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Case Report

Clinical Diagnosis and Treatment of Leptospirosis in two Dogs

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ABSTRACT

Leptospirosis is a common disease of livestock, pet animals and wildlife throughout the world. Two dogs aged between 3-4 years were presented to the clinic with a history of fever (104.4°F), progressive anorexia with vomiting, polyuria and discolored urine. Upon clinical examination, all oral mucous membranes and the skin surfaces of ventral abdominal side were icteric. Urine and blood samples were collected and send to the laboratory for diagnosis. Dark field microscopic examination revealed the presence of leptospiral organisms in urine sample. Microscopic agglutination test is used to determine the presence of antibodies against leptospira organisms. Streptomycin-penicillin and doxycycline along with supportive therapy were used in dogs for 15 days, and they made a full recovery from disease. The present case reports focuses on early detection of leptospirosis and timely therapeutic intervention.

Keywords: Leptospirosis, icterus, Microscopic Agglutination Test (MAT), Streptomycin, Penicillin, Doxycycline, microscopy.

INTRODUCTION

Leptospirosis is a sporadic bacterial zoonotic disease caused by spirochetes of the genus Leptospira that affects humans and wide range of animals (Rojas *et al*., 2010). This disease continues to have a major impact on people living in urban and rural areas of developing countries with a high level of morbidity and mortality. It has a significant clinical presence in canine medicine. In addition to an increased number of cases, more diverse clinical presentations are being recognized (Ananda *et al*., 2008). Leptospirosis is transmitted by the urine of an infected animal and is contagious as long as it is still moist. Leptospiral infections cause both acute and chronic disease and the severity of infections are related to the virulence of the organism, susceptibility of the host, and the affected host species (Radostitis *et al*., 2007).

There are four clinical forms of leptospirosis infection in dogs such as peracute, subacute, acute and chronic. Pyrexia (103-104°F), shivering, and generalized muscle tenderness are the first clinical signs in acute leptospirosis followed by vomiting, rapid dehydration, and peripheral vascular collapse subsequently (Greene *et al*., 1998).

Case presentation

Two dogs (Dog 1 – Spitz, Male, 3 years and Dog 2 – Spitz, Female, 4 years) were presented to the clinic on lateral recumbency with the symptoms of high fever, anorexia, vomiting, polyuria and deep yellow colored urine (Fig. 1). Upon clinical examination, all oral mucous membranes (Fig. 2) and skin surfaces at ventral side of the abdomen (Fig. 3) were icteric. On physical examination high temperature (104.1°F in Dog 1 and 104.4°F in Dog 2), increased respiration (46 breaths/min) and pulse rate (126/min), icteric conjunctival mucous membranes (Fig. 4) were observed. Blood sample was collected from peripheral vein and sent to labrotory for microscopic agglutination test to determine the antibody titer of leptospirosis. Urine sample was collected by passing catheter in both the dogs and tested for presence of leptospira organisms under dark field microscope. Whole blood and serum were collected for hemato-biochemical analysis. Haematological analysis of blood revealed low levels of Hb, PCV, TEC, more no. of leukocytes and neutrophils. Increased levels of ALT, AST, BUN and creatinine levels were observed (Table 1). On ultrasonography hepatomegaly, distended gall bladder and enlarged kidneys were recorded. Microscopic Agglutination Test (MAT) was done on 5th day of onset of clinical signs and the titre was 1:800 for L. canicola and 1:400 for L. pomona.

Treatment

Dogs were treated with injections of streptomycin-penicillin, 25000 IU/kg, bwt, im., flunixine meglumine, 2

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Table 1: Hematologic and serobiochemical results.

S. No	Parameters	Reference values	Dog 1		Dog 2	
			Before therapy	After therapy	Before therapy	After therapy
1.	Hb (g/dl)	12 - 15	8.7	10.1	7.2	9.4
2.	PCV (%)	35 - 47	29	32	27	30
3.	TEC (10^6/µl)	5 - 8	4.89	5.17	4.10	5.06
4.	TLC (10^3/µl)	6 - 14	15.1	11.02	16.3	12.2
5.	Neutrophils (%)	60 - 70	77	68	75	70
6.	Lymphocytes (%)	10 - 30	17	25	19	24
7.	Monocytes (%)	2 - 10	4	5	3	3
8.	Eosinophils (%)	0 - 9	2	2	3	3
9.	Basophils (%)	0 - 1	-	-	-	-
10.	ALT (U/L)	21 - 102	127	71	148	77
11.	AST (U/L)	23 - 66	96	52	102	61
12.	BUN (mg/dL)	10 - 28	45	24	52	22
13.	Creatinine (mg/dL)	0.5 – 1.5	1.8	1.3	2.0	1.6
14.	Total protein (mg/dL)	5.4 – 7.1	6.1	6.5	5.7	6.0
15.	Total bilirubin (mg/dL)	0.15 – 0.50	1.1	0.7	1.3	0.62
16.	Direct bilirubin (mg/dL)	0.06 – 0.12	0.21	0.11	0.29	0.12

mg/kg, bwt, im and fluid therapy (Dextrose Normal Saline,10ml/kg, bwt. iv) for 5 days followed by doxycycline, 5 mg/kg, bwt, for 15 days po and silymarin, 10ml, po., bid. Symptomatically antiemetic (emeset, 0.2 mg/kg, bwt, iv) was administered to control emesis. The owner was warned about the zoonotic importance and advised to follow strict personnel hygienic measures.

DISCUSSION

The major clinical presenting features in the present cases were acute onset of anorexia, fever, and vomiting. This is in accordance with the findings of John *et al*., 2002. Biochemical values of both dogs showed increased serum urea and creatinine levels, and had increased ALT, AST and bilirubin levels suggesting kidney and liver damage. After cutaneous or mucosal penetration, the infectious leptospires spread via the blood, where they multiply and reach target tissues such as the liver and kidneys characterized by hepatic and renal failure, with associated biochemical and hematological disturbances and is often lethal if not treated quickly (Genevie`ve Andre´-Fontaine, 2006). Leptospira generally target adult animals ranging from one to six years of age. In dogs, the incubation period (time from exposure to signs of clinical disease) varies between 3 and 20 days; the most common signs of disease are anorexia, lethargy, vomiting, fever, weight loss, increased drinking and urinating (polydipsia/polyuria), diarrhea, abdominal/lumbar pain, icterus/jaundice, stiffness/reluctance to walk (myalgia), enlarged kidneys (renomegaly), small areas of hemorrhage (petechia) or sometimes severe hemorrhage, and low platelet count (thrombocytopenia).

Certain serovars are more frequently associated with hepatic involvement and include Leptospira icterohaemorrhagiae and L. Pomona (Shawn Kearns, 2009). Leukocytosis with neutrophilia was the hematological findings. Enlarged kidneys on ultrasound scan might be due to renal lesions that occur during leptospire migration. Although the actual mechanism is unclear, the presence of leptospires in the renal tissