

Diagnostic Challenge

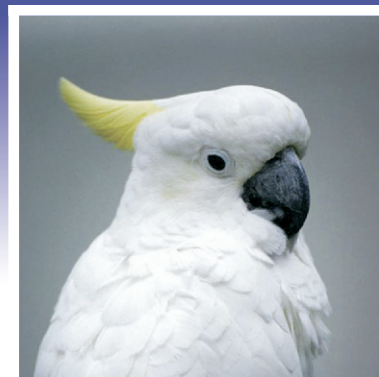


Fig 1. Ventral conjunctival swelling involving the left eye in a red-lored Amazon parrot.

History

A 50-year-old male red-lored Amazon parrot (*Amazona autumnalis*) was presented for evaluation of a ventral conjunctival mass involving the left eye (OS). The owner first noticed the lesion 2 weeks before presentation, and it had been increasing in size since first observed. The parrot had been in its current home for 15 years. The parrot was fed a seed-based diet, which primarily consisted of sunflower seeds and, occasionally, mixed fruits and vegetables. There was no history of coughing or sneezing, his appetite and activity level had been normal, and his feces and urates had not changed. The parrot was not housed with any other birds and had not been in contact with other birds recently.

On physical examination, the parrot was mildly overweight, 390 g, and had a body condition score of 4 out of 5. There was dry, bilateral, mucopurulent discharge noted in the nostrils, with the right being more severe. There was generalized blunting of the choanal papilla. The mass noted OS involved only the ventral palpebral conjunctiva. Erythema and edema were associated with the mass. When digital pressure was applied to the lower lid, full visualization of the mass was achieved. The mass was estimated to be 1 cm by 5 mm in size and extended ventrally behind the lower eyelid. It occupied around 70% of the ventral palpebral conjunctiva and obscured approximately 25% of the globe (Fig 1). The rest of the physical examination was unremarkable.

At this time, based on the physical examination, develop a differential diagnosis and diagnostic protocol for this case.

Diagnosis

The initial diagnostic workup included a complete blood count (CBC), plasma chemistry panel, an ophthalmologic examination, culture and sensitivity, and biopsy of the conjunctival swelling.

The bird was masked down with Isoflurane (Abbott Laboratories, North Chicago, IL USA) (5%, 1 L O₂), intubated with a 3.0 uncuffed endotracheal tube, and maintained with isofluorane (2.5%, 1 L O₂). A swab of the eye was first taken for bacterial culture and sensitivity. The eye was then examined and stained with fluorescein. A small 1-mm superficial corneal ulcer was demonstrated in the ventral half of the cornea. This superficial ulcer appeared to be the result of the mass rubbing on the cornea. A blood sample was obtained for a CBC and plasma chemistry panel. Electrocautery was used to obtain three 3 × 3 × 3-mm tissue samples from the mass. After the first sample was obtained, an impression smear was made for cytological analysis. The mass was highly vascular, and a substantial amount of hemorrhage was encountered. Topical epinephrine was used to control the hemorrhage. The bird recovered from anesthesia with no complications and was started with topical ciprofloxacin (Falcon Pharmaceuticals, Ltd., Fort Worth, TX USA) every 8 hours OS. Survey radiographs were recommended as part of the complete workup; however, these were declined by the owner because of financial constraints. Differential diagnoses for the conjunctival mass included neoplasia, bacterial conjunctivitis with underlying sinusitis, fungal conjunctivitis, parasitic conjunctivitis, or a reaction to an ocular foreign body.

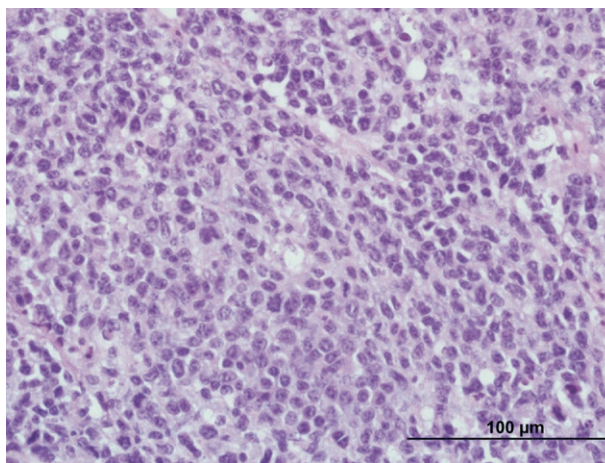


Fig 2. Histopathology of the biopsy taken from the conjunctival swelling, showing homogenous round cell population identified as neoplastic lymphocytes.

The CBC was found to be within normal limits.¹ The biochemical profile revealed a mild increase in both the aspartate aminotransferase (AST) (466 U/L; reference range, 130-350 U/L) and creatine kinase (5785 U/L; reference range, 45-265 U/L).¹ Microscopic examination of the impression smear was unremarkable, with erythrocytes being the dominant cell type. There were also small numbers of epithelial cells and mononuclear cells. The microscopic findings from the biopsy revealed a homogenous round cell population identified as neoplastic lymphocytes (Fig 2). The neoplastic cells were medium- to large-sized cells with large nuclei, small amounts of eosinophilic-stained cytoplasm, and moderate anisocytosis and anisokaryosis. The nuclei were round- to oval-shaped, with prominent vesicular chromatin and occasional multiple nucleoli. Mitotic figures were occasionally observed (0-1/high-power field). Immunohistochemical special stains for CD 3 (T-cells) were positive on the tissue, indicating that the tumor was T-cell in origin. *Pseudomonas aeruginosa* and alpha-hemolytic *Streptococcus* spp were isolated from the

lesion. The final diagnosis was a bacterial conjunctivitis and sinusitis with underlying cutaneous T-cell lymphoma.

