Aegyptianellosis in falcons from Kuwait

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Summary

Thirty-five falcons out of 1706 (2%) exhibited Aegyptianella-like inclusion bodies in red blood cells in association with compatible clinical signs and a positive response to doxycycline therapy. Signs reported more often were arthritis (48.5%), reduced speed and strength in flight (45.7%), weight loss (45.7%), dyspnoea (45.7%) diarrhea (31.4%) and anorexia (31.4%). This study suggests that aegyptianellosis is not rare in captive falcons from the Middle East.

Keywords: Aegyptianella pullorum - Aegyptianellosis - Falcon - Kuwait.

Introduction

Bacteria of the genus Aegyptianella sp. (Anaplasmataceae) are rickettial parasites of avian erythrocytes causing a disease in birds similar to anaplasmosis in cows [13]. Up to now, Aegyptianella pullorum is the only validated species. Pathogenicity associated with Aegyptianella has been recorded mostly in domestic birds such as turkeys, domestic ducks and chickens [1,13]. Clinical signs reported more often are anorexia, diarrhea and paralysis [11,12]. Pathological changes have been detected in some wild birds [11], including the Falconiformes [6,12]. The geographical distribution of aegyptianellosis follows the distribution of its vector tick, Argas persicus [4,7], found mostly in tropical and subtropical areas [1,8-10]. It is therefore assumed that the disease is common in birds from tropical, sub-tropical and Mediterranean areas. However, in this author’s knowledge, there are no records of the presence of Aegyptianella spp. in birds of prey from the Middle East, although the species spectrum of these bacteria is apparently wide [2]. It seemed thus important to report some cases recently observed in falcons from Kuwait.

Material and Methods

From early May 2003 to the end of April 2005, blood samples drawn from the brachial vein of 1706 captive falcons from Kuwait were used to immediately prepare fresh blood smears air-dried and stained with the Wright technique. Slides were then examined under the oil immersion lens of a Leica DMLS microscope, equipped with a camera DC-180, for the presence of Aegyptianella spp. inclusion bodies in the erythrocytes. Mixed infections were ruled out. Infected birds were treated orally with doxycycline mixed with the meat at doses of 25 mg/kg/body weight [11,12] for 20 days and re-examined after 21 days.

Results

Thirty-five falcons out of 1706 (2%) were diagnosed with aegyptianellosis. There were 21 females and 14 males, 1-8 year olds, 25 Saker falcons (Falco cherrug), 6 Peregrine falcons (Falco peregrinus) and 4 Gyrfalcons (Falco rusticolus). Countries of origin were the following: Kuwait (9), Iran (8), Iraq (5), Mongolia (4), Pakistan (4), Germany (2), Syria (1), Emirates (1) and United Kingdom (1). The 4 gyrfalcons examined were imported from Germany (2), UK (1) and Emirates (1). Travel to Saharan and sub-Saharan countries was reported in 5 cases. Clinical signs were present in all affected raptors and are listed in table I. Microscopic examination revealed the presence of round (figure 1a), oval (figures 1b and 1c) and clover-like (figures 1d and 1e) Aegyptianella-like inclusion bodies in the circulating red blood cells of all patients. In some cases, erythrocytes showed a protrusion at the site in which an Aegyptianella-like inclusion body was located (figures 1b and 1c). Some inclusion bodies were pictured in the act of entering (endocytose) or exiting (exocytose) the membranes of red blood cells (figures 1f-1h). Intensity of infection was not calculated but apparently was lower than 1%. At the end of doxycycline therapy, thirty-three falcons presented a complete clinical remission in association with disappearance of inclusion bodies from the blood. Partial remission was reported in 1 case and 1 Saker falcon showing a 7-day history of anorexia, dyspnoea and diarrhoea died before starting the therapy.

Résumé

Aegyptianellose chez les faucons au Koweit. Par W. TARELLO.

Trente-cinq faucons sur 1706 (2%) montraient des corps d’inclusions de type Aegyptianella dans leurs globules rouges en association avec des symptômes évocateurs et une réponse thérapeutique positive à la doxycycline. Les signes cliniques les plus fréquents étaient une arthrite (48.5%), une diminution de la capacité au vol (45.7%), une perte de poids (45.7%), une dyspnée (45.7%) une diarrhée (31,4%) et une anorexie (31,4%). Cette étude suggère que l’aegyptianellose n’est pas rare chez les faucons de chasse au Moyen-Orient.

