Scientific Works. Series C. Veterinary Medicine. Vol. LXI (2)
ISSN 2065-1295; ISSN 2343-9394 (CD-ROM); ISSN 2067-3663 (Online); ISSN-L 2065-1295

CHARACTERIZATION OF THE MAIN VISCERAL LESIONS IDENTIFIED IN PSITTACINES DEAD FROM DIFFERENT CAUSES

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Abstract

Exotic bird pathology is an emerging field, needed for an accurate understanding of the biology and disease response of these species.
The present paper is aimed to emphasize different lesions in some organs of psittacine cases submitted to necropsy due to sudden death, tumoral disease or metabolic disease.
The study was conducted over a two year period (2013-2014) at the Department of Pathological Anatomy from the Faculty of Veterinary Medicine,.Bucharest. Seven psittacine cases, from three different species were submitted to diagnosis. The following organs were submitted to gross and histopathologic examination for each case: lung, heart, liver, kidney, gastro-intestinal tract, spleen and brain. Lesional changes in the organs were classified as: inflammatory, circulatory, necrotic, distrophic and tumoral. The lung presented circulatory lesions in all seven cases and for one case tumoral lesion as well, while the kidney presented both circulatory and necrotic changes in five of the seven cases. The heart was affected in two cases of necrosis, one case of distrophy and one case of tumoral lesion. The liver was affected in two cases by circulatory lesions and one case of inflammatory lesion. The brain was affected in two cases by inflammatory lesions and one case of circulatory injury. The gastro-intestinal tract was affected in one case of necrosis and the spleen, in one case of circulatory lesion. In addition, normal aspects were observed in nine organs, mostly in heart, liver and, spleen. Post-mortem transformation was noticed in 21 organs, mostly kidneys, gastro-intestinal tract, spleen and brain.
In conclusion, circulatory and necrotic lesions were frequently encountered in the studied cases. Regarding non-lesional changes in the organs, these appeared with increased frequency, proving the importance.of a rapid diagnosis.

Key words*: psittacine, avian, visceral lesions.*

INTRODUCTION

Similar to other animals, birds are susceptible to a variety of diseases.
Pet and exotic birds such as psittacines have their own unique diseases that can be influenced by management, genetics and nutrition that play a significant role in the initiation and outcome of different organ pathologies.
A variety of infectious (Andersen and Vanrompay, 2000; Black et al., 1997; Clavijo et al., 2000; 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) causes of aviary bird mortality have been documented the world over. However, information pertaining to the conditions affecting aviary birds in Romania, is scarce despite a rise in popularity of these birds. This is mainly due to the fact that owners, breeders and clinicians give up to full investigations in order to find out the cause of death of the birds. We consider that each case studied contributes to enriching veterinary medical information for exotic birds, especially parrots.
In this context, the paper presents the evaluation of main lesions present in different organs from seven cases of psittacines submitted to pathologic investigations. The authors aim is to complete information

regarding the types of lesions in the internal organs most frequently diagnosed in psittacine cases.

MATERIALS AND METHODS

The present study was conducted over a two year period during January 1st 2013 and December 31st 2014 at the Department of Pathological Anatomy from the Faculty of Veterinary Medicine, U.S.A.M.V. Bucharest.
For the research, seven cases of psittacines belonging to private owners were submitted to diagnosis after death. The birds belonged to the following species: three cases of *Melopsittacus undulatus*, two cases of *Psittacula krameri*, one case of *Nymphicus hollandicus* and one case of *Psephotus haematonotus*.
In the context, the following organs were examined: lung, heart, liver, kidney, gastro-intestinal tract, spleen and brain. Changes in the organs were classified as prior to death, dystrophic and tumoral changes and after death modifications.
The methods used in the study included gross and microscopic examinations. Gross examination was performed using small dissection tools adapted for the birds submitted to the study, as soon as the cases were submitted to diagnosis. Gross examination evaluated colour, dimensions, volume, consistency and the aspects after sectioning the organs for each of the organs studied. Microscopic evaluation was performed using histopathologic sections on each of the organs studied. Multiple, representative organ sections were fixed with 10% formaldehide, processed and Hematoxilin-Eosin stained.

RESULTS AND DISCUSSIONS

The cases submitted for this paper were diagnosed with tumoral disease, metabolic disease and sudden death syndrome. General information regarding the psittacines are listed in Table 1.

