

Esophageal Squamous Cell Carcinoma in a Nanday Conure (*Aratinga nenday*)



A 17-year-old Nanday conure (*Aratinga nenday*) was presented for weakness, occasional dyspnea, and ruffling. The reported clinical signs were intermittent respiratory distress and rare mucus production from the mouth in the past two weeks. A radiopaque mass of 1-centimeter was detected just cranially to the heart during the radiographic examination. Esophageal and clavicular air sac endoscopy confirmed a severe esophageal dilation causing a ventral displacement of the syrinx. Five months after initial presentation the bird died. Necropsy with histopathology were performed. Histopathological findings were compatible with a distal esophageal squamous cell carcinoma. According to the authors, this report is the first distal esophageal squamous cell carcinoma reported in a Nanday conure. Moreover, the use of clavicular air sac endoscopy in order to obtain biopsy sample, revealed a good tolerability by the patient, with rapid recovery times and absence of adverse effects.

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INTRODUCTION

Birds kept as companion animals reach old age because of improvements in their quality of life, such as breeding, feeding, and veterinary care provided. As a result, an increasing number of geriatric disease conditions, degenerative and neoplastic diseases, are being diagnosed and managed by veterinarians. Among pet birds, psittacine are most frequently diagnosed with neoplasia.¹ Squamous cell carcinomas (SCCs) are malignant tumor of the epithelial cells lining certain tissues or organs.² SCCs are common epithelial tumor in many domestic animals, especially cats, dogs, cattle, and horses. It has also been described in various avian

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species, from chickens to parrots.³⁻¹⁷ In a survey of neoplasia in pet birds, only 1.7% of the neoplasms were SCCs, and they have been reported rarely in psittacine species and have affected primarily the integument and gastrointestinal systems.^{9,18,19} The SCCs behave in a locally invasive fashion and have a low metastatic rate. Diagnosis can be obtained by cytology

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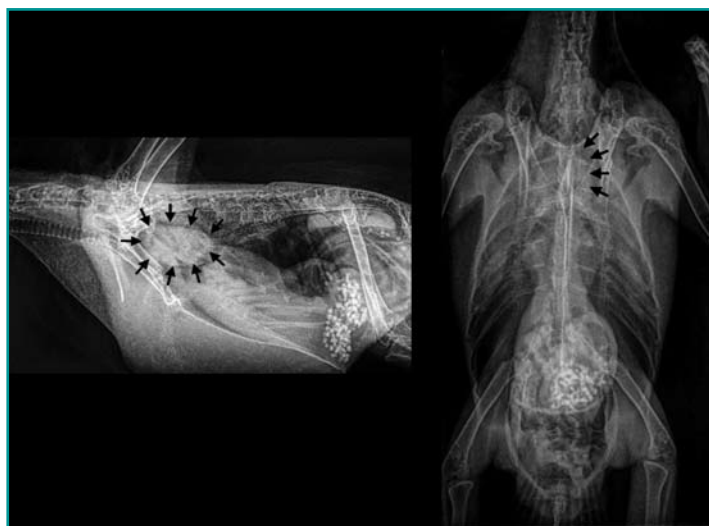


Figure 1 - Right lateral and ventrodorsal radiographs of the 17-year-old Nanday conure (*Aratinga nenday*). A well-defined radiodense mass at the base of the heart was observed in both view (arrows).



Figure 2 - Postmortem picture of the Nanday conure, after the chest removal. The margins and the position of the distal esophageal mass (arrows) were revealed. The mass was just cranial and adherent to the heart base, no vessel involvement was detected.

and histopathology.²

The SCC can occur anywhere on the body and are commonly seen on the feathered skin,^{20,21} beak,¹² infraorbital sinus,⁵ tongue,³ pharynx,¹⁷ uropygial gland,²² phalanges and in the upper gastrointestinal tract, particularly affecting the crop.^{3,6,7,11,12,16,23} Cockatiels, Amazon parrots, and Conures are commonly affected.²⁴ In a recent article the esophageal SCC were found in a blue-fronted Amazon parrot (*Amazona aestiva*) and a mealy Amazon parrot (*Amazona farinosa*).²⁵ Lastly a review article conducted in California reported only 12 cases of psittacine birds with alimentary SCC.²⁶

