Some Disease Conditions Of Aviary Birds Based On Pathologic And Clinical Findings At The University Of Zimbabwe Veterinary Hospital And Pathology Laboratory From 1986- 2004

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Abstract

A review of 880 aviary bird case files, including pathology, biopsy, and clinical findings was conducted at the University of Zimbabwe Veterinary Pathology Laboratory and Hospital for the period 1986- 2004. The ages of the birds ranged from hatchling to 40 years old. Ninety-two percent of these were psittacines while the remainder were passerines. Among the psittacines, the Lovebird and the African Grey parrot had the greatest prevalence rates of 46% and 17% respectively. The passerines included the threatened Lady Gouldian finch, the canary and the mynah. Infections accounted for the greatest cause of mortality at 64%. Some causes of mortality had a species biased distribution, with the lovebird succumbing mostly to the psittacine beak and feather disease (PBFD) virus and aspergillosis. However, the majority of problems transcended species barriers. Of the zoonotic agents, only Salmonella, Mycobacterium and Chlamydophia psittaci were noted. Biosecurity measures need to be reinforced in order to curb the spread of infectious agents.

INTRODUCTION

Aviary birds are quite commonly used as pets because of their beauty, colour and ability to mimic talking. A variety of infectious (Andersen and Vanrompay, 2000; Black et al., 1997; Clavijo et al., 2000; Grimes et al., 1997; Hoop et al., 1996; Sanchez-Cordon et al., 2002; Shihmanter et al., 1998) and non-infectious (Duff, 1997; Gibbons et al., 2000; Harrison, 1998; Koutsos et al., 2003; Schoemaker et al., 1999; Tell et al., 1997) causes of aviary bird mortality have been documented the world over. However, information pertaining to the conditions affecting aviary birds in sub Saharan Africa in general, and Zimbabwe in particular, is scarce despite a rise in popularity of these birds. As a result, some veterinarians shy away from practicing aviary bird medicine since it has often not been part of the undergraduate veterinary curricula in this region.

The objectives of this study were to show the prevalent disease conditions of aviary birds in Zimbabwe and highlight their zoonotic infections, based on pathologic and clinical findings at a national referral diagnostic facility.

CASE REPORT

A total of 880 aviary bird case files, including pathology, biopsy, and clinical findings, were reviewed at the University of Zimbabwe Veterinary Pathology Laboratory and Hospital for the period 1986- 2004. The centre is a national referral diagnostic facility, and the period covered began with the time of inception of the facility. Standard and routine pathologic and clinical diagnostic methods were employed at the institution in line with acceptable standards for veterinary diagnosis. The files used included standardized clinical and pathology record forms that guaranteed standardization of records, and ensured an internal agreement on standard nomenclature over the study period.

Data were collected and summarized for parameters that included history, clinical signs, gross postmortem lesions, histopathology, microbiology, and parasitology. A summary of the species of aviary birds, and their most prevalent pathologic and clinical findings was subsequently compiled. Period prevalence was compiled by pooling together the number of birds for the period under study.

RESULTS

A total of 880 case files were reviewed, and involved mainly the lovebird (Agapornis spp), African Grey parrot (Psittacus erithacus), Cape parrot (Poicephalus robustus), canary (Serinus canarius), budgerigar (Melospittacus undulatus), cockatiel (Nymphicus hollandicus), various finch species, cockatoo (Cacatua spp.), and other unspecified parrots.Ninety-two percent of the birds were psittacines while the remainder were passerines (Table 1).

Figure 1

Table 1: A summary of the frequency of occurrence of the various avian species (n= 880).

Bird Order (%)	Species	Frequency of occurrence (%)
Psittaciformes (92)	Lovebird	46
	African Grey	17
	Cape parrot	4
	Budgerigar	3
	Cockatiel	3
	Cockatoo	2
	*Other parrots	17
Passeriformes (8)	Canary	4
	Finches	3
	Mynah	1

* parrot species that were not specifically named in the records.

