Microscopic and clinical evidence for Ehrlichia spp. infection in Saker falcons (Falco cherrug)

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SUMMARY

Four captive Saker falcons (Falco cherrug) from Kuwait exhibited Ehrlichia-like inclusions bodies in the circulating monocytes in association with compatible clinical signs and responsive to doxycycline therapy. This study suggests that ehrlichiosis may affect birds of prey.

Keywords : Ehrlichiosis - Saker falcon - Kuwait.

Introduction

Genus Ehrlichia contains obligate intracellular gram positive bacteria belonging to the family Rickettsiaceae, characterized by their unique tropism for circulating leucocytes and platelets. Several Ehrlichia spp. can be transmitted to a variety of hosts in nature, including dogs [3,7], horses [3], cats [5,6,9], roe-deers, boars [4], bears, mooses, chamois, birds [4] and human beings [5-6,9]. Usually, Ixodes ticks are the vectors [7,9]. Definitive diagnosis of ehrlichiosis is made by cytological demonstration of morulae (i.e., inclusions formed by clusters of rickettsiae) in leucocytes or by PCR, in association with clinical signs consistent with Ehrlichia infection and response to anti-rickettsial drugs [3,5]. The predominant signs of ehrlichiosis are anorexia, lethargy, arthralgia, neck rigidity, lymphadenomegaly, weight loss, incoordination and pale mucous membranes [7,9]. Stomatitis, conjunctivitis and opportunistic fungal infections have been also recorded in cats [6,9].

Microscopic and clinical evidence of ehrlichiosis as a naturally occurring disease affecting birds has never been reported so far. However, it is acknowledged that wild birds carrying infected ticks may be reservoir hosts for Ehrlichia chaffeensis, the agent of human monocytic ehrlichiosis (HME), and for Anaplasma phagocytophilum, the zoonotic agent of granulocytic ehrlichiosis [1,2]. Furthermore, a variant of Anaplasma phagocytophilum has been recently identified for the first time in birds [4]. It seemed thus worthy to report four clinic cases highly evocative of ehrlichiosis found in falcons in the Middle East.

Clinic cases

Diagnosis of monocytic ehrlichiosis was made in 4 Saker falcons (Falco cherrug) from Kuwait, based on the same criteria used for mammals : cytological demonstration of inclusion bodies in monocytes (figures 1-4), clinical signs compatible with ehrlichiosis, absence of concurrent conditions and response to doxycycline therapy (table I). Blood samples obtained in sterile conditions from the brachial vein of each falcon were used to prepare fresh blood smears stained with the Wright technique and examined under a microscope Leica DMLS (x 100 oil immersion objective) equipped with a camera Leica DC 180. On each slide, two hundred monocytes were examined consecutively. The presence of Ehrlichia-like inclusions (initial bodies) was observed in the cytoplasm of some monocytes (figures 1-4) and the percentage of infected monocytes was calculated before and after treatment (table I). These inclusions bodies were identical to those previously reported in other host species diagnosed with ehrlichiosis by this author [6-8]. Falcons were treated orally with doxycycline mixed with the meat at 25 mg/kg [8] once a day for 20 days and a clinical and microscopical re-examination was performed at the end of therapy. Clinical remission from signs highly evocative of ehrlichiosis [5-7, 9], such as arthralgia, neck rigidity (altered posture of the neck), lethargy, in-coordination and tachypnea and bleeding from the nose, was observed at the end of therapy in association with a sharply decreased number of mononuclear inclusions in falcons n°1 and 3 and disappearance of mononuclear inclusions in falcons n°2 and 4 (table I). A second course of doxycycline was then given to falcons n°1 and 3, although they were clinically recovered, in order to eliminate the residual inclusions. Checks made 20 days later confirmed complete clinical and haematological recovery in falcons n°1 and 3.

Conclusion

Normal falcon monocytes do not possess granules [10]. Occasionally, cells with cytoplasmatic granules have been seen in the peripheral blood of falcons and have been defined as “ toxic granulations ” associated with underlying systemic illness [10]. This definition is compatible with the diagnosis of ehrlichiosis. Furthermore, the response to long-term doxycycline treatment is consistent with the cytological diagnosis of ehrlichiosis and is compatible with the suggested criteria for its diagnosis [5]. Taken together, these elements indicate that ehrlichiosis exists in falcons, requiring further serologic and molecular evaluation for assessing the carrier status of animals and identifying the peculiar species involved [3].
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Table I. — Clinical signs and outcomes of therapy with doxycycline in 4 falcons diagnosed with monocytic Ehrlichia-like organisms infection.

<table>
<thead>
<tr>
<th>Duration of the disease</th>
<th>Clinical signs (%) of monocytes affected</th>
<th>Clinical outcomes</th>
<th>Blood Check (%) of monocytes infected</th>
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</thead>
<tbody>
<tr>
<td>1 - Saker, F, 5 years, 1070g, 03 Oct 03</td>
<td>3 months Arthralgia, neck rigidity, incoordination, tremors (17%)</td>
<td>Complete clinical recovery</td>
<td>Positive (3%) = 2nd course of doxycycline</td>
</tr>
<tr>
<td>2 - Saker, M, 1 year, 784g, 13 Dec 03</td>
<td>1 month Anorexia, lethargy, neck rigidity (22%)</td>
<td>Complete clinical recovery</td>
<td>Negative</td>
</tr>
<tr>
<td>3 - Saker, M, 1 year, 745g, 23 Oct 2003</td>
<td>3 days Anorexia, vomiting, weight loss, lethargy, arthralgia (25%)</td>
<td>Complete clinical recovery weight = 930g</td>
<td>Positive (5%) = 2nd course of doxycycline</td>
</tr>
<tr>
<td>4 - Saker, F, 1 year, 1100g, 10 Feb 04</td>
<td>2 weeks Anorexia, weight loss, dyspnoea, lethargy, bleeding from the nose (12%)</td>
<td>Complete clinical recovery weight = 1260g</td>
<td>Negative</td>
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