CASE REPORT

A 17-year-old, DNA male sexed, Nanday conure (*Aratinga nenday*) was referred for weakness, occasional dyspnea, and ruffling. The owner reported intermittent respiratory distress, and rare mucus production from the mouth for the previous two weeks. The bird's diet consisted of commercial pellets, mixed seeds with occasional fruit and vegetable supplements. Slightly poor body conditions were reported on physical examination (95 grams a day of presentation), the bird body condition score (BCS) was of 2.5 out of 5 assessed by pectoral musculature.²⁷ The bird exhibited sporadic increases in respiratory effort, lethargy, and regurgitation of food or expectorated mucus from the mouth. Swab samples for bacterial and mycological cultures were obtained from the trachea and choanae. Tracheal and choanae analysis were negative. Normal fecal microflora for psittacine birds was visible at Gram's fecal stain.²⁸ During the day-hospital, an orthogonal total body radiographic study was performed. At right lateral and ventrodorsal view, a well-defined radio-dense mass effect was identified at the heart's base (Fig 1).

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Differential diagnoses for this finding were neoplasia, esophageal dilation, bacterial or fungal granuloma. The owner refused blood work for financial reasons. However, the mass was investigated by endoscopic examination through the esophagus and clavicular air sac. The patient was premedicated using butorphanol (1 mg/Kg Dolorex 10mg/ml Intervet srl, Italy) and induced by face mask with isoflurane at 4.5% (vaporizing setting) with an oxygen flow of 1.5 L/min. The

patient was intubated with 1.5-mm endotracheal tube non-cuffed and maintained under anesthesia at 2.5% of isoflurane with an oxygen flow of 1 L/min. Anesthesia monitoring included use of a Doppler ultrasound probe for heart rate, intraesophageal thermometer for body temperature, capnography for CO₂ partial pressures, and electrocardiography for cardiac electrical activity. The bird was placed in dorsal recumbency with the head elevated at 45 degrees to facilitate intraoperative visualization into the anterior thoracic cavity. After a surgical preparation of the skin, an incision was made cranial to the thoracic inlet. To better identify the insertion zone, a small amount of air was injected inside the esophagus to avoid the damage of the crop mucosa during the skin incision. A small hole through the air sac membrane was made using smooth curved hemostatic forceps. A 30° Hopkins rigid endoscope (2.7 mm, 18 cm) connected to a halogen light source by a cable (Karl Storz Veterinary Endoscopy America Inc, Goleta, CA, USA) was introduced inside the clavicular air sac. During the procedure, severe dilation of the surface of the esophagus was observed. The dilated esophagus rested on the cardiac surface causing ventral displacement of the syrinx. Since the lesion was not indicative of parenchymatic growth, but rather of a cavitary organ, a fine-needle aspiration (FNA) cytology was performed instead of the core biopsy. After an uneventful recovery, the bird was discharged. Conservative therapy to avoid secondary bacterial infection and non-steroidal anti-inflammatory drug was started with marbofloxacin (Marbocyl 2% Vetoquinol SA France) 5 mg/kg PO q24h for 10 days, and meloxicam (Metacam 5 mg/ml Boehringer Ingelheim) 1 mg/kg PO q12h for 7 days.

