Self-Mutilation in Parrots with Aspergillosis

Jayne Weller, David N. Phalen
Avian, Reptile and Exotic Pet Hospital
Wildlife Health and Conservation Centre
University of Sydney
415 Werombi Road
Camden, NSW 2570

INTRODUCTION

Aspergillus spp. are ubiquitous fungi that can be contracted via inhalation of spores from a contaminated environment (Jones and Orosz, 2000). Disease occurs when there has been chronic exposure to low levels of spores or acute inhalation of a large number of spores (Jones and Orosz, 2000). Some degree of immunodeficiency or naivety may also predispose birds to aspergillosis (Kunkle and Sacco, 1998). Due to the method of exposure, *Aspergillus* colonies usually develop initially in the respiratory tract, including the nasal turbinates, on the syrinx, and in the air sacs and lungs (Jones and Orosz, 2000). When disease occurs in the lower respiratory system, *Aspergillus* colonies first develop typically in the caudal thoracic and abdominal air sacs (Phalen, 2001). If the colonies in the caudal thoracic and abdominal air sacs produce spores, additional colonies may also be found in the lungs and cranial thoracic and interclavicular air sacs. *Aspergillus* spp. are highly invasive and can penetrate adjacent tissues or vessels and disseminate to other tissues through the vascular system (Jones and Orosz, 2000). Birds may exhibit an acute form of aspergillosis, resulting in rapid onset of death or may have a chronic form, with infections being present for many months before exhibiting signs (Orosz, 2000).

Feather damaging behavior, defined as barbering or pulling at the feathers, has been associated with many different causes, including hypothyroidism (Clubb et al., 2002, 2004), infectious skin disease., nutritional deficiencies (Clubb et al., 2004), allergies (Clubb et al. 2002) and most commonly, behavioral problems such as stereotypies due to stress or boredom (Rosenthal, 1993; Briscoe *et al*., 2004). Anecdotally feather damaging behavior has also been mentioned to occur in birds that are overly bonded to their owners and as the result of hormonal or reproductive behaviours (Briscoe, et al., 2004). Elevated concentrations of circulating antibodies to *Aspergillus* spp. antigens have been found in many birds displaying feather damaging behavior, but an actual link between *Aspergillus* spp. infections and feather destructive behaviour has not been proved (Clubb, *et al*., 2004). Additionally, the accuracy of serological testing for exposure to *Aspergillus* has been questioned (Fudge and Speer, 2001).

Mutilation of the skin and deeper structures is a sign that has often been grouped together with feather damaging behavior and as a result may be assumed to be caused by similar aetiologies. While this may be accurate in some cases where mild skin damage is associated with feather plucking, it is unlikely that the diseases and behaviours that would result in feather chewing or even feather plucking would overlap entirely with those that would cause a bird to tear away large portions of its skin and, in some cases, underlying tissue.

In this manuscript, we report on four cases of severe self mutilation of the feathers, skin and underlying tissue in parrots that appeared to be triggered by aspergillosis of air sacs of the coelomic cavity.

CASE REPORTS

The cases reported here were all diagnosed during a particularly wet summer, ideal for Aspergillus growth and inhalation of spores as they need to dry out to become airborne (Dykstra, *et al.,* 1997).

Case 1

A nineteen month old Galah *(Eolophus roseicapillus)*-Corella *(Cacatua sanguinea*) hybrid was presented with a four week history of severe feather damaging behaviour near the vent which had recently progressed to mutilation of the skin and underlying tissues. On presentation, the bird had a wound on the lateral aspect of its caudal pelvis and tail that extended to the underlying bone. The wound was infested with maggots. The bird was thin with a body condition score of 2.5/5 but was still very hungry. It had voluminous droppings and the cloaca was dilated indicating some possible neurological deficit. Haematology demonstrated a marked regenerative anaemia, moderate leukocytosis caused by a lymphocytosis and a monocytosis. Heterophils had marked toxic changes and there were scattered bands and metamyelocytes. The haemogram was assessed to be consistent with a chronic inflammatory reaction with a more recent degenerative left shift. The bird was hospitalized and started on amoxicillin clavulanate (Norbrook, Australia) 125mg/kg IM BID, enrofloxacin (Ilium, Australia) 20mg/kg SC BID and meloxicam (Ilium, Australia) 0.2mg/kg PO SID. A collar (Kruuse, Denmark) was also placed to stop the bird from additional self mutilation. On the third day of hospitalization after little response to treatment and further attempts at self mutilation even with the collar applied, a radiograph was taken. The radiographic findings were of a caudally displaced ventriculus and a soft tissue mass at the level of the cloaca, consistent with an aspergillus or mycobacterial granuloma. Itraconazole (Janssen-Cilag, Australia) at 10mg/kg PO SID was commenced. The bird was improving and was discharged after five days in hospital. Four days after discharge, it died. Necropsy revealed a large granuloma closely associated with and encompassing the colon and cloaca. Cytology of the mass revealed dichotomously branching septate fungal hyphae consistent with those produced by an *Aspergillus* spp.

Case 2

A nine-year old male Eclectus parrot (*Eclectus roratus*) presented with a one week history of feather damaging behaviour and inappetance for two days. On physical examination the bird had lost some condition (body condition score 3/5), and general feather health was poor with oily and frayed feathers. The bird had pulled out the feathers around the neck and near the thoracic inlet and the extent of feather pulling had increased in the past two to three days. Damage to the skin had occurred from feather pulling and the bird had started to chew at the skin causing skin damage. The owner also reported a voice change, reluctance to talk, and a disinterest in the normal toys in the cage. On physical examination there were clumped feathers around the nares which was interpreted as evidence of mild nasal discharge. A complete blood count found a leukocytosis characterized by a marked monocytosis and heterophilia. *Chlamydophila psittaci* was ruled out as antibodies to *C. psittaci* were not detected (Biogal's Immunocomb. Biogal Galed Labs, Kibbutz Galed 19240, Israel). Radiography showed an increased soft tissue opacity cranial to the heart in the region the bird had been feather and skin picking.

The bird remained in hospital for two days and was started on Itraconazole (10mg/kg PO SID). After being discharged the bird improved rapidly at home and regained normal voice and activity levels. At a fourteen day recheck the wounds had healed and the feathers had regrown. Treatment with Itraconazole was continued for another four weeks. The owner did not return for repeat haematology due to cost constraints and one month after finishing treatment the bird recommenced feather damaging behavior, refused food and stopped talking. Haematology was within normal limits but another four weeks of Itraconazole was commenced. At this time, hormonal reasons for feather picking could not be ruled out since the bird was displaying mating behavior and Leuprorelin (Abbott, Australasia) 0.1 µg IM was administered. Four weeks later the owner reported that the bird was back to normal, eating and drinking normally and talking a lot.

Case 3

A four and a half year old sulphur-crested cockatoo (*Cacatua galerita)* was presented with a one week history of feather damaging behaviour that had escalated to mutilation of the skin and underlying tissues. The diet was poor and consisted of mixed wild bird seed, mince, biscuits, and chocolate. On physical examination the bird was in good body condition (pectoral muscle score 4/5). There was a large (3 by 3cm) full-thickness skin wound over the left cranial ventral surface of the pectoral muscle and more superficial skin wounds over the remaining skin covering the pectoral muscle. There was evidence of moderate nasal discharge around the nares (brown stained, clumped feathers). A complete blood count indicated a marked leukocytosis characterized by a marked monocytosis and moderate heterophilia, changes consistent with a chronic active granulomatous disease such as psittacosis, mycobacteriosis or aspergillosis. *Chlamydophila psittaci* infection was ruled out when circulating antibodies were not detected. The bird was admitted to hospital for six days and initially treated with enrofloxacin (20mg/kg PO SID), Meloxicam (Ilium, Australia) 0.5mg/kg PO SID and on the second day, Itraconazole 10mg/kg PO SID, was added to the treatment regime. A collar was also fitted to prevent the bird from further mutilating.

The owner was reluctant to carry out further diagnostics due to cost constraints so radiographic evidence of a granuloma was not documented. The bird was stable and responding to the medication on discharge. Two weeks later the bird returned for a recheck and the wound was healing well, the bird was not feather damaging or mutilating the skin even when the collar was removed. Itraconazole was continued for another four weeks before a repeat haematology. The case was unfortunately lost to follow-up.

Case 4

Aa two and a half year old Galah *(Eolophus roseicapillus)*, presented with a one week history of feather damaging behavior which had escalated to mutilation of the skin and underlying tissues on the day of presentation. The bird lived in a cage indoors but hygiene was not paramount and the newspaper on the floor of the cage often became wet and then would dry. The bird had a good diet of seed and fresh vegetables and some fruit but did not get a lot of exercise and therefore had marked subcutaneous fat. On further physical exam it had marked respiratory effort and a very large (4 by 3cm) full thickness skin wound over its cranial pectoral muscles and other less severe skin wounds over all the pectoral skin. The bird was hospitalized for wound care and blood collection. Haematology demonstrated a marked leukocytosis characterized by a monocytosis and heterophilia with toxic changes to the heterophils and monocytes. Treatment was started and a collar placed to prevent further mutilation. Meloxicam was administered at 0.5mg/kg IM together with enrofloxacin

(20mg/kg SC, SID) and Itraconazole (10mg/kg PO, SID). The wound was cleaned and dressed with Aloveen Thin (Smith and Nephew, England). Radiography the following day revealed an increased soft tissue opacity near the heart base underlying the site of mutilation of the skin and underlying tissues. There were also miliary lesions in the lungs on the lateral view, both lesions being consistent with an infection caused by an *Aspergillus* spp.

The bird was markedly improved after one day in hospital and was discharged with oral medications meloxicam (0.5mg/kg PO SID), enrofloxacin (20mg/kg PO) SID and Itraconazole (10mg/kg PO SID). At the first recheck after one week of treatment the bird was bright alert and responsive, eating and drinking normally and was not feather damaging or picking at the bandage even with the collar off. The bandage was replaced and the wound was healing well. After four weeks of Itraconazole haematology was normal and two more weeks of Itraconazole was prescribed. There has been no relapse of clinical signs after the medication was finished.

DISCUSSION

Aspergillosis is difficult to diagnose. Antemortem definitive diagnosis of the disease relies on endoscopy and cytology or histopathology of biopsied material. These procedures, however, may not be advisable in very sick patients (Fudge and Speer, 2001; Cray, et al., 2009). In the absence of endoscopic confirmation of infection, cumulative findings from history and physical examination, together with haematologic findings and radiographic signs can provide a high index of suspicion of aspergillosis (Jones and Orosz, 2000; Fudge and Speer, 2001). Serodiagnostics are not available in Australia and they have a limited sensitivity (Fudge and Speer, 2001; Phalen, 2001). Plasma electrophoresis is an ancillary diagnostic tool that can provide additional circumstantial evidence of aspergillosis in parrots (Cray *et al*., 2009).

While only one of the four cases reported was definitively diagnosed with aspergillosis after post mortem examination and cytology of the granuloma, the other three cases demonstrated either haematologic or radiographic findings or both that were highly suggestive of aspergillosis and all cases responded to antifungal treatment. Infection with *C. psittaci*, another disease that might cause similar haematologic findings, was ruled out in two cases by serology.

Radiographic findings, in the three birds were consistent with granulomas within the coelomic cavity adjacent to the region of body where the feather damaging behavior and mutilation of skin and underlying tissue was occurring. *Aspergillus* spp. form granulomas most commonly in the respiratory tract, especially the caudal thoracic and abdominal air sacs but may also disseminate into other organs (Fudge and Speer, 2001; Phalen, 2001). Aspergillus granulomas are painful. In people, aspergillosis is described as being acutely painful when associated with implant infection. Chest pain and pleurisy are the presenting complaints in respiratory tract infection and if associated with the brain, aspergillus causes severe headaches (Oestreicher *et al*., 1999; Vaishya and Sharma, 2004; Turgut et al., 2008). Pain is suggested as the reason for the skin and underlying tissue mutilation in the cases presented here.

Feather damaging behavior and mutilation of the skin and underlying tissues is a relatively common presenting complaint in an avian practice. While feather damaging behavior like barbering and mild chewing of feathers may be attributed to non-infectious causes such as hormonal abnormalities, nutritional deficiencies, or hypersensitivities, mutilation of the skin and underlying tissue most likely indicates more severe painful aetiologies. Pain is documented in most case reports of aspergillosis

in human medicine as a presenting complaint (Oestreicher *et al*., 1999; Vaishya and Sharma, 2004; Turgut et al., 2008; Huang, et al., 2011). Additionally, pain and discomfort has been reported as a cause of self mutilation in horses, both in abdominal and skin disease including mycotic dermatitis (Chahal and Kirk, 1975; McDonnell, 2008). Aspergillosis should be carefully considered as a differential in patients presenting with mutilation of the skin and underlying tissues. Ideally, further diagnostic tests such as endoscopy and cytology should be completed on patients with suggestive haematologic and radiographic findings of aspergillosis to definitively diagnose the disease and determine the best course of treatment.

