Abstract

Anamnesis: A one year old French Bulldog male, affected by gastrointestinal symptoms and abdominal pain, with no response to the established therapeutic schedule was attended. Clinical and laboratory findings: The most significant finding was thrombocytopenia and seropositive for Borrelia burgdorferi by IDEXX 4S Snap test. Treatment approach: treatment was established with tetracycline and doxycycline. Eight months later the dog showed signs of polyarthritis and received a second antibiotic treatment with remission of the disease and sero-reversion. Conclusions: This case is of epidemiological relevance because it is the first time canine borreliosis is evidenced by serology in dogs from an urban setting, suggesting the disease is moving on toward middle altitude and urban areas. Clinical signs and treatment schedule are reviewed.

Key words

Borrelia burgdorferi, canine borreliosis, thrombocytopenia, zoonosis.
Gonzalez-Dominguez MS et al. First report of canine borreliosis seroprevalence in Medellín-Colombia

Resumen

Anamnesis: un perro de la raza Bulldog francés de un año de edad, fue llevado a consulta por tener síntomas gastrointestinales, sin respuesta al tratamiento previo. Hallazgos clínicos y de laboratorio: el perro presentó trombocitopenia y serología positiva a Borrelia burgdorferi por IDEXX 4S Snap test. Tratamiento: El tratamiento se instauró con tetraciclina y doxiciclina. A los 8 meses el perro mostró poliartritis y continuaba seropositivo, por lo cual recibió un segundo esquema con antibióticos que resultó en remisión de los signos y serorreversión. Conclusiones: este caso es de relevancia epidemiológica por ser la primera vez que se diagnostica la borreliosis canina en un área rural por serología, lo que sugiere que la enfermedad se puede estar desplazando hacia centros urbanos y mayores altitudes. En la discusión se revisan los signos clínicos y el esquema de tratamiento de la enfermedad en caninos.

Palabras clave

Borrelia burgdorferi, borreliosis canina, trombocitopenia, zoonosis.

Resumo

História: A consulta foi realizada a cão do raça buldogue francês de um ano, ter sintomas gastrointestinais, sem resposta ao tratamento anterior. Os achados clínicos e laboratoriais: o cão tem trombocitopenia e sorologia positiva para Borrelia burgdorferi pelo IDEXX 4S Snap test. Tratamento: o tratamento foi iniciado com tetraciclina e doxiciclina. Aos 8 meses, o cão tem artrite e manteve-se soropositivo, pelo qual recebeu um segundo esquema de antibiótico o que resultou em remissão dos sinais e sero-reversão. Conclusões: neste caso, é de importância epidemiológica por ser o primeiro borreliose canina diagnosticado sorologicamente em uma área rural, o que sugere que a doença está se deslocando para os centros urbanos e as altitudes mais elevadas. Na seção de discussão dos sinais clínicos e esquema de tratamento da doença em cães são tratados.

Palavras-chave

Borrelia burgdorferi, canine borreliose, trombocitopenia, zoonoses.
Introduction

Borrelia or Lyme’s disease was first described after the occurrence of an arthritis epidemic in Lyme, Connecticut in 1976. In 1982, a Spirochete was proposed as the etiology, subsequently confirmed. Borrelia is a gram negative microorganism requiring two hosts for completing its life cycle: a mammal and an arthropod, the latter an Ixodes tick. Clinical signs in dogs include fever, lethargy, claudication, local inflammatory reactions, pain, polyarthritis, renal and digestive abnormalities. Diagnosis is based on detection of circulating antibodies by ELISA, amplification of Borrelia burgdorferi genome by PCR, bacterial culture, and clinical laboratory findings. Treatment consists of the administration of antibiotics during 10 to 30 days (including cephalosporins, amoxicillin, azithromycin or doxycycline or even for more than 4 weeks). Prophylaxis is based on commercial vaccines not available at the moment in Colombia. In the present work we report the presence of a probable case of Borrelia burgdorferi diagnosed by serology only in Medellin, Colombia, a city located at 1,540 m over sea level.

Patient examination

Anamnesis

A one-year-old male French bulldog was attended at the Small Animal Clinics of University CES (Medellin, Colombia). At consultation the dog had complete vaccination and anti-parasite schedules. The dog was presented due to recurrent emesis, loss of appetite and loose stools during the last four days. The owner reported that the dog was born in Colombia and has never left the country. The owner signed informed consent for sampling and data collection for this case report. The authors reported there is no conflict of interest.

Clinical findings and diagnostic aids used

On physical examination, body weight, respiratory and cardiac frequency and capillary refill time were 12 kg, 30/min, 112 bpm, and 2 sec, respectively. Mucosae were normal and body temperature was 38 °C. The dog demonstrated pain at abdominal palpation, and then it was considered intestinal obstruction. Abdominal contrast radiography, hemoleucogram parameters, serum alkaline phosphatase, alanine amino transferase, blood urea nitrogen, Creatinine, and fecal tests were performed.

