

Mycobacteriosis of the red-lored amazon parrot: a case report

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ABSTRACT: A two-year-old red-lored amazon parrot (*Amazona autumnalis*) presented with progressive weight loss and general poor condition. In the radiograph a bounded egg was diagnosed, which was surgically removed under general anaesthesia. Two weeks later a fibrino-mucous cloacal discharge was observed. Clinical examination revealed a thickened structure along the left side of the cloaca. Bacterial culture was performed, in which *Pseudomonas aeruginosa* growth was demonstrated. Radiographs and blood examination showed no abnormalities. Despite treatment, no improvement in the bird's clinical condition was observed. The owner decided to euthanise the parrot. At autopsy a large tumour of the cloaca was disclosed. Microscopic examination of the lesion revealed a mycobacterial tubercle with numerous giant cells. In addition, Ziehl-Neelsen staining was performed and revealed numerous acid-resistant bacilli within the granulomatous lesions.

Keywords: red-lored amazon; parrot; mycobacteriosis; diagnosis

Tuberculosis (tbc) is caused by *Mycobacterium* which belongs to the family of Mycobacteriaceae, subclass Actinomycetales. *Tuberculosis* and *avian* agents, as well as numerous saprophytic species present in water or soil can be included in the *Mycobacterium* genus (Van DerHeyden 1997). These organisms are Gram-positive, elongated, rod-shaped, straight or slightly curved bacteria (Dhama et al. 2011). In Ziehl-Neelsen staining, bacilli are visualised as red in colour. Due to culture requirements and very slow growth in media, identification of the bacteria is difficult (Ledwon and Szeleszczuk 2007).

Birds contract the infection primarily through the digestive tract or aerogenically. Moreover, bacteria can be also transmitted by arthropods. Numerous studies have assessed the possible role of fomites in outbreaks (Shitaye et al. 2010). There is also the possibility of mycobacterial transmission from infected people to birds, mainly during feeding with chewed food (Steinmetz et al. 2006). In those cases,

gross lesions are localised mainly around the beak and under the tongue (Hoop et al. 2002).

Older birds are more susceptible to infection. The disease develops slowly and clinical symptoms are usually noticed three to four weeks before death. After ingestion, bacilli enter the gastrointestinal tract and then disseminate within the liver. Characteristic lesions called tubercles can be observed in numerous organs, e.g. in the liver, spleen or bone marrow (Washko et al. 1998). Avian mycobacteriosis is a slow-spreading, chronic disease, in which only about 5% of cases show clinical signs shortly after infection (Schmidt et al. 2008).

Case description

A two-year-old, household red-lored amazon parrot (*Amazona autumnalis*) presented with progressive weight loss and a general poor condition. The bird and all equipment were bought in a pet

store. The parrot was a solitary in-house pet and its diet consisted mainly of seeds (especially sunflower), nuts and fruits. Radiograph and faecal examination was performed, based on which a bounded egg was diagnosed (Figure 1). The cloaca was washed with a chlorhexidine solution and a neomycin unguent was applied. The bird was rehydrated with multi-electrolyte fluid injection and vitamins. Despite administration of treatment, no improvement was observed. The bounded egg was surgically removed under general anaesthesia. After two weeks the owner noticed apathy and loss of appetite. A significant amount of mucus mixed with blood and fibrin was observed to flow out from the cloaca. Clinical examination revealed a thickened structure along the left side of cloaca. Amoxicillin with clavulanic acid was given. The bird's condition improved somewhat, but the amount of cloacal discharge remained unchanged. Bacteriological culture of cloacal material was performed, in which *Pseudomonas aeruginosa* growth was demonstrated. According to the obtained antibiogram, local treatment using gentamicin was started. Thereafter, an improvement in the bird's clinical condition was observed. However, one month later the bird once again became apathetic. Radiographs showed no abnormality. Blood examination revealed mild anaemia, leukocytosis with increased level of heterophiles and lymphocytopenia (Table 1). In blood smear numerous immature lymphocytes, single apoptotic cells and a few activated heterophiles were observed. Administration of lincomycin was recommended. Unfortunately, the bird was in poor condition, and there was no more response to treatment. Upon the request of the owner, the bird was euthanised and an autopsy was performed.

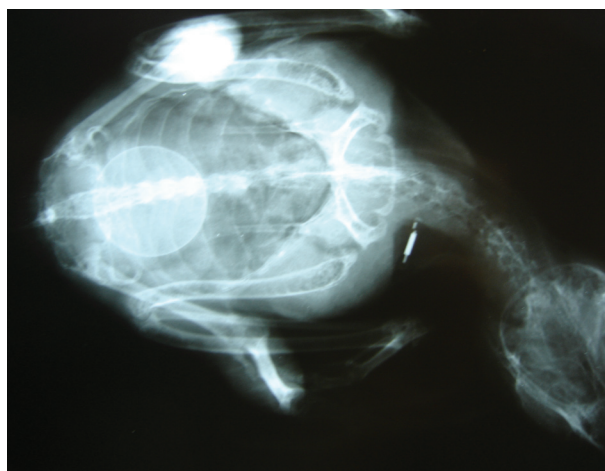


Figure 1. Radiograph of parrot, bounded egg is visible

Table 1. Blood examination

Test	Results	References
RBC (T/l)	2.04	2.4–4
HGB (g/l)	118	190–250
HCT (%)	29.2	40–50
WBC (G/l)	22	6–11
HETS (%)	86	55–80
LYM (%)	9	20–45
MONO (%)	3	0–3
EOS (%)	1	0–1
BASO (%)	1	0–1
AST (IU/l)	115	130–350
BA (μmol/l)	< 35	18–60
CK (IU/l)	118	55–345
UA (mg/dl)	4.4	2.3–10
Glu (mg/dl)	248	190–345
Ca ⁺⁺ (mg/dl)	9.9	8.5–14
Phos (mg/dl)	3.5	3.1–5.5
TP (g/dl)	5.0	3–5
Alb (g/dl)	2.2	1.9–3.52
Glob (g/dl)	2.9	1.3–3.7
K ⁺ (mmol/l)	4.1	3–4.5
Na ⁺ (mmol/l)	144	125–155

This disclosed a tumour-like lesion in the cloacal area. Histopathological examination of the lesion revealed the presence of a mycobacterial tubercle with numerous multinucleated giant cells. Moreover, foci of caseous necrosis were visible (Figure 2). In addition, Ziehl-Neelsen staining was performed and revealed numerous acid-resistant bacilli within the granulomatous lesions (Figure 3).

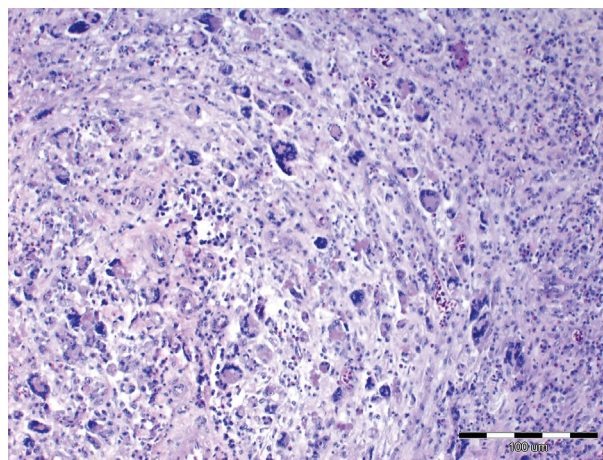


Figure 2. Tubercle, numerous multinucleated giant cells; H&E staining, × 100

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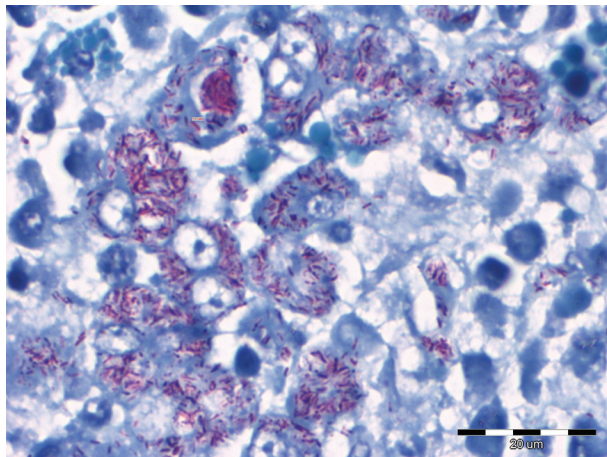