Table 1. General data regarding the cases submitted in the study

Identification number	Species	Age - years	Sex	Diagnosis
14719	Nymphicus hollandicus	9	female	Metastatic hemangio-sarcoma
14729	Psephotus haematonotus	0.5	male	Metabolic bone disorder and emaciation
14799	Melopsittacus undulatus	6	male	Seminoma
14869	Melopsittacus undulatus	2	female	Sudden death
14870	Melopsittacus undulatus	3	female	Sudden death
14802	Psittacula krameri	4	female	Sudden death
14803	Psittacula krameri	3	male	Sudden death

LUNG
At gross examination, the lungs presented red colour, varying from bright to dark red. The cases associated with sudden death, presented bright red colour and focal areas of haemorrhage. The case of subcutaneous hemangiosarcoma presented dark red nodules surrounded by pale pink pulmonary parenchyma.
At microscopic examination, the cases with sudden death or prolonged suffering such as the metabolic disorder and the case with testicular tumor, presented either hyperaemia, congestion, haemorrhage or non-inflammatory edema. It is known that avian lung can present post mortem circulatory artefacts such as free blood in the parabronchi. This condition is caused by blood running back into the lungs through the air sac ostia, when the vessels are cut during gross examination (Randall, 1996). In order to differentiate ante mortem of post mortem changes, the presence of siderocytes was of great help.
Regarding the cases with sudden death, the morphologic diagnosis of lung hyperaemia and haemorrhages with no inflammatory acute response, leads to the possible diagnosis of acute intoxication. In recent papers, researchers studied aspects in air intoxications and in anticoagulant toxic substances on birds, showing the high susceptibility of the avian lung to acute vascular changes (Duff, 1997; Binev et col. 2012).

HEART

The gross examination of the heart presented little or no colour or shape modification. The case affected by subcutaneous hemangiosarcoma presented a dark red nodule near the apex on the interventricular septum, consistent for a metastasis. Histopathologic examination revealed an infiltrative mesenchymal cellular population with anisokaryosis, anisocytosis, proeminent nucleoli and atypic mitosis. The tumor contains vascular channels lined by poorly defined endothelium, as well as solid foci of lee differentiated neoplastic cells. For this case, a larger, ulcerated similar tumor was found on the cheek of the *Nymphicus hollandicus.* The final diagnosis for the heart lesion was of metastatic hemangiosarcoma (Schmidt, 2013).

Other histopathologic aspects identified in the cases studied were one case of hialinosis and two cases of cardiac muscle necrosis. Myodegeneration can cause cardiac failure and in our cases it supports the clinical evolution of the cases that presented sudden death (Schmidt et col, 2003).

LIVER

On gross and microscopic examination, three cases presented chronic active hepatitis with mainly mononuclear cell infiltration. Two cases presented a dark red colour with round margins and blood on sectioning the organ, consistent for hepatic stasis. Microscopically, the organs were affected by either congestion or haemorrhage. Two cases were affected by post-mortem changes, including hypostasis, friability and subcapsular gas formation. Histopathologically, these cases presented hepatocytes with various degrees of post mortem modifications.

KIDNEY

At gross examination, kidneys presented uniform surface and a brown to dark red colour. Microscopically, they revealed frequent post mortem changes, including basal membrane detachment and intratubular hyaline deposits. Tubular necrosis was also present, sometimes making it difficult to discriminate between ante mortem and post-mortem changes. Regarding necrotic aspects, clusters of necrotic tubules and their basement membranes only partly intact were observed (Schmidt et col, 2003)..

In addition, lesions of stasis and haemorrhage were observed in all four cases associated with sudden death.

This might mean that avian kidney is a shock organ and reacts acutely to life threatening injuries. Several studies were made on the sudden death syndrome in broiler chickens, which comprises a complex etiology. Among other morphologic changes in the organs, stasis and haemorrhages were frequently observed in the lungs and kidneys of the chickens affected by the syndrome (Ononiwu et col., 1979).

BRAIN

Brain examination is an important step in cases in which the cause of death is unknown. In the cases submitted to our study, gross examination of the brain presented several inconveniences as the formalin fixation was performed in partially removed skull in order for better preservation of such fragile structures. On the other hand, on microscopic examination, the brain suffered mostly from post mortem changes and, in one cases discrete inflammatory reaction and hyperaemia in a case associated with sudden death were also noticed.

