

AVIAN ASPERGILLOSIS AND CANDIDIASIS (CANDIDOSIS) - SOME NOTES ON DIAGNOSIS AND TREATMENT

Fungi are widespread in the environment. Some can cause disease in vertebrate and invertebrate animals, amongst them members of the genera *Aspergillus* and *Candida*.

Disease caused by *Aspergillus*, particularly but not exclusively by *Aspergillus fumigatus*, has long been recognised as a cause of death in captive, sometimes free-living, birds (Cooper, 1985). One of the earliest scientific accounts of avian aspergillosis in the English language was of a case in a peregrine at the Zoological Society of London by Crisp (1854). Dr Patrick Redig (2008) provided a scholarly review of current thinking about the disease, with particular reference to birds of prey. He emphasised that aspergillosis can be acute, chronic or localised. Acute infections are exemplified by "brooder pneumonia" of galliform birds, chronic typified by diffuse focal lesions in the viscera, and localised readily recognisable by the presence of distinct granulomata. The clinical signs seen in birds vary and can range from to insidious loss of weight and subtle behavioural changes to acute respiratory distress and sudden death.

Definitive diagnosis of aspergillosis is not always easy (Cooper, 2002). It can involve a combination of techniques – recognition of clinical signs linked with an appropriate history, detection of antibodies, identification of the fungus in tracheal washes and on culture, the finding of haematological and protein electrophoretic changes and the direct viewing of lesions in or on internal organs using rigid or flexible endoscopes. Endoscopy plays a particularly important role in the diagnosis of aspergillosis and can be considered the "gold standard".

Disease due to *Candida* (usually *C. albicans*) is also widespread, in many species. In birds candidiasis (candidosis) may follow prolonged administration of antibiotics (Forbes and Altman, 1998). It usually causes lesions in the mouth, crop or oesophagus, often presenting as a thickening and with an accumulation of yellow diphtheritic material. Clinical signs may include anorexia, dysphagia and regurgitation. Diagnosis is by microscopical examination of a stained preparation of the debris. While topical treatment of candidiasis is often possible, severe cases, where the *Candida* has invaded the lining epithelium of the alimentary tract, usually require systemic antifungal therapy.

Treatment of aspergillosis has long presented challenges, not just in birds. Various agents have been tried over the years. Itraconazole is particularly effective at preventing the growth of *Aspergillus* species but until recently it was difficult to attain high concentrations of this compound in body fluids and tissues. This year (2014) a new formulation was granted a full European product licence as a treatment against mycotic infections in ornamental birds - that is, those not intended for human consumption. This product, "Fungitraxx", contains a high concentration of cyclodextrin - a ring of glucose molecules within which the antifungal agent is positioned. Such a configuration enhances solubilisation and absorption of the itraconazole within the body. This new formulation is effective against both *Aspergillus* and *Candida*.

Although therapy is now practicable, the prevention of avian aspergillosis and avian candidiasis remains important (Cooper, 2002). Birds are most likely to become infected by *Aspergillus* when they are exposed to large numbers of spores and this can occur when hygiene is poor, ventilation inadequate and if diets or feeding surfaces are mouldy or dusty. Stressors appear to contribute and if birds are immunocompromised, they are more susceptible both to initial infection and to

subsequent fungal dissemination. *Candida*, likewise, is frequently associated with poor hygiene, hypothermia, malnutrition, vitamin A deficiency, immunosuppression or damage to the oropharynx.

References

COOPER JE. (1985) *Veterinary Aspects of Captive Birds of Prey*. The Standfast Press, Gloucestershire.

COOPER JE. (2002) *Birds of Prey: Health & Disease*. Blackwell, Oxford.

CRISP E (1854) Filaria in the heart of a peregrine falcon (*F. peregrinus*). *Transactions of the Pathological Society of London*, 5:345.

FORBES NA and ALTMAN RB (1998) *Self-Assessment Colour Review of Avian Medicine*. Manson, London.

REDIG P (2008) Fungal diseases – aspergillosis. In: *Avian Medicine 2nd edition*, ed. J Samour. Mosby, London; pp 275-291.

Compiled by JOHN E COOPER, DTVM, FRCPath, FSB, CBiol, FRCVS, RCVS Specialist in Veterinary Pathology, Diplomate, European College of Veterinary Pathologists, European Veterinary Specialist, Zoological Medicine