The FNA cytology reported an elevate bacterial microflora and vegetal-based material, which were compatible with sampling of the esophagus. The cell population consisted mainly of macrophages and degenerated granulocytes with bacterial phagocytosis. There were also rare, large squamous cells and numerous broken cells with bare nuclei. A fragment of plant-based material and rare budding yeast cells compatible with *Candida spp.* were also observed in one of the preparations. The owner reported improvements after antibiotic therapy, although the parrot continued to show intermittent mucus production from the mouth, lethargy, sneezing and rarely episodes of regurgitation. Despite recommending it, the owner refused to repeat the FNA or perform a core biopsy to confirm the suspicion of neoplasia. Five months after presentation, the owner found the dead parrot in the cage and presented the bird for postmortem examination (Fig 2). A 17 mm lesion was detected dorso-medially the sy-



Figure 3 - Postmortem picture of the whole isolated lesion of the esophagus of the Nanday conure (*Aratinga nenday*). The black arrow indicates the distal esophageal mass; the white arrow indicates the proventriculus.

ringe and cranially at the base of the heart. Mild hyperemia of the trachea and lungs, congestion of the spleen, liver, proventriculus and, ventriculus were reported during the postmortem examination. Other postmortem macroscopic findings were unremarkable. The whole mass was sampled and sent to histopathology (Fig 3).

Kasraeian et al. compared the open surgical biopsy with fine-needle aspiration and core biopsy for soft tissue masses in humans. The open surgical biopsy has 100% sensitivity and specificity. In regard to determining the exact diagnosis, fine-needle aspiration had a 33.3% accuracy and core biopsy had a 45.6% accuracy.

The microscopic examination revealed a densely cellular, infiltrative epithelial neoplasia, involved the esophageal wall. The neoplasia was composed by polygonal cells organized in islands and trabeculae, with squamous differentiation and numerous keratin pearls, supported by abundant fibrous stroma (Fig 4). A mixed inflammatory infiltrate was present, with several heterophils, a smaller number of lymphocytes and plasma cells. A granulomatous inflammation with giant multinucleated cells and abundant bacterial population were also evident. The final diagnosis was esophageal transmural squamous cell carcinoma.

DISCUSSION

In the reported cases, the Nanday Conure showed mild respiratory distress and ptyalism. These signs were compatible with the dyskinesia of the esophagus and with the ventral displacement of the syringe, which produced an altered airflow through the trachea and the bifurcation of the primary bronchi. Because of the location of the lesion, FNA cytology was cho-

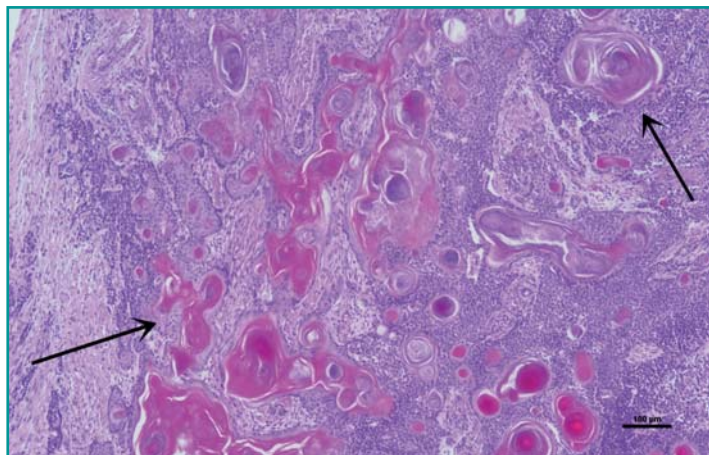


Figure 4 - Microscopic photography of the esophageal mass showed a trans-mural epithelial neoplasm, with squamous differentiation and keratin pearl formations. (arrows) (H.E., original objective 10x, Bar=100µm).

sen to avoid surgery and reduce the risk to the patient. Esophageal endoscopy revealed no macroscopic changes in the visualized mucosa. Endoscopy through the clavicular air sac was a procedure not used in any other case of esophageal SCC. The advantages of the technique used were the reduced invasiveness and the ability to visualize the organ and obtain biopsy specimens for both FNA and core biopsy. In this described case, FNA cytology did not provide a diagnosis of a neoplastic mass on the first attempt. Despite our finding, FNA remains an appropriate diagnostic tool to attempt to obtain a diagnosis noninvasively, at least in the human medical literature.²⁹

Endoscopy through the clavicular air sac was a procedure not used in any other case of esophageal SCC. The advantages of the technique used were the reduced invasiveness and the ability to visualize the organ and obtain biopsy specimens for both FNA and core biopsy.