Among the psittacines, the lovebird and the African Grey parrots had the greatest prevalence rates of 46% and 17% respectively. The passerines (8%) included the threatened Lady Goulidan finch (Chloebia gouldiae), the canary and the mynah (Gracula religiosa). Also noteworthy was the low prevalence rate of the budgerigar at 3%. The ages of the birds ranged from hatchling to a 40 year old African Grey parrot. However, an average age was difficult to compute owing to inconsistencies in the recording of the ages of the birds. The most commonly occurring findings included infectious agents (64%), internal parasitism (6%), tumours (5%), nutritional deficiencies (4%), and others (Table 2).

Figure 2

Table 2: The inter-species frequency of occurrence of some commonly occurring pathologic and clinical findings among the aviary birds under review.

Species of birds	Common conditions	% of birds affected
Lovebird	Psittacine beak and feather disease	51
	Aspergillosis	14
	Suspected herpes/adenovirus	7
	*Others (undiagnosed, overcrowding, poor condition, etc)	28
African Grey	Psittacine beak and feather disease Aspergillosis	8
	Vitamin A deficiency	8
	Calcium deficiency	3
	Subcutaneous carcinoma	3
	Lead poisoning	3
	Pneumoconiosis	12
	*Others	3
		60
Cape parrot	Mycobacteriosis	13
	Raillietina species	13
	Chlamydophylosis	13
	Bacterial infections	48
	Acute renal failure	13
Canary	Visceral gout	25
	Viral enteritis	25
	Poxvirus	25
	Feather dysplasia	25
Budgerigar	Trauma	29
	Lymphosarcoma	14
	Fibrosarcoma	29
	Obesity	14
	Helminthiasis	14
Cockatiel	Crop rupture	17
	Helminthiasis	8
	Bacterial	25
	Non bacterial nephritis	8
	*Others	42
Finches	Brain vacuolation	43
	Toxicity,	43
	*Others	14
Cockatoo	*Raillietina* species	25
	Aspergillosis	25
	Yolk peritonitis	25
	Cloacal impaction	25
Other parrots	Salmonellosis (Macaw, Amazon), Internal parasites, aspergillosis, bacterial, mycobacterium (Macaw), Psittacine beak and feather disease, Calcium and vitamin A deficiency, (Patagonian parrot), myxoma with cartilage metaplasia (unidentified parrot), visceral gout (lorikeet),	Conditions occurred in variable and minute quantities

*Various conditions that occurred in variable and minute quantities

Of the infectious agents, the psittacine beak and feather disease (PBFD) virus occurred most frequently, affecting mainly the lovebird and African Grey parrot. Other viruses (suspected herpes/adenovirus, poxvirus), bacteria (Klebsiella, Pseudomonas and Bacillus), some zoonotic infections, and fungi (Aspergillus species) completed the list of infectious agents (Table 3).

Figure 3

Table 3: The distribution by category of the main pathologic and clinical findings among aviary bird species under review.

Category (%)	Agent (%)	Main species/Types	Main species affected
Infectious (64)	Virus (31)	Circovirus, herpes, pox	Lovebird, African Grey, canary
	Bacteria (16)	*Klebsiella, E. coli, Pseudomonas, Bacillus, Salmonella, Mycobacterium*	Parrot, Cape parrot, Budgerigar, macaw, Amazon,
	Fungi (13)	*Aspergillus*	
		Mycobacterium	Lovebird, African Grey
	Zoonotic	*Chlamydophila psittaci*	Cape parrot, Macaw
	(4)	*Salmonella*	Cape parrot
			Amazon, Macaw
Internal parasites (6)	Round worms (4)	*Ascaridia* species	Parrot, cockatiel, African Grey
		Raillietina species	
	Tapeworms (2)		Cape parrot, Cockatoo, Meyer's parrot
Tumours (5)	Tumours (5)	Fibrosarcoma, Lymphosarcoma	Budgerigar
		Myxoma	Unidentified parrot
		Carcinoma	African Grey
Nutritional (4)	Deficiency (4)	Hypovitaminosis A	Conure, African Grey
		Hypocalcaemia	African Grey