Treatment approach

After no radiographic evidence of abnormalities in the intestine and no parasites detected in fecal test, a treatment for a general non specific condition was established as follows: 80 ml/kg/day crystalloids, 0.9% sodium chloride and 28 mg/kg/12 h dipirone. Twenty-four hours later 15 mg/kg/12 h metronidazole, 15 mg/kg/12 h trimetoprim-sulfa and 2 mg/kg/12 h ranitidine were instituted for therapy. A comercial soft diet was also prescribed. In a control hemoleucogram exam performed three days later it was found thrombocytopenia then a Snap IDEXX 4S test was practiced which detects antibodies against Ehrlichia canis, Borrelia burgdorferi, Anaplasma phagocitophylum and Dirofilaria Immitis specific antigens. The result was positive for Borrelia burgdorferi.

After treatment was completed with 5 mg/kg/12 h oxytetracycline. Once the oral way was restored the antibiotic was changed to 10 mg/kg/24 h PO/19 days doxycycline hyclate, 15 mg/kg/12 h PO/5 days metronidazol and 20 mg/24 h PO/10 days omeprazol. Eight months later, the patient was led once again at consultation when he was presented severe neck pain, and a progressive loss of appetite. No changes were observed at the vertebral column radiographic exam or in the hemoleucogram parameters or blood chemistry exams. The dog was then treated with 30 mg/kg/2 days dipirone and 4 mg/kg/2 days tramadol, followed by 0.75 mg/kg dexamethasone and 2 mg/kg ranitidine. In addition, a control test resulted positive for Borrelia burgdorferi. The patient was given 5 mg/kg/12h during 25 days doxycycline. Nine months later two additional serological tests resulted negative.
The occurrence of borreliosis and its clinical forms will depend on the species of *Borrelia* implicated, the zone of incidence, the continent where it occurs and the breed of the dog. According to Gerber et al. (2007), the predominant affected breed is Bernese mountain dog but they could not determine it to be a breed predisposition. In humans affected by the disease several species of *Borrelia* have been isolated and correlate with clinical sings and tissue tropism, a pattern of pathogenicity proposed to occur also in canine borreliosis. In several tropical regions of Colombia the disease was evidenced by serology: in Monteria (Capital of Cordoba State) 12% seropositivity was found of in a sample of 200 dogs. Interestingly, a serological survey performed in a human population in the same region showed a 4.6% seropositivity. In the present case report the dog lived in Medellin city located at 1,540 m above sea level. This fact represent the first time borreliosis is reported in that altitude. Other studies have correlated the incidence of borreliosis to the frequency of *Ixodes* ticks that was found under the limit of 1,300 and 1,070 m above sea level in Italy and Switzerland, respectively.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Units</th>
<th>First consultation</th>
<th>Three days later</th>
<th>Eight months later</th>
<th>Reference values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Erythrocytes</td>
<td>Mill/µl</td>
<td>8.22</td>
<td>7.29</td>
<td>7.71</td>
<td>5.5-8.5</td>
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<tr>
<td>Hematocrit</td>
<td>%</td>
<td>55</td>
<td>48</td>
<td>53</td>
<td>37-55</td>
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<tr>
<td>Hemoglobin</td>
<td>g/dl</td>
<td>18.4</td>
<td>17.1</td>
<td>17.7</td>
<td>12.0-18.0</td>
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<tr>
<td>MCV</td>
<td>fl</td>
<td>65</td>
<td>63</td>
<td>65</td>
<td>60-77</td>
</tr>
<tr>
<td>MCHgC</td>
<td>g/dl</td>
<td>34.9</td>
<td>37.8</td>
<td>36.2</td>
<td>32-37</td>
</tr>
<tr>
<td>Platelets</td>
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<td>200</td>
<td>140</td>
<td>137</td>
<td>200-500</td>
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<tr>
<td>Plasma proteins</td>
<td>g/dl</td>
<td>68</td>
<td>66</td>
<td>58</td>
<td>55-75</td>
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<tr>
<td>Leukocytes</td>
<td>/µl</td>
<td>10690</td>
<td>8610</td>
<td>8210</td>
<td>8000-14000</td>
</tr>
<tr>
<td>Eosinophils</td>
<td>/µl</td>
<td>0</td>
<td>86.1</td>
<td>410</td>
<td>100-1500</td>
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<tr>
<td>Neutrophils</td>
<td>/µl</td>
<td>7910</td>
<td>7146</td>
<td>5747</td>
<td>3300-10000</td>
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<tr>
<td>Bands</td>
<td>/µl</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0-300</td>
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<tr>
<td>Lymphocytes</td>
<td>/µl</td>
<td>2779</td>
<td>1377</td>
<td>1888</td>
<td>1000-4500</td>
</tr>
<tr>
<td>Monocytes</td>
<td>/µl</td>
<td>0</td>
<td>0</td>
<td>164</td>
<td>100-700</td>
</tr>
</tbody>
</table>

