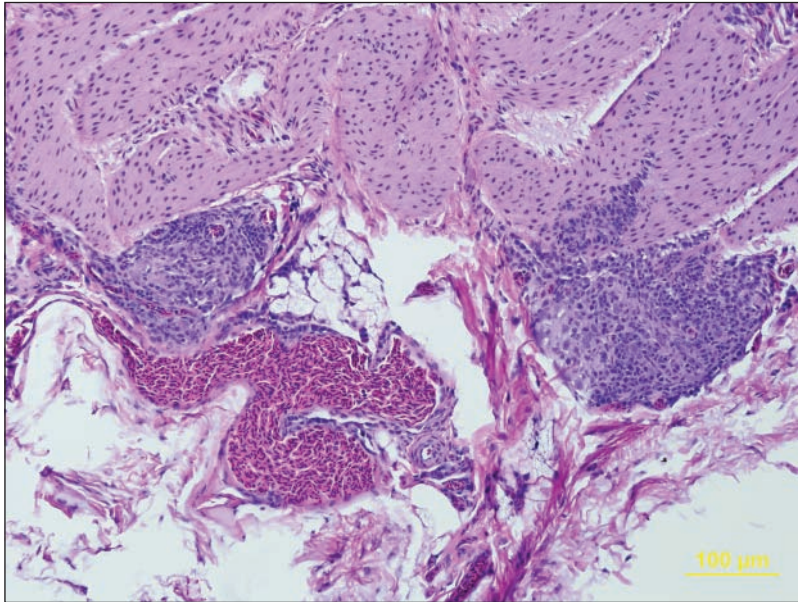


Figure 2—Photomicrograph of a section of the tunica muscularis of the crop of the bird in Figure 1. Multiple ganglia and nerves within the tunica muscularis are effaced and expanded by severe lymphoplasmacytic infiltrate. H&E stain; bar = 100  $\mu$ m.

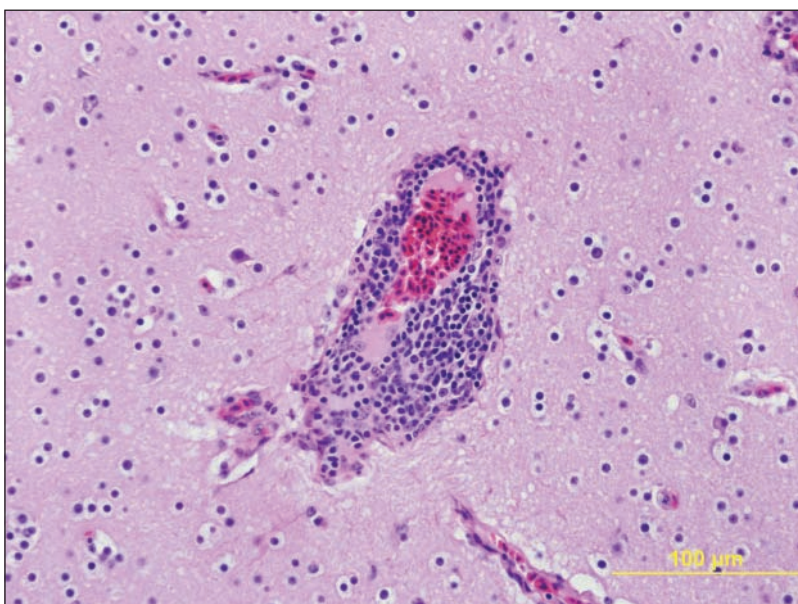


Figure 3—Photomicrograph of a section of the brain of the bird in Figure 1 illustrating the presence of lymphoplasmacytic perivascular cuffing. H&E stain; bar = 100  $\mu$ m.

medulla, in the periadrenal ganglia, and within nerves adjacent to the thyroid and parathyroid glands.

## Morphologic Diagnosis

Severe proventricular dilatation; moderate, multifocal, lymphoplasmacytic, ingluvial, proventricular, ventricular, intestinal, periadrenal, and perithyroidal ganglioneuritis; and severe, multifocal, lymphoplasmacytic meningoencephalitis and medullary adrenalitis.

## Comments

The gross and microscopic lesions in the bird of this report were typical of proventricular dilatation disease (PDD). This disease was first identified in macaws in the 1970s and is now known to affect psittacine birds worldwide.<sup>1-4</sup> Clinical signs and lesions consistent with PDD in nonpsittacine birds such as Canada geese, a canary, a greenfinch, a bearded barbet, and a long-wattled umbrellabird have also been reported.<sup>5,6</sup> Although the etiology of PDD has not been confirmed, it has been suggested that a neurotropic virus is the probable cause. An unclassified 80-nm, enveloped virus has been identified in affected birds, and the virus is capable of inducing disease in experimentally infected psittacine birds.<sup>1,2</sup> The development of PDD-like disease has also been detected after injection of birds with psittacine gangliosides.<sup>7</sup> More recently, it has been suggested that a bornavirus may be involved,<sup>4,8</sup> but Koch's postulates for such a causal relationship have not been fulfilled to date.

Proventricular dilatation disease is also known as macaw wasting syndrome, neuropathic gastric dilatation, or lymphoplasmacytic ganglioneuritis and encephalomyelitis. The underlying inflammation within the central, peripheral, and autonomic nervous systems leads to the clinical signs of gastrointestinal dysfunction and CNS disease. These signs can include weight loss, regurgitation, excretion of undigested food, weakness, ataxia, and seizures. Although gastrointestinal and CNS signs can develop concurrently, either may develop alone.<sup>1-4,8,9</sup> A presumptive antemortem diagnosis of PDD can be made on the basis of history, clinical signs, and radiographic findings<sup>10</sup>; histologic evidence of lymphoplasmacytic ganglioneuritis in biopsy specimens of the proventriculus or ventriculus provides a definitive diagnosis.<sup>11</sup> Because of the risk of such biopsy procedures in debilitated birds, crop biopsy specimens are more commonly obtained for antemortem diagnosis.<sup>11</sup> However, the likelihood of obtaining false-negative results appears higher with histologic ex-



amination of crop biopsy specimens than examination of proventricular or ventricular biopsy specimens.<sup>11</sup> Collection of a full-thickness crop biopsy specimen and examination of multiple sections of the same tissue increases the likelihood of detecting characteristic histologic lesions.<sup>11</sup> Microscopic lesions can be found in a variety of other ganglia throughout the body. Histologic evaluation of tissues is characterized by lymphoplasmacytic infiltrates that are most often within myenteric ganglion and nerves. These infiltrates may also be present in the brain, spinal cord, sciatic and other peripheral nerves, conductive tissue of the heart, smooth and cardiac muscles, and adrenal glands.<sup>2,8,12</sup>

Differential diagnoses for lymphoplasmacytic meningoencephalitis in birds include other viral infections, such as infections with paramyxovirus, alphavirus (Eastern and Western equine encephalitis), picornavirus (avian encephalitis virus), adenovirus, influenza A virus, and West Nile virus.<sup>12</sup> However, these viruses do not usually cause the gastrointestinal tract lesions that are associated with PDD.

Although there is no known cure for PDD, most owners choose supportive treatment rather than euthanasia of affected birds. Treatment with cyclooxygenase-2 inhibitors has been successful in some instances.<sup>13</sup> However, it has been proven that PDD is transmissible,<sup>2</sup> and quarantine of affected birds might be important in aviary settings wherein birds commingle.

## References

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