The tumours included a carcinoma in a 25 year old African Grey parrot, and fibrosarcomas and lymphosarcoma in African Grey parrots and budgerigars. The carcinoma in the African Grey parrot grossly presented as a white to medium-brown, well circumscribed but deeply attached subcutaneous tumour extending from the external auditory meatus to the

submandibular area. The centre was necrotic and had a rich blood supply. Histopathologic examination revealed nests and cords of pleomorphic epithelial cells. The cells were large, bizarre shaped, multinucleated, and with mitotic figures. Attempted stratification was seen in some areas, with clear spaces in between the cells as seen in the stratum spinosum. Desmoplasia was pronounced in the background. However, since it was a biopsy specimen, it was not possible to determine the exact origin of the tumour, or to give a specific diagnosis other than that of carcinoma. Some findings had a species biased distribution, with the lovebirds and African Grey parrots succumbing mostly to the PBFD virus and aspergillosis (Table 2). However, the majority of problems transcended species barriers. Of the zoonotic agents 109 (4%), only Salmonella, Mycobacterium and Chlamydophia psittaci were noted in Amazon parrots (Amazona spp.), macaws (Ara spp.), and Cape parrots (Table 3).

DISCUSSION

The diagnostic techniques used during clinical and pathologic investigations generally proved satisfactory for the diagnosis of various conditions. The bird species submitted generally represented the variety of aviary birds noted in different parts of the world. However, it was not possible from this study to verify aspects such as species popularity. The species that were submitted included endangered species, namely the Cape parrot of South African origin, which has a pending CITES Appendix 1 listing, and the Lady Gouldian finch. Not all parrot species were specifically named, and for purposes of this study, a group known as ‘other parrots' was established.

Infectious agents were the most commonly encountered finding (64%) among the birds and included viruses, bacteria, and fungi. The isolated bacteria (E. coli, Klebsiella, and Pseudomonas) were mainly environmental and/or opportunists suggesting underlying factors like stress, viral infections or malnutrition. Also, since most avicultural facilities were closed systems, the high prevalence of infectious agents like the PBFD virus is usually indicative of a breach or laxity in biosecurity that allows pathogens to be moved around.

The viral infections included circovirus, poxvirus and suspected herpes/adenoviruses. Psittacine circovirus is the causative agent of PBFD, which is generally considered a disease of the psittacine species (Albertyn et al., 2004). In this study, only lovebirds and a few African Greys were affected. PBFD has been associated with varying clinical and mortality patterns in different lovebird species in Zimbabwe (Kock et al., 1993). The virus is transmitted horizontally primarily through viral shedding in the feather dander (and possibly vertically). Psittacine circovirus can cause feather pulpitis, multifocal necrosis of feather and follicular epithelium, exudative folliculitis, feather loss, beak and claw lesions, and an immunocompromise that opens the way to opportunistic infections (Roy et al., 2003). Ante-mortem diagnosis is possible through histopathologic examination of plucked feathers, feather follicle biopsies or biopsies of affected palatine beak epithelium, looking for the typical lesions and globular basophilic intracytoplasmic viral inclusions in macrophages and epithelial cells. In some countries, the detection of circoviral DNA in a blood sample, using DNA probe technology, is available for ante-mortem diagnosis, and is often more definitive and sensitive in detecting infected individuals than feather histopathology (Roy et al., 2003). Circovirus inclusions are also commonly found in the bursa of juvenile psittacines dying acutely of overwhelming opportunistic infections, often before feather or beak lesions are noted clinically.