Table 1. Results of the patient’s hemoleucogram exams performed during initial consultation and follow-up period.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Units</th>
<th>First consultation</th>
<th>Eight months later</th>
<th>Reference values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creatinine</td>
<td>Mg/dl</td>
<td>0.86</td>
<td>0.85</td>
<td>0.5-1.5</td>
</tr>
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<td>ALT</td>
<td>U/l</td>
<td>64</td>
<td>41</td>
<td>21-102</td>
</tr>
<tr>
<td>FA</td>
<td>U/l</td>
<td>32</td>
<td>20</td>
<td>10-73</td>
</tr>
<tr>
<td>BUN</td>
<td>Mg/dl</td>
<td>9.8</td>
<td>15</td>
<td>10-28</td>
</tr>
</tbody>
</table>

Table 2. Results of blood chemistry exams practiced during initial consultation and follow up period.

Reference values at Instituto Colombiano de Medicina Tropical (ICMT) Veterinary Lab.
Several species of ticks including *Ixodes* vector of *B. burgdorferi*, can be found in the tropical zone where the patient was located. In 25 Municipalities of the Antioquia State (Colombia), *Rhipicephalus (Boophilus) microplus* (*Ixodes*) was the predominant tick isolated in 68% of the cases. In contrast, 100% of captures were classified as *Rhipicephalus (Boophilus) microplus* in the Cundinamarca State (Colombia) 18.

Clinical signs of canine borreliosis may include pyrexia, loss of appetite, lethargy, lymphadenopathy, and polyarthritis, and glomerulonephritis that progress toward renal failure and myocarditis. Although the patient showed mild thrombocytopenia with platelet aggregation, changes in blood chemistry parameters are not specific. Krimer *et al* (2011) found claudication, anorexia, pyrexia and loss of weight with no neurological signs in patients affected by borreliosis. At the first consultation, the patient showed acute abdominal pain probably related to enteritis, whereas at the second one, presented thoracolumbar pain, acute cervical column pain, and loss of appetite.

Patients affected by borreliosis become seropositive and can persist as such for months, or years. The diagnosis is based on serological tests (ELISA, Direct Immunofluorescence), or antigen detection by PCR. The patient was diagnosed seropositive, and remained as such eight months later; however, at a sampling performed one year after the first consultation, he had seroconverted. Because of the highly complex behavior of the disease, Speck *et al* (2007), proposed a diagnosis schedule based on the results of hemoleucogram parameters, blood chemistry, urine analysis, testing for other infectious agents, rheumatoid factor, and antinuclear antibodies tests, with the aim to discard differential diagnoses. In a study conducted in New York (Westchester County) and Connecticut found that serotest results revealed little or no change in antibody titer for lame dogs given antibiotics or for healthy dogs 2 or more months after initial sample collection. It is important to note that the patient was positive for serological diagnosis with a SNAP test and no diagnosis was supplemented, which makes the case is suspected but not confirmed the presence of the disease. This becomes the first epidemiological alarm to monitor the disease and begin to identify possible cases and if required begin prophylactic vaccination processes.

The current treatment of canine borreliosis is based on the use of tetracycline, mainly doxycycline, ampicillin or amoxicillin, third generation cephalosporin and/or erythromycin and its derivatives. In a review on human borreliosis (Lyme’s disease) by Stricker (2007) the author stated that a 14 weeks antibiotic schedule is necessary for successful treatment of patients with persistent symptoms of the disease. In addition, this author mentioned that severity and duration of Lyme’s disease may be aggravated by tick-born co-infections. The patient was treated with oxytetracycline followed by doxycycline, which resulted in a successful remission after a successful antibiotic schedule. Prevention of canine borreliosis is mainly based on vector control by using depot insecticides. The current available vaccination schedules, warrant immunity during one year. However, due to the lack of authorization for its use in Colombia, we recommend a program based on controlling ectoparasites by the use of spot-on products, or collars containing fipronil, amitraz or other acaricides. In several studies performed in Europe and in the United States, *Ixodes* ticks have prevalence of infections with *Borrelia burgdorferi*, between 4.6 and 7.8%. We can suspect an increase in the incidence of canine borreliosis in the near future. Similarly, the zoonotic potential should be taken into account for prevention and control of the disease.

**Conclusion**

Because of the high persistence of ticks in the Department of Antioquia as well as in other Departments of the Country, together with the possibility of a widespread distribution of ticks as a consequence of climate change, we must suspect an increase incidence of tick-borne bacterial infections. Finally, it is necessary to determine a diagnostic schedule aimed to detect these dogs in the early stages of the disease, which could provide the patient with a better prognosis and a greater expectancy of life and it is important to complement the serological diagnosis with ELISA and PCR, to establish more comprehensive diagnostics.
Acknowledgements

INCA-CES Research Group research activities are supported by Universidad CES (Medellin, Colombia). The authors thank Dr. Juan Maldonado-Estrada (Universidad de Antioquia) for his critical reviewing of the manuscript.

References