In conclusion, aspergillosis is difficult to definitively diagnose in parrot patients. However, it is possible that this fungus may be a significant cause of severe feather damaging behaviour and mutilation of the skin and underlying tissues and should be seriously considered and an attempt at diagnosis made when presented with such clinical signs. Further research and documentation of cases diagnosed with aspergillosis displaying severe feather damaging behavior and mutilation of the skin and underlying tissues needs to be conducted to scientifically assess the significance of the above case reports.

REFERENCES

Briscoe, J. A., Reisner, I. R. and Rosenthal, K. 2004. Incorporating the veterinary behaviourist: A new model for the diagnosis and treatment of a feather damaging pet parrot. Proceedings of Annual Conference of Association of Avian Veterinarians, August 17-19, New Orleans, Louisiana, USA. Pp 293-296.

Clubb, S. L., Garner, M. M. and Cray, C. 2002. Detection of inflammatory skin disease in psittacine birds using paired skin biopsies. Proceedings Annual Conference of Avian Veterinarians, August 26-30, Monterey, California, USA. Pp 193-200.

Clubb, S. L., Garner, M. M. and Cray, C. 2004. Diagnostic assessment of feather damaging behavior in African Grey Parrots (*Psittacus erithacus*). Proceedings Annual Conference of Avian Veterinarians, August 26-30, Monterey, California, USA. Pp 313-318.

Clubb , S. L., Cray, C., Arheart, K. L and Goodman, M. 2007. Comparison of selected diagnostic parameters in African Grey Parrots (*Psittacus erithacus)* with normal plumage and those exhibiting feather destructive behavior. Journal of Avian Medicine and Surgery 21, 259-264.

Chahal, L. A. and Kirk, E. J. 1975. Toxins which produce pain. Pain 1, 3-49.

Cray, C., Reavill, D., Romagnano, A., Van Sant, F., Champagne, D., Stevenson, R., Rolfe, V., Griffin, C. and Clubb, S. 2009. Galactomannan Assay and Plasma Protein Electrophoresis Findings in Psittacine Birds with Aspergillosis. Journal of Avian Medicine and Surgery. 23, 125-135.

Dykstra, M. J., Loomis, M., Reininger, K. et al., 1997. A comparison of sampling methods for airborne fungal spores during an outbreak of Aspergillosis in the forest aviary of the North Carolina Zoological Park. Journal of Zoo and Wildlife Medicine 28, 171-174.

Fudge, A. M. and Speer, B. 2001. Selected controversial topics in avian diagnostic testing. Seminars in Avian and Exotic Pet Medicine 10, 96-101.

Huang, C., L, M., Lu, R., Peng, H. and Chao, H. 2011. A case of pulmonary aspergilloma and actinomycosis. Journal of Medical Microbiology 60, 543-546.

Jones, M. P. and Orosz, S. E. 2000. The diagnosis of Aspergillus in Birds. Seminars in Avian and Exotic Pet Medicine 9, 52-58.

Kunkle, R. A. and Sacco, R. E. 1998. Susceptibility of convalescent turkeys to pulmonary Aspergillosis. Avian Diseases 42, 787-790.

McDonnell, S. M. 2008. Practical review of self mutilation in horses. Animal Reproduction Science 107, 219-228.

Oestreicher, J. H., Bashour, M. and Chiu, B. 1999. Aspergillus mycetoma in a secondary hydroxyapatite orbital implant: a case report and literature review. Ophthalmology 106, 987-991.

Orosz, S. E. 2000. Overview of Aspergllosis: Pathogenesis and Treatment Options. Seminars in Avian and Exotic Pet Medicine 9, 59-65.

Phalen, D. N., 2001. The use of Serological Assays in Avian Medicine. Seminars in Avian and Exotic Pet Medicine 10, 77-89.

Rosenthal, K. 1993. Differential diagnosis of feather picking in pet birds. Proceedings of Annual Conference of Association of Avian Veterinarians, August 31-September 4, Nashville, Tennessee. Pp 108-112.

Turgut, M., Ozsunar, Y., Oncu, S., Akyuz, O., Ertugrul, M. B., Tekin, C., Gultekin, B. and Sakarya, S. 2008. Invasive fungal granuloma of the brain caused by Aspergillus fumigatus: a case report and review of the literature. Surgical Neurology 69, 169-174.

Vaishya, S. and Sharma, M. S. 2004. Spinal Aspergillus vertebral osteomyelitis with extradural abscess: Case report and review of literature. Surgical Neurology 61, 551-555.