Figure 3. Acid-resistant bacilli; Ziehl-Neelsen staining, $\times 400$

DISCUSSION AND CONCLUSIONS

The primary lesions of mycobacteriosis in birds are nearly always in the intestinal tract. Such lesions form tumour-like structures on their surfaces, and deep ulcers can be observed. Typical caseous lesions are usually found in the liver and spleen; in rare cases tubercles can be observed within the lungs and other tissues (Christal 2006).

Clinical signs are unspecific and in the early stages no clinical signs are observed. Many affected birds show diarrhoea, and the comb and wattles may regress and become pale. Sometimes, respiratory signs and sudden death may occur; dyspnoea is less common (VanDerHeyden 1997; Christal 2006; Schmidt et al. 2008). In the chronic stage birds show apathy, lack of appetite and gradual weight loss. Feathers, especially around the cloaca, become dull or ruffled; the comb, wattle, and earlobes are often pale, thinner and dry (Dhama et al. 2011). Occasionally, muscle atrophy, joint swelling and lameness are observed. Tuberculous arthritis can even lead to paralysis. Bloody diarrhoea may also occur. In blood examination, lymphopaenia and erythropania may be disclosed (Schmidt et al. 2008; Dhama et al. 2011). In the present case, no specific clinical signs were observed. The parrot was in poor condition and the bounded egg misled the veterinarians. In later stages, fibrino-mucous discharge from the cloaca was observed, which was also connected with previous clinical history. Radiographs also showed no abnormalities, except for the bounded egg.

Bacteriological culture has several limitations. Bacilli require special culture conditions, such as

specific substrates, nutrients, temperature and oxygenation (Tell et al. 2001). Examination may be performed in standard media or special media based on the BACTEC 460TB system (Hoop et al. 1993). In conventional culture media growth is visible when the pathogen numbers at least 100–1000 in 1 ml of material sample. The duration of the test is up to 12 weeks (Tell et al. 2001). Examination in BACTEC system allows detection of single bacteria. Two to six weeks can be required for visualisation of the colonies (Hoop et al. 1993; Tell et al. 2001). In the case described here bacteriological culture revealed only *Pseudomonas aeruginosa* infection, probably due to wrong culture media and incorrect culture conditions.

The diagnosis of mycobacteriosis is mainly based on post-mortem examination. Gross lesions are usually visible in the intestines, liver, bones, spleen, kidneys and lungs. Within the intestinal wall granulomatous tumours of a few millimetres to a few centimetres in size, grey-white or grey-yellow in colour and round in shape, are present. The liver and spleen are enlarged; the surface and cross section reveals round, white, beige or yellowish tubercles of soft consistency. Lesions are usually easy to expound from the organ pulp. In histopathological examination characteristic tubercles composed of epithelioid cells, giant cells of the Langhans type and lymphoid cells are visible. Epithelioid cells are characterised by abundant cytoplasm and vesicular nuclei. Giant cells are round or oval with numerous nuclei arranged in the shape of a horseshoe, wreath or are agglomerated. Lymphoid cells are smaller than normal lymphocytes and contain large, chromatin-rich nuclei (Hoop et al. 1993; Ledwon et al. 2008).

The late diagnosis of the patient described here was linked to a wrong primary diagnosis. Firstly, the bounded egg and secondary clinical signs were not specific for mycobacteriosis. The bacteriological culture also misled the veterinarians.

Microorganisms of the family Mycobacteriaceae are considered as opportunistic pathogens of animals and humans. The most commonly encountered pathogen in birds is *Mycobacterium avium*. Wild birds, as well as exotic birds and poultry are all sensitive to infection. It should be noted that mycobacteriosis in birds may be induced by *Mycobacterium tuberculosis*, which can be transmitted from animals to humans. According to a WHO report (2013), tuberculosis remains one of

the world's deadliest communicable diseases. Thus, the importance of this disease and the potential risk for owners and veterinarians prompted us to describe this case here.

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