Based on the diagnostic findings, the owners were offered 2 options for treatment: surgical reduction of the mass followed by radiotherapy or chemotherapy or the use of chemotherapeutic agents as the sole treatment. The owners elected to use prednisolone as the chemotherapeutic treatment because of financial constraints. The parrot was given a single injection of dexamethasone sodium phosphate (2 mg/kg intramuscularly once; American Regent, Inc., Shirley, NY USA) and on the following day was started on oral prednisolone (1 mg/kg by mouth every 24 hours; Roxane Laboratories, Columbus, OH USA). The topical ciprofloxacin was also continued. The parrot was discharged and continued on oral prednisolone and scheduled for a reevaluation appointment 5 days later. The owner failed to comply with additional follow-up appointment requests, but 4 months after the initial diagnosis, according to the owner, the bird continues on prednisolone and appears healthy.

Discussion

Avian lymphosarcoma is frequently reported in poultry and is commonly associated with Marek's disease and avian leukosis virus.^{2,4} It is reported as the most common neoplasia in pet birds.⁵⁻⁷ Lymphoma has been reported in a variety of different species, with the male canary being the most common bird presented.^{5,6,8} In birds, this neoplasia can infiltrate a number of different organs. The spleen and liver are 2 of the most commonly affected organs, and affected animals frequently present with a history of emaciation and lethargy.^{3,5,8-11} Cutaneous nodular lymphosarcoma is the next most commonly reported site for invasion.^{2,4,6,11-13} The eye has been identified as a common site for cutaneous lymphoma, but previous reports were generally associated with the palpebral muscles. In these cases, affected animals often presented with exophthalmus or severe palpebral swelling.^{2,5,6,9,11-13} It has been suggested that the absence of lymph nodes in avian species may be responsible for the (apparent) increased prevalence of cutaneous lymphoma in birds when compared with mammalian species.⁴

In cases of cutaneous lymphoma, whole body radiographs usually reveal hepatomegaly, splenomegaly, and renomegaly, and suggest that the tumor has metastasized.^{3,5,6,8-11} In cases of lymphoma where the cutaneous nodular proliferation is the primary site of progression, systemic involvement is likely to occur.^{6,14,15} There is only a single postmortem report of a macaw with lymphoma that was limited to the eye, oral cavity, and harderian gland.⁹ In the case of this Amazon parrot, there is a high likelihood that the lymphoma had metastasized, but it

could not be confirmed without further diagnostics (e.g., radiographs, endoscopy). If the conjunctival mass truly represented the primary site of the lymphoma, then it is possible that the mass represented the origin of the neoplastic lymphocytes. A leukemic blood profile can be seen with cases of avian lymphoma; however, this finding is inconsistent.^{5,6} A more common sign of lymphoproliferative disease in the peripheral circulation of birds occurs when lymphocytes develop large pseudopodia.^{4,6,12} This finding can be associated with other disease conditions too; however, their presence in a bird with nodular masses should always increase the diagnostician's suspicion of lymphoma. In this parrot, serial blood smears would have to be reviewed to definitively rule out the presence of lymphocytic pseudopodia. Therefore, based on our single CBC, we cannot say for certain whether pseudopodia were present on the lymphocytes of this bird.

Other blood changes associated with lymphoma in birds are inconsistent. In many reports of avian lymphoma, an increase in AST is reported.^{2,8,12,13} Authors usually attribute this change to the stress of handling or to intramuscular injections. However, this change may be associated with hepatic changes (e.g., hepatitis).

There is only one other reported case of lymphoma in an Amazon parrot in which the differentiation of the neoplastic lymphocyte cell type was determined.¹⁰ In our case, immunohistochemical staining of the mass with antibodies directed against CD3 and BLA-36 stained positively only for CD3, suggesting a T-cell lymphocyte population. The only other report in which the differentiation in lymphocyte type was determined was in an umbrella cock-

atoo (*Cacatua alba*) with T-cell-rich B-cell lymphoma.⁴ It is undetermined as of yet whether one lymphocyte type is more common and whether one type is associated with a poorer prognosis. Secondary bacterial infections, such as that diagnosed in this parrot (e.g., bacterial conjunctivitis and sinusitis), has been described previously in other cases of avian lymphoma.^{6,8} The infections may be attributed to the immunosuppression associated with the abnormal lymphocytes in circulation or with the changes in the integrity of the tissues (e.g., ulcers).

Prednisolone has been used in a number of cases of cutaneous lymphoma as a general chemotherapeutic.^{5,6,12} With this treatment, there is generally a rapid reduction in the size of the cutaneous nodule(s). This treatment does not appear to have a similar response in other tissues, such as the liver or spleen.^{6,15} In this case, prednisolone resulted in a reduction in the size and severity of the cutaneous mass.

Survival rates for psittacines affected with this type of neoplasia vary. An African gray parrot (*Psittacus erithacus*) treated with orthovoltage x-ray survived for 2 months posttreatment, whereas an Amazon parrot treated twice daily with prednisone survived for 32 weeks posttreatment.^{12,13} A generalized treatment protocol for avian lymphoma has yet to be determined; however, current recommendations for canines are considered acceptable.¹⁶ In this particular case, it is unclear whether surgical removal of the cutaneous swelling would have improved the prognosis. The size of the mass did decrease dramatically over a matter of days, suggesting that surgical reduction would not have changed the outcome. However, as stated previously, it is uncertain whether there was systemic involvement in

this case. If the tumor had metastasized, it is unlikely that the prednisolone treatment alone would have provided any long-term improvement in the prognosis. In the end, the survival time for this parrot will ultimately be determined by the amount of systemic involvement of the neoplastic infiltrates.

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