

Proventricular Dilation Disease Concurrent with Inguvitis in an Indian Ring-necked Parakeet (*Psittacula krameri manillensis*)

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Abstract : A six-year-old, intact female Indian ring-necked parakeet (*Psittacula krameri manillensis*) was presented due to chronic weight loss and anorexia. The bird was tentatively diagnosed as proventricular dilation disease (PDD) by radiographic evidences of dilated crop and proventriculus. The patient was symptomatically treated, however the bird was die two months after the first presentation. At necropsy finding, distinctive signs of PDD were noted, and PDD concurrent with ingluvitis was finally diagnosed according to histopathologic examination.

Key words : bird, Indian ringneck parakeet (*Psittacula krameri manillensis*), ingluvitis, proventricular dilation disease (PDD)

Introduction

Proventricular dilation disease (PDD) has been known as neuropathic gastric dilation, psittacine wasting syndrome, lymphoplasmacytic ganglioneuritis, and encephalomyelitis. It is a progressive and fatal disease, characterized histologically by lymphoplasmacytic infiltrates in central and peripheral nervous tissue (1,6,8,10). This condition is most commonly seen in macaws, but spoon bills, Canada geese, toucans, finches, and more than 50 species of psittacines have been also affected (1,8,9). This case report describes the clinical and histopathologic findings of PDD in a parakeet bird.

Case Report

A six-year-old, intact female Indian ring-necked parakeet (*Psittacula krameri manillensis*) was presented for evaluation of chronic weight loss, diarrhea, and anorexia for two months. The bird was inhabited in the non-painted stainless steel cage with one mate bird. The mate bird revealed normal body condition on physical examination. The offered diet was composed of pellets, fruits, and seeds.

Body weight of the bird was 100 g (normal range; 150 to 200 g), and marked atrophy of the pectoral musculature was appeared. Abnormal findings including delay of bacilic vein refill time, dull and stress line feathers at the whole body feathers, and air filled crop were noted on physical examination.

Tail feathers were contaminated with droppings. Choanal and cloacal swabs and crop washing were performed for ruling out of bacterial, mycotic, or protozoal infection of the gastrointestinal tract. Examination of the cloacal specimen revealed numerous budding yeasts. Cytological examination of crop washings revealed abundant gram-positive cocci and budding yeasts. These yeasts were confirmed as *Candida* spp. based on the isolation test. On radiographic findings, air-filled crop and dilated proventriculus were prominent (Fig 1, A and B). Crop cytology from the patient indicated bacterial and fungal overgrowth in the crop even though most normal birds normally contain mixed population of gram-positive bacterial and occasional yeasts. Therefore, this patient was initially diagnosed as PDD based on history, clinical signs, and radiographic findings. In addition, secondary intestinal candidiasis, ingluvitis, and crop stasis were also noted.

According to previous examinations, initial treatment was consisted of metoclopramide (Metoclopramide, Sinil pharm, South Korea, 0.5 mg/kg, PO, BID), itraconazole (Itraconazole, Iyeoun pharm, South Korea, 5 mg/kg, PO, SID) and enrofloxacin (Baytril 50injR, Bayel Korea, South Korea, 10 mg/kg, PO, SID). Separation of the mate from the patient was also recommended. Two weeks later, the bird became alert, and clinical signs including anorexia and crop dilation were remarkably improved. However, body weight was not increased and the bird was suddenly died at six weeks after initial examination. Based on the consent of owner, we performed necropsy for definitive diagnosis.

Postmortem examinations revealed severe pectoral muscle atrophy (Fig 2A), dilated crop and proventriculus (Fig 2B and

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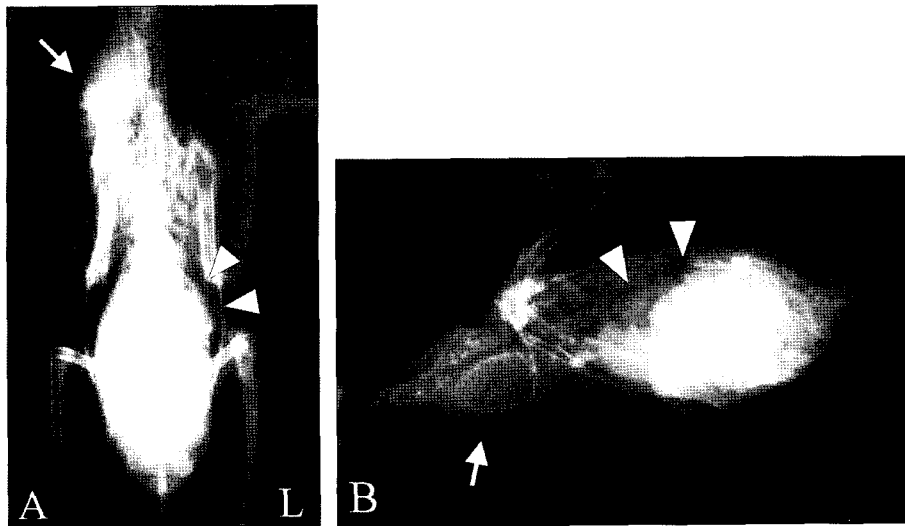


Fig 1. Radiographic examinations. A: Ventrodorsal (VD) view of a parakeet. Dilated crop with air (arrow) and dilated proventriculus (arrow heads) are noted. Decreased size of left abdominal air sac and widening of cardiohepatic angle are detected due to dilated proventriculus. B: Right lateral view of a parakeet. Same as a VD aspect, severely dilated crop with air (arrow), elevation of the proventriculus-ventriculus shadow, and dilated proventriculus (arrow heads) are prominent.

