

# AN ATYPICAL CASE OF PROVENTRICULAR DILATATION DISEASE

## IN A RED-AND-GREEN MACAW (*ARA CHLOROPTERUS*)

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### ABSTRACT

A red-and-green macaw (*Ara chloropterus*) was presented with inappetence, regurgitation and the passage of undigested seeds in the feces. Radiographic examination revealed severe dilatation of the proventriculus but PCR and serological testing for parrot bornavirus (PaBV) were negative. Contrast radiography was performed and revealed that the proventricular dilatation and associated clinical signs resulted from circumferential thickening of the proventricular wall leading to severe narrowing of the lumen of the proventriculus. Based on further testing, psittacid herpesvirus 1, megabacteriosis and parasitosis were considered unlikely as possible causes for the clinical signs and associated radiographical findings. Other etiologies of proventricular disease, such as neoplasia, mycobacteriosis and zygomycosis, could not be entirely excluded. The owners, declined the collection of gastric biopsies for histological examination and microbiological and molecular testing. Following the initiation of antimicrobial treatment because of suspected dysbacteriosis, all clinical signs resolved and radiographs taken four months after initial presentation revealed a normal appearance and size of the proventriculus. For the present case, bacterial proventriculitis associated with hyperplasia of the proventricular wall was put forward as a final but presumptive diagnosis highlighting the need to differentiate bacterial proventriculitis from other causes of proventricular dilatation disease in macaws.

### CASE HISTORY

A four-year-old, male red-and-green macaw with a body weight of 1.165 kg was presented with inappetence, weight loss, regurgitation and the presence of undigested seeds in the feces. The macaw was fed pellets combined with a commercial seed mixture for parrots and fruit and vegetables on a daily basis. One month prior to initial presentation, the macaw started to show a decreased appetite and occasional regurgitation and the passage of undigested seeds in the feces. PCR testing for psittacine beak and feather disease, parrot bornavirus (PaBV), polyomavirus and *Chlamydia psittaci* infection was negative and PaBV antibodies could not be detected. As supportive and symptomatic treatment showed no effect and the frequency of regurgitation increased progressively, the macaw was referred to a veterinary teaching hospital two months after the clinical signs were initially noted.

**Radiographic examination** revealed proventricular dilatation. The ratio between the height of the proventriculus and the height of the sternum was 0,8 (**Figure 1**), exceeding the physiological reference ratio of 0,52. Blood was collected from the jugular vein for a serum biochemistry profile and hematologic evaluation at the time of physical examination. Abnormal findings were limited to moderate leukocytosis with heterophilia and mild hypoglycemia. Contrast radiography was performed to allow a better assessment of the proventriculus as well as the gastro-intestinal transit time using iopromide (Ultravist, 350 mg/ml), a lead-based contrast fluid at a dose of 2,5 ml/kg body weight. Radiographs were made at the moment of injection (T0) and one (T1'), three (T3') and five (T5') minutes after administration of the contrast medium. At T1', T3' and T5' filling of the passage of the contrast fluid from the crop to the proventriculus and filling of the proventriculus and the ventriculus were observed, respectively. Luminal filling and delineation of the oesophagus, crop and ventriculus as well as the transit time were considered normal. Prominent stenosis of the proventricular lumen with a residual diameter of approximately 2 mm and marked, circumferential thickening of the proventricular wall, however, were noticed (**Figure 2**).

**Further testing** for conditions that have been associated with PDD and/or hyperplasia of the proventricular wall in psittacines were performed and included PCR for psittacid herpesvirus-1 (PsHV-1) and *Cryptosporidium* spp. as well as fecal examination for megabacteria, *Salmonella* spp. and nematodes.

In order to examine other causes of PDD in the macaw, such as neoplasia, mycobacteriosis and zygomycosis, the collection of gastric biopsies for histological examination and microbiological and molecular testing was advised but declined by the owner. Although considered as a secondary finding at that time, dysbacteriosis was suspected based on the evaluation of fecal smears and antimicrobial treatment with enrofloxacin (Baytril 10%, 10 mg/kg, per orally, BID) was started for two weeks. At the end of this treatment, the macaw displayed a normal behaviour and appetite and regurgitation as well as the passage of undigested seeds in the feces had completely resolved. Four months after initial presentation, radiographical examination was repeated and revealed a normal appearance and size of the proventriculus. During a two-year follow up period, the macaw did not show recurrence of the clinical signs.

### DISCUSSION & CONCLUSION

The present case describes PDD in a red-and-green macaw caused by hyperplasia of the proventricular wall with stenosis of the proventricular lumen resulting in clinical signs related to impaired proventricular function and passage of ingesta through the proventriculus. Based on the clinical history and findings, primary or facultative bacterial proventriculitis was considered as the etiology of the observed gastric disorder in the macaw. Although various primary or opportunistic infectious diseases, including PaBV infection, *Macrorhabdus ornithogaster* (megabacteriosis), salmonellosis, parasitosis (e.g. *Cryptosporidium* spp., Spiruroidae infection) and PsHV-1 (papillomatosis) were considered highly unlikely based on the performed tests, false negative test results should always be taken into account. Nevertheless, neoplasia, mycobacteriosis and gastric mycosis (e.g. zygomycosis) were eventually considered as the most likely causes based on the findings for the present case. Although the collection of biopsies of the proventriculus would have been the most decisive method to diagnose the latter conditions, this is considered technically challenging and highly invasive when performed by coeliotomy and gastrotomy. Although not routinely used in birds, a more rapid and exact diagnosis might have been accomplished in a minimally invasive way by performing gastroscopy via the oral approach, allowing the inspection of the proventricular lumen and mucosal surface and the collection of biopsies for histopathological, microbiological and molecular examination. Based on the complete resolution of clinical signs and radiographical signs of PDD following antimicrobial treatment, bacterial proventriculitis was put forward as a definitive diagnosis. Unfortunately, the causative agent could not be identified. A definitive diagnosis of PDD associated with bacterial proventriculitis is challenging and should ideally rely on a combination of imaging and the collection of gastric biopsies for histological examination as well as microbiological and molecular testing.