GASTRO-INTESTINAL TRACT

At gross examination, the digestive tract presented frequently autolysis, post mortem gas formation in the intestinal loops and fluid dark red and brown content. Microscopic evaluation confirmed post mortem changes, consisting of mucosa decollation and admixing with intestinal food content.

One of the cases of budgerigars (*Melopsittacus undulatus*) submitted to the study presented petechial discrete haemorrhages on the proventricular mucosa. The lesion could not be associated with any other lesion on the rest of the gastro-intestinal tract (Schmidt et col, 2003).

SPLEEN

Gross examination of the spleen in four of the studied cases revealed a flask consistency and when sagital sections were performed, softening and diffluence of the splenic pulp were observed. These characteristics are

common post-mortem changes. Cytopathologic examination revealed normal aspects, such as small and large lymphocyte population and blood elements. Histopathologic examination revealed normal splenic parenchyma, post-mortem changes characterized by autolysis and necrotic cellular features and one case of hyperaemia.

Table 2. Categories of lesions and modifications identified in the organs examined in the study

CASE/ ORGAN	Lung	Heart	Liver	Kidney	Brain	Gastro-intestinal	Spleen
14719	T C	T	PM	PM	PM	PM	W c
14729	C	W c	I	PM	PM	W c	W c
14799	C	Ne	I	Ne PM	Wc	PM	PM
14869	C	W c	C	C PM	PM	C PM	PM
14870	C	Ne	C PM	C Ne PM	C PM	PM	W c
14802	C	W c	I	C Ne PM	PM	PM	C
14803	C	D	W c	C Ne PM	I PM	PM	PM

C = circulatory, T = tumoral, PM = post mortem, I = inflammatory, D = dystrophy, Ne = necrosis, W c = without changes

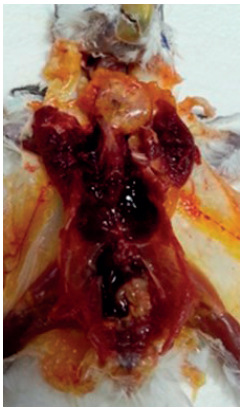

Figure 1 Congestive lung and kidney (case 14869) (original)

Figure 2 Myocardium tumour, close to the apex. Note other post mortem changes such as biliary infiltration and cadaveric spots on the liver (case 14719) (original)

Figure 3 Petechial haemorrhage in the proventriculus (case 14869). Note the grain content of the proventriculus, sign of rapid evolution of the disease (original).

Figure 4 Eviscerated gastro-intestinal tract with autolysis (case 14802) (original).

Figure 5 Echimosis and petechia in the lung and congestive kidney (case 14729) (original).

Figure 6 Hepatic stasis (case 14870) (original).

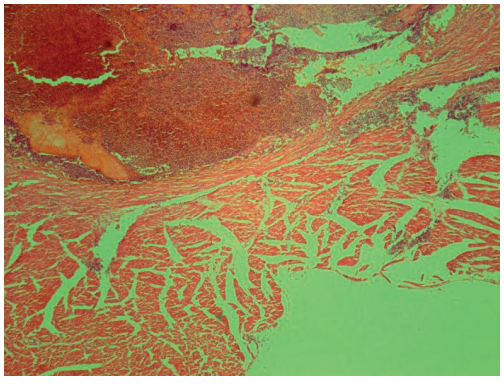

Figure 7 Hemangiosarcoma of the myocardium, H.E., 10x (case 14719) (original)

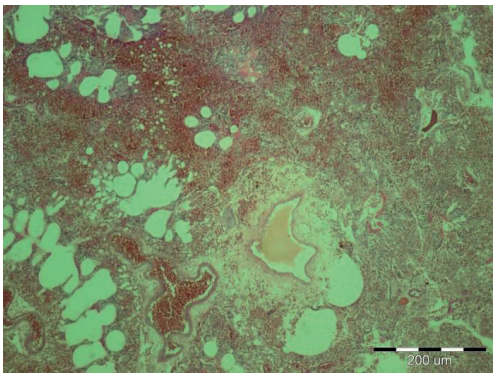

Figure 8 Pulmonary stasis and non-inflammatory edema, H.E., 10x (case 14870) (original)