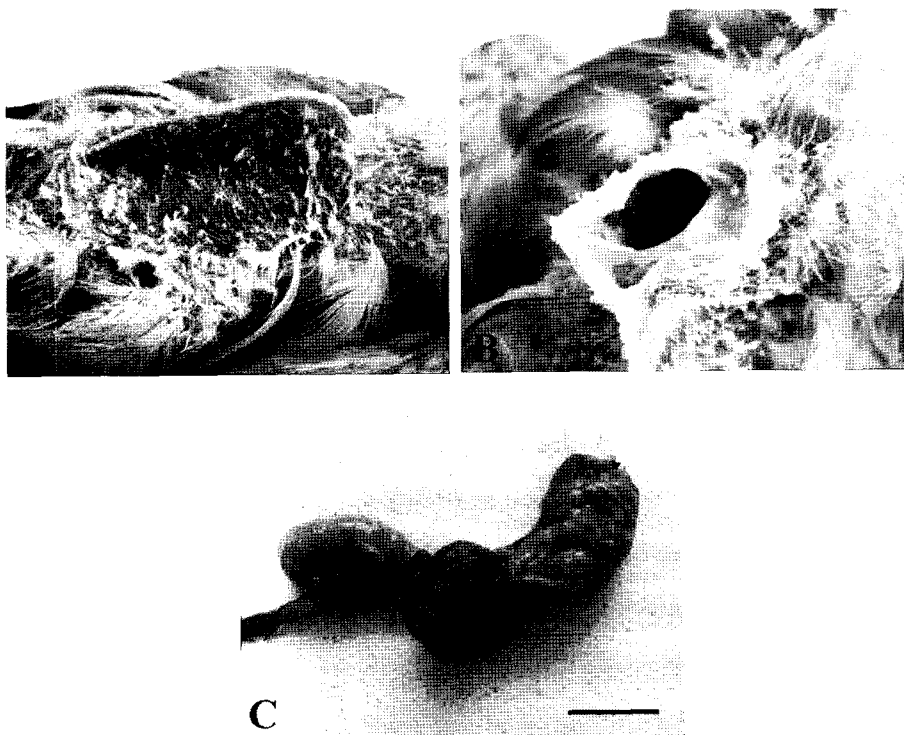


Fig 2. Postmortem examinations of a bird with PDD. A: Severe pectoral muscle atrophy is revealed. B and C: Undigested seeds are noted in the crop and proventriculus. Crop wall is pale and thin. Proventriculus is distended with undigested materials which are well distinguished with naked eye because of thin wall. Scale bar = 2 cm.

C), and distended and transparent duodenal loop, which are consistent findings of PDD. Collected crop and proventriculus tissue were fixed in 10% formalin, cut section, and stained with hematoxylin and eosin (H&E) using a routine method for light microscopic examination. On the microscopic

appearance, the ganglia of crop and proventriculus had multifocal lymphoplasmacytic infiltrates and degeneration of neurons (Fig 3A and B). The microscopic changes in the myenteric plexus of crop and proventriculus were suggestive of PDD. Moreover, the crop had multifocal bacterial infec-

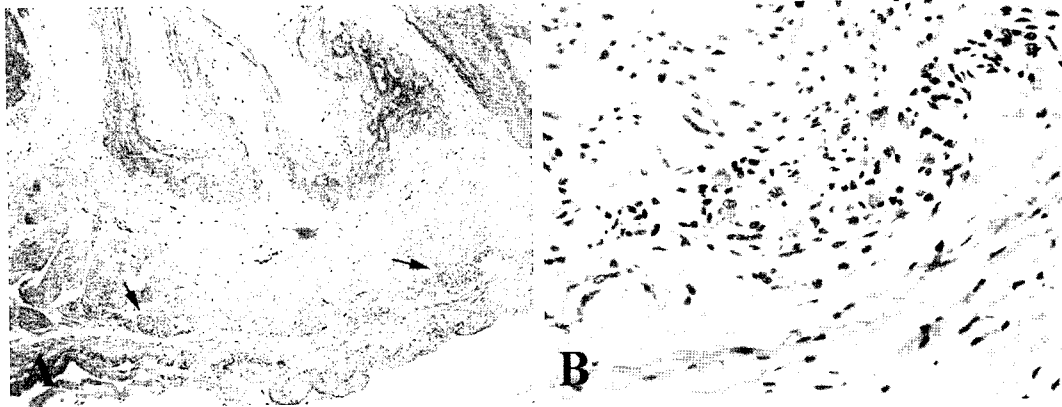


Fig 3. Histopathologic examinations. A: Lymphoplasmacytic infiltration is noted on the crop. $\times 400$. B: Magnification of right arrow in a figure A. $\times 1000$, H&E stain.

tion, likely secondary to the stasis. Accordingly, the bird was definitively diagnosed as PDD concurrent with ingluvitis based on the histopathological findings.