Kasraeian et al.³⁰ compared the open surgical biopsy with fine-needle aspiration and core biopsy for soft tissue masses in humans. The open surgical biopsy has 100% sensitivity and specificity. Regarding determining malignancy, fine-needle aspiration and core biopsy had 79.17% and 79.2% sensitivity, 72.7% and 81.8% specificity, and overall accuracy of 75.4% and 80.7%,

respectively. In regard to determining the exact diagnosis, fine-needle aspiration had a 33.3% accuracy and core biopsy had a 45.6% accuracy.²⁹

Dysphagia and delayed emptying of the crop can be directly explained by physical obstruction and by the disturbance of the motility of the neoplastic mass. Other clinical signs of dysphagia and undigested seeds in the feces have been associated with gastrointestinal SCC in other species.^{11,13,17,26} Supporting evidence for secondary dysbiosis included marked bacterial overgrowth and budding yeast (*Candida* spp.) observed either in the cytology and post-mortem examination. According to the literature, the best treatment is to obtain a complete surgical removal when the affected anatomical area allows it.^{24,26}

In this case, the mass was located caudal to the thoracic inlet and adjacent to the heart, making whenever possible, the surgical removal difficult to obtain completely. After informing the owner of the risks related to the procedure, he did not consent to the surgery. The alternative and proposed treatment for difficult SCCs are cryosurgery, external beam radiation therapy or chemotherapy.^{2,26,30-33}

Mild respiratory distress and ptyalism are signs compatible with the dyskinesia of the esophagus and with the ventral displacement of the syringe, which produced an altered airflow through the trachea and the bifurcation of the primary bronchi.

However preliminary data from a multi-institutional retrospective study on the outcome of SCCs in 85 birds treated with surgery, chemotherapy, or radiation therapy indicate that complete surgical excision was associated with a more positive outcome.²⁴ This report aims to describe a first case of SCC in the distal esophagus diagnosed in a Nanday Conure. The authors want to emphasize the possibility of using clavicular air sac endoscopy to obtain biopsy sample. Although the sampling was not diagnostic in this case, the method confirmed a good tolerability by the patient, low invasiveness with rapid recovery times and absence of adverse effects. Furthermore, the importance of explaining elderly parrot owners to regularly perform health checks, considering that in this specific case, the negative outcome was influenced by the impossibility to perform advance diagnostic tests right away.

KEY POINTS

- More and more parrots today reach a considerable age when they become elderly. Among pet birds, psittacids are those most frequently diagnosed with neoplasia.
- Squamous cell carcinomas (SCC) are malignant tumours of the epithelial cells lining certain tissues or organs. SCCs are common epithelial tumours in many domestic animals, especially cats, dogs, cattle and horses. They have also been described in several avian species, from chickens to parrots.
- SCC are locally invasive and have a low rate of metastasis. Diagnosis can be obtained by cytology and histopathology.
- Surgical removal is the treatment of choice. For SCC that are difficult to reach or where anatomical location makes removal impossible, alternative and proposed treatments are cryosurgery, external beam radiotherapy or chemotherapy. However, preliminary data from a multi-institutional retrospective study on the outcome of SCC in 85 birds treated with surgery, chemotherapy or radiotherapy indicate that complete surgical excision is associated with a more positive outcome.
- A biopsy access that provides excellent access and low impact appears to be access through the inter-clavicular air sac.

Carcinoma Squamoso Esofageo in un Conuro Nanday (*Aratinga nenday*)