Only three zoonotic agents (Salmonella, Mycobacterium and Chlamydophia psittaci) were isolated from a possible range of other agents that could include Encephalitozoon spp., Cryptococcus spp. (Albertyn et al., 2004; Andersen and Vanrompay, 2000; de Wit et al., 2003; Koutsos et al., 2003; Latimer et al., 1996; Malhotra Sandeep and Capoor, 1984). Zoonotic infections will in future assume a new dimension between pets and their owners with the advent of the Human Immunodeficience Virus (HIV) and other immunocompromising factors, as exemplified by the transmission of a Cryptococcus species from a pet cockatoo to an immunocompromised (drug related) owner (Nosanchuk et al., 2000).

Internal parasitism accounted for 6% of the cases, and mainly involved gastrointestinal roundworms and tapeworms in a variety of psittacines. It should be remembered that some cestodes, such as Raillietina (Skrjabinia) spp of the Davaineidae family have definitive hosts that include the chicken, pigeon, turkey and pheasant, and that the insect intermediate hosts may include flies, ants, and beetles (Malhotra Sandeep and Capoor, 1984). As with viral and bacterial infections, the presence of internal parasites can be linked to inadequate biosecurity mechanisms that allow the parasites or their intermediate

hosts to be introduced into the aviary.

Non-infectious diagnoses included tumours (5%), nutritional problems (4%), traumatic injuries, cloacal impactions, and pneumoconiosis. The tumours in this study included carcinomas, fibrosarcomas and lymphosarcoma in African Grey parrots and budgerigars. In the literature, tumours have been recorded in aviary birds, and have included gastrointestinal adenocarcinoma and cholangiocarcinoma in a peach-fronted conure (Aratinga aurea), basal cell carcinoma in a blue-fronted Amazon parrot (Amazona aestiva), malignant lymphoma in Amazon parrots, locally invasive squamous cell carcinoma in a 22- year- old African Grey parrot, and metastatic renal carcinomas (de Wit et al., 2003; Gibbons et al., 2000; Klaphake et al., 2006; Latimer et al., 1996; Tell et al., 1997), to name just a few of the reported tumors. The carcinoma noted in the African Grey parrot in this study could not be specifically classified as the specimen was from a biopsy, making it impossible to determine its origin. Although the ages of the affected birds in this study were not always indicated, the occurrence of tumours would not be surprising since aviary birds can have long lifespans, as evidenced by the 40-year-old African Grey parrot with a carcinoma in this study.

The nutritional problems (4%) recorded included vitamin A and calcium deficiencies in the African Grey parrot. Vitamin A deficiency can be recognized by frequent respiratory infections, scaliness on the feet and beak, and poor plumage (Schoemaker et al., 1999). Nutritional problems are common in pet birds because of an all-seed diet (Harrison, 1998; Koutsos et al., 2001; Koutsos et al., 2003; Schoemaker et al., 1999; Ullrey et al., 1991) that does not provide adequate nutrients for the birds (Dolphin, 1987). However, the prevalence of nutritional problems was unexpectedly low. This observation could be associated with the relative ease with which nutritional deficiencies are often diagnosed clinically, together with the high success rate of timely interventions that may result in few birds proceeding to post mortem or to a referral centre.

Other non-infectious findings included traumatic injuries, cloacal impactions and pneumoconiosis. Pneumoconiosis in birds' lungs can be related to housing in dusty, enclosed locations, and are for the most part incidental lesions at post-mortem. Reports of clinically relevant pneumoconiosis are also available, and include that in an eagle, diagnosed on ante-mortem lung biopsy, which was presumably due to exposure to train engine exhaust in a zoological park (Joseph, 1996). The risk factors and specific causes of the pneumoconiosis in this report were not determined.

CONCLUSION

The lovebird and African Grey parrot were the most commonly encountered species, while infectious agents, particularly the PBFD virus, were the most commonly diagnosed problems among the birds. The occurrence of zoonotic infections like Salmonella species, Mycobacterium species and Chlamydophia psittaci calls for a reminder to all those involved with aviary birds to take the necessary precautionary measures, while biosecurity measures need to be reinforced in order to curb the spread of infectious agents.

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