Discussion

PDD shows histologic and epidemiologic characteristics exist to suggest a neurotrophic virus, which was suspected of a togavirus or paramyxovirus (2,5,7,9). The virus causes lymphoplasmacytic infiltration of the nerve ganglia supplying the musculature of the gastrointestinal tract, peripheral, and central nervous system (8). Numerous clinical signs are revealed depending on the lymphoplasmacytic infiltration in the region of nervous tissues. Accordingly, gastrointestinal signs including progressive weight loss, delayed crop emptying, regurgitation, undigested seeds in the feces were observed. Furthermore, neurologic signs including ataxia, limb weakness, difficulty perching, or cardiologic signs could be presented, or a combination of both (7,8,9). Generally, early signs revealed gastrointestinal signs and neurologic signs accompanied lately (9). Chief signs of this case were limited gastrointestinal signs, weight loss, diarrhea, and anorexia. Typical gastrointestinal signs of PDD presented in this patient supported diagnostic localization.

Due to numerous clinical signs and normal results of blood profiles, definitive diagnosis is practicable based on a biopsy of the crop, proventriculus, or ventriculus. Radiography and contrast studies could be used for diagnostic tool, even though the dilation of proventriculus can be the results of other diseases and the proventriculus of PDD may be appeared radiographically normal (7,8,9). Large biopsy (0.5×0.5 cm) of crop tissue containing at least one visible vessel to ensure the presence of a nerve is required (2,8). Crop biopsy with endoscopy is commonly used diagnostic technique. However, this method showed false negative diagnostic results due to the variable distribution of nerve involvement. Recent studies (4,5) showed that approximately only 70% birds with a clinical diagnosis of PDD has lymphoplasmacytic infiltrates in the crop. Therefore, diagnosis of PDD is very difficult. Because

crop biopsy can offer negative results and ventriculus biopsy is not indicated due to common complications (7). As a result, numerous PDD is finally diagnosed postmortem examination accompanied with histopathologic study. Histologically, lymphoplasmacytic infiltration of the splanchnic nerves in the muscular tunics of the proventriculus, ventriculus, and crop are observed. Nonsuppurative encephalitis, myelitis, and radiculoneuritis can also occur concurrently or solitary (7).

This patient revealed remarkable PDD signs on the radiographic examination. For these reasons we needed further study such as contrast study or crop biopsy. But, additional study was not performed due to debilitated state of the patient. Accordingly, definitive diagnosis could be accomplished after necropsy and finally diagnosed based on the histopathologic examinations. Isolation test of the virus that induced disease in this patient did not performed.

The prognosis of PDD is poor to grave because no treatment was available other than supportive care (2). Median survival time of PDD is variable depending on the progress and severity of the clinical signs. This patient showed six weeks survival time. Cyclooxygenase-2 (cox-2) and alpha interferon were recently suggested of new choice. Supportive care also indicated with force feeding, liquid diet, gastrointestinal promotility drugs, parenteral vitamins, and antifungal or antibacterial drugs (2,7,9). In addition, hygiene, separation of other birds is critical in that of transmissible behavior (7). The efficacy of new medicines had not been clarified yet. Unfortunately we chose a symptomatic treatment instead of applying new medical treatment, so efficacy of these drugs couldn't confirm.

PDD can be complicated with primary or secondary bacterial, mycotic, or protozoal infection because of partial or complete obstruction of the intestines or crop stasis due to decreased gastrointestinal motility (1,7). In the same manner, the bird affected presented secondary bacterial and mycotic infections on initial and histopathologic examinations. It is suggested that affected birds are indicated to examine crop washings and feces for diagnosis of other concurrent infections.

In conclusion, this case is finally diagnosed as PDD con-

current with ingluvitis according to clinical, radiographic, and histopathological findings in an Indian ring-necked parakeet bird. Early diagnosis with crop biopsy and appropriate treatment are crucial to manage and treat PDD in birds.

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인디안 링넥 앵무새에서 발생한 소낭염을 동반한 선위확장증

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요 약 : 6개월령의 암컷 인디안 링넥 앵무새가 만성 식수와 식욕부진을 주 증상으로 내원하였다. 새는 방사선 검사상에서 소낭과 선위 확장을 보여 선위확장증으로 잠정 진단 되었었으며 환자에게 대증 치료를 실시 하였으나 내원 2달이 지난 후 폐사하였다. 부검소견상, 선위 확장증의 특징적인 소견이 관찰되었으며, 조직검사를 통하여 최종적으로 소낭염을 동반한 선위 확장증으로 확진 되었다. 이 증례보고는 국내에 아직까지 보고되지 않았던 선위확장증에 대한 임상적이고 조직병리학적 내용을 서술하고 있다.

주요어 : 새, 인디안 링넥 앵무새, 소낭염, 선위확장증