Riassunto

Un Conuro Nanday (*Aratinga nenday*) di 17 anni è stato presentato a visita per debolezza, dispnea occasionale e piumaggio arruffato. I segni clinici riscontrati durante la visita erano difficoltà respiratoria intermittente e rara produzione di muco dalla bocca nelle ultime due settimane. Radiograficamente si è evidenziata una massa radiopaca di 1 centimetro localizzata cranialmente al cuore. È stata eseguita un'endoscopia esofagea e tramite il sacco aereo clavicolare, le quali hanno confermato la presenza di una massa che dislocava ventralmente la siringe. Cinque mesi dopo la presentazione iniziale il pappagallo è stato rinvenuto morto dalla proprietaria. È stata eseguita una necropsia con esame istopatologico della massa esofagea. I risultati istopatologici hanno diagnosticato un carcinoma squamoso della porzione distale dell'esofago, neoplasia non descritta in letteratura nel parrocchetto Nanday. L'utilizzo dell'endoscopia tramite il sacco aereo clavicolare, per ottenere un campione biotico, ha mostrato la buona tollerabilità da parte del paziente con tempi di recupero rapidi ed assenza di effetti avversi.

REFERENCES

1. Filippich LJ. Tumor control in birds. *Journal of Exotic Pet Medicine* 13(1) 25-43, 2004.
2. Robat CS, Ammersbach M, Christoph M. Avian oncology - disease, diagnostic and therapeutic. *Veterinary Clinics of North America: Exotic Animal Practice* 20 57-86, 2017.
3. Anderson WI, Steinberg H. Primary glossal squamous cell carcinoma in a Spanish cochon hen. *Avian Diseases* 33 827-828, 1989.
4. Bauck LD. Neoplasms. In: Roskopf W, Woerpel R. Ed. *Diseases of Cage and Aviary Birds* 3rd Ed. Baltimore, MD: Williams and Wilkins, 1996, pp. 480-489.
5. Figueroa OD, Tully TN, Williams J *et al.* Squamous cell carcinoma of the infraorbital sinus with fungal tracheitis and ingluvitis in an adult Solomon Eclectus Parrots (*Eclectus roratus solomonensis*). *Journal of Avian Medicine and Surgery* 20(2) 113-119, 2006.
6. Hatkin J, Styer E, Miller D. Inguvial squamous cell carcinoma in a game chicken. *Avian Diseases* 46 1070-1075, 2002.
7. Head KW, Else RW, Dubielzig RR. Tumors of the alimentary tract. In: Meuten DJ Ed. *Tumors in Domestic Animals*, 4th Ed. Ames: Iowa State University Press, 2002, pp. 439-443.
8. Latimer KS. Oncology. In: Ritchie BW, Harrison GJ, Harrison LR. *Avian Medicine: Principles and Application*. Lake Worth: Wingers Publishing, 1994, pp. 640-672.
9. Leach MW. A survey of neoplasia in pet birds. *Seminars in Avian and Exotic Pet Medicine*, 1 52-64, 1992.
10. Lopez-Beceiro AM, Pereira JL, Barreiro A *et al.* Squamous cell carcinoma in an immature common stork (*Ciconia ciconia*). *Journal of Zoo and Wildlife Medicine*, 29(1) 84-86, 1998.
11. Malka S, Keirstead ND, Gancz AY *et al.* Inguvial squamous cell carcinoma in a geriatric cockatiel (*Nymphicus hollandicus*). *Journal of Avian Medicine and Surgery* 19(3) 234-239, 2005.
12. Manucy TK, Bennett RA, Greenacre CB *et al.* Squamous cell carcinoma of the mandibular beak in a Buffon's macaw (*Ara ambigu*). *Journal of Avian Medicine and Surgery*, 12 158-166, 1998.
13. Murtaugh RJ, Ringler DJ, Petrak ML. Squamous cell carcinoma of the esophagus in an Amazon parrot. *Journal of the American Veterinary Medical Association*. 188 872-873, 1986.
14. Petrak ML, Gilmore CE. Neoplasms. In: Petrak ML Ed. *Diseases of cage and aviary birds*. 2nd ed. Philadelphia: Lea and Febiger, 1982, pp. 606-637.
15. Reavill DR. A review of psittacine squamous cell carcinomas submit-