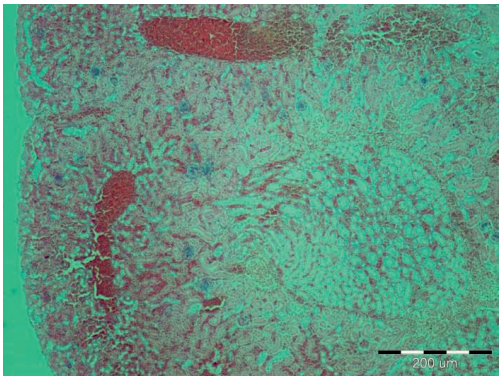

Figure 9 Kidney haemorrhage, stasis and tubular necrosis H.E., 10x (case 14802) (original)

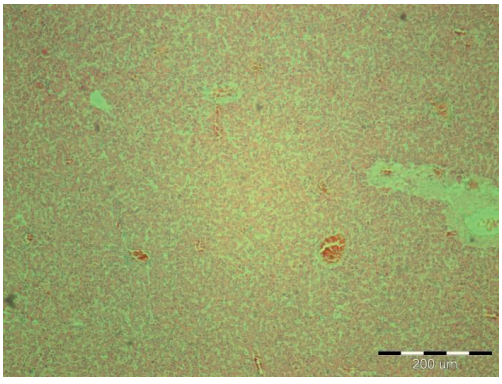

Figure 10 Liver without changes , H.E., 10x (case 14803) (original)

CONCLUSIONS

The types of visceral lesions identified at the psittacines submitted to diagnosis were mainly vascular and necrotic.

Inflammation was diagnosed in the liver in three of the seven cases and in the encephal at one case associated with sudden death.

Regarding non-lesional changes in the organs, these appeared with increased frequency, proving the importance of a rapid diagnosis.

ACKNOWLEDGEMENTS

The authors would like to thank SynevoVet Laboratories for the support in processing some of the samples.

REFERENCES

Andersen, A.A. and Vanrompay D. Avian chlamydiosis. 2000. Rev Sci., Tech 19(2): 396-404.

Binev R. G., Valchev I., Groseva N., Lazarov L., Hristov T., Uzunova K. 2012. Morphological Investigations of Experimental Acute Intoxication with the Anticoagulant Rodenticide Bromadiolone in Pheasants, J. of the Faculty of Veterinary Medicine Istanbul University, vol 38, nr.2, 161-173

Black, S.S., Steinohrt, L.A., Bertucci, D.C., Rogers, L.B. and Didier, E.S. 1997. Encephalitozoon hellem in budgerigars (Melopsittacus undulatus). Vet. Pathol., 34(3): 89-98.

Clavijo, A., Robinson, Y., Booth, T., and Munroe, F. 2000. Velogenic Newcastle disease in imported caged birds. Can Vet J., 41(5): 404-406.

Dolphin, R.D. 1987. Feeding and nutritional disorders. In: Companion bird medicine, E.W. Burr, ed. IOWA State University Press, Iowa.

Duff, P. 1997. Acute inhalant toxicoses of cagebirds. Vet Rec., 140(19): 512.

Harrison, G.J. 1998. Twenty years of progress in pet bird nutrition. J Am Vet Med Assoc., 212(8): 1226-1230.

Hoop, R.K., Bottger, E.C. and Pfyffer, G.E. 1996. Etiological agents of mycobacterioses in pet birds between 1986 and 1995. J. Clin. Microbiol., 34(4): 991- 992.

Joseph, V. 1996. Pollutant pneumoconiosis in a golden eagle (Aquila chrysaetos). Assoc Avian Vet Proc pp 227-230.

Koutsos, E.A., Matson, K.D. and Klasing, K.C. 2001. Nutrition of Birds in the Order Psittaciformes: A Review. J Avian Med Surg., 15(4): 257-275.

Koutsos, E.A., Tell, L.A., Woods, L.W. and Klasing, K.C. 2003. Adult Nutrition-Related problems in pet birds. Tijdschr Diergeneeskd., 124(2): 39-43.

Ononiwu J.C.,. Thomson R.G, Carlson H.C., and Julian R.J. 1979. Pathological Studies of "Sudden Death Syndrome" in Broiler Chickens, Can Vet J. 70–73.

Randall C.J., Reece R.L., 1996, Color Atlas of Avian histopathology, Mosby-Wolfe, 1-19, 21-29, 48-99, 103-114, 126-141, 149-168, 189-192

Schmidt R.E. 2013. Avian Cardiovascular System, Western Veterinary Conference EX15.

Schmidt R.E., Reavill D.R., Phalen D.N. 2003. Pathology of Pet and Aviary Birds, Blackwell Publishig, 3-17, 17-30, 42-56, 95-100,149-155.