Discussion

The first description of *Aegyptianella* was done by Carpano (1928) in Sudan while examining the blood of diseased poultry [3]. Since then *A. pullorum* has been reported in a variety of domestic [1,8,13] and wild birds [2,9] worldwide. However, very few researches have been carried out in the Middle East. This study reports the evidence of 35 captive falcons from Kuwait showing *Aegyptianella*-like inclusions in the blood associated with compatible clinical signs responsive to doxycycline.

Normal falcon erythrocytes do not show inclusions in the cytoplasm. Microscopic detection of round (figure 1a), oval (figures 1b and 1c) and clover-like (figures 1d and 1e) inclusion bodies morphologically consistent with *A. pullorum* [5] and located internally to (figure 1a), protruding from (figures 1b and 1c) or entering/exiting the erythrocytes (figures 1f-h) is diagnostic for aegyptianellosis. These rickettsial forms can be seen either inside or outside the red blood cells membranes (figures 1a-h), since erythrocytic vesiculation is the mode of entrance or exit of initial bodies from the red blood cells [3]. Additionally, the response to long-term doxycycline treatment is consistent with the cytological diagnosis of aegyptianellosis and compatible with the suggested criteria for its diagnosis.

In Italy, a heron and two birds of prey diagnosed with aegyptianellosis showed anorexia, emaciation, paralysis, diarrhoea, fever and death [11, 12]. The clinical pattern reported in this study is similar, only showing milder manifestation. On the other hand, it is acknowledged that birds living in endemic areas are less susceptible to the infection, showing slighter signs [1]. In fact, no one case of paralysis was reported among these birds of prey.

Arthritis (48.5%) and reduced speed and strength in flight (45.7%), instead, were milder signs of ambulatory impairment more commonly noticed. Severe emaciation was not observed in the study group, but a milder sign of un-proper feeding defined as weight loss (45.7%) was frequently observed, whereas diarrhoea and anorexia were present in approximately 1/3 of cases. Young animals, immune-depressed adults or birds living in non-endemic areas can develop acute infection leading to sudden death [6]. Only one fatal case was observed in the study group and this was an adult Saker falcon from Kuwait brought too later for consultation and suffering a 7-day history of anorexia and diarrhoea. Overall, these observations confirm that clinical signs are milder in birds living in or imported from endemic areas [9].

*Aegyptianella* is transmitted by the *Argas persicus* and *Argas walkerae* ticks, common ecto-parasites of domestic and wild birds also affecting a vast variety of vertebrate hosts, including human beings [3, 4]. Nymphs and adults feed on birds during the night only and suck the blood for a short period of time, leaving the host at daylight [7]. This may explain why tick infestation was reported in only 2 rap-tors in this study. Unfortunately ticks were removed and destroyed before the consultation. However, hunting travels to Africa (in 5 cases) and countries of origin reported, most of which lay in the sub-tropical area (Kuwait, Iran, Iraq, Pakistan, Syria), are compatible with the areas of diffusion of *A. persicus* and *A. walkerae*. Diseased gyrfalcons imported from Germany and UK probably acquired the infection locally or during travels to Africa. In short, aegyptianellosis is not rare in captive adult birds of prey from the Middle East, showing clinical signs milder than those generally reported in young birds and in non-endemic areas.

Full therapy is nonetheless worthy to be administered in such cases since chronic infection due to *A. pullorum* can enhance the risk of transmission between co-living individuals and cause permanent slight diminution of performances, which constitutes a strong handicap for hunting fal-con.

Conclusion

Current avian literature seldom includes aegyptianellosis [6] in the differential diagnosis of the intracellular blood parasites of birds of prey and this prevents a full understanding of the role that these bacteria play as possible causes of morbidity and mortality, whether acting alone or concomitant with infections caused by other disease agents. Concurrent tick-transmitted diseases, such as babesiosis due to *Babesia shorttii*, may further complicate the clinical picture. It is the-

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<th>Number of birds</th>
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<td>Wing/leg arthritis</td>
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<td>Reduced speed &amp; strength in flight</td>
<td>16</td>
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<tr>
<td>Weight loss</td>
<td>16</td>
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<td>Dyspnoea</td>
<td>16</td>
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<td>Diarrhoea</td>
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<td>Anorexia/poor appetite</td>
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<td>Weakness</td>
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<td>Sinusitis</td>
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Table I. — Numbers and percentage of birds out of 35 falcons from Kuwait showing clinical signs associated with *Aegyptianella* infection.
FIGURE 1. — Aegyptianella-like inclusion bodies in the reported falcons (x100) : internally round (a), oval (b, c), clover-like (d, e) inclusions, exiting (f, g) or entering (h) the red blood cell membranes.
Therefore advisable a scrupulous search for *Aegyptianella pullorum* in captive falcons living in endemic areas and presenting chronic poor performance.

**References**