- ted during 1998-2001. 7th Annual Conference of the European Association of Avian Veterinarian, Loro Parque, Spain, 2001, pp. 237-240.
16. Rubio CA, Fu-Sheng L. Spontaneous squamous cell carcinoma of the esophagus in chickens. *Cancer*, 64 2511-2514, 1989.
17. Vázquez S, Quiroga MI, Aleman N *et al.* Squamous cell carcinoma of the oropharynx and esophagus in a Japanese bantam rooster. *Avian diseases* 47 215-217, 2003.
18. Bauck LD. A clinical approach to neoplastic disease in the pet bird. *Seminars in Avian and Exotic Pet Medicine* 1 65-72, 1992.
19. Schmidt RE. Neoplastic diseases. In: Altman RB, Clubb SL, Dorrestein ML, Quesenberry K Ed. *Avian Medicine and Surgery* 1st Ed. Philadelphia: WB Saunders, 1997, pp 590-599.
20. Klaphake E, Beazley-Keane SL, Jones M *et al.* Multisite integumentary squamous cell carcinoma in an African grey parrot (*Psittacus erithacus erithacus*). *Veterinary Record* 158(17) 593-596, 2006.
21. Suedmeyer WK, Henry C, McCaw D *et al.* Attempted photodynamic therapy against patagial squamous cell carcinoma in an African rose-ringed parakeet (*Psittacula krameri*). *Journal of Zoo and Wildlife Medicine* 38(4) 597-600, 2007.
22. Beaufre H, Brasseur G, Heimann M. What is your diagnosis? Squamous cell carcinoma of the uropygial gland. *Journal of Avian Medicine and Surgery* 21(4) 321-324, 2007.
23. Youl JM, Gartrell BD. Multidrug-resistant bacterial ingluvitis associated with squamous cell carcinoma in a budgerigar (*Melopsittacus undulatus*). *Veterinary Clinics of North America: Exotic Animal Practice* 9(3) 557-562, 2006.
24. Zehnder A, Swift L, Sundaram A. Multi-institutional survey of squamous cell carcinoma in birds. 35th Annual Conference of the Association of Avian Veterinarian, New Orleans, 2014.
25. Staudenmaier AM, Simone-Freilicher EA, Noonan BP *et al.* Antemortem diagnosis of esophageal squamous cell carcinoma in a blue-fronted Amazon parrot (*Amazona aestiva*) and a mealy Amazon parrot (*Amazona farinosa*). *Journal of the American Veterinary Medical Association* 254(11) 1324-1328, 2019.
26. Gonzalez-Astudillo V, Mete A, Navarro MA *et al.* Alimentary squamous cell carcinoma in psittacines: 12 cases and review of the literature. *Journal of Veterinary Diagnostic Investigation* 33(5):906-912, 2021.
27. Pollock C. Body Condition Scoring in Birds. *Lafeber.com*. Available at: <https://lafeber.com/vet/body-condition-scoring/>. Published October 6, 2012.
28. Bowman TA, Jacobson ER. Cloacal flora of clinically normal captive psittacine birds. *The Journal of Zoo Animal Medicine* 11 (3) 81-85, 1980.
29. William J, Frable MD. Fine-needle Aspiration Biopsy: A Review. *Human Pathology* 14(1) 9-28, 1983.
30. Kasraian S, Allison DC, Ahlmann ER *et al.* A comparison of fine-needle aspiration, core biopsy, and surgical biopsy in the diagnosis of extremity soft tissue masses. *Clinical Orthopaedics and Related Research* 468(11) 2992-3002, 2010.
31. Hecke NV, Martel A, Garmyn A *et al.* Intratumoral chemotherapy in an integumentary squamous cell carcinoma in a cockatiel (*Nymphicus hollandicus*). *Vlaams Diergeneeskundig Tijdschrift*, 87(2) 86-92, 2018.
32. Nemetz LBM. Strontium-90 therapy for uropygial neoplasia. 25th Annual Conference of the Association of Avian Veterinarian. New Orleans, 2004, pp. 15-19.
33. Swisher SD, Phillips KL, Tobias JR *et al.* External beam radiation therapy of squamous cell carcinoma in the beak of an African Grey parrot (*Psittacus timneh*). *Journal of Avian Medicine and Surgery* 30 (3) 250-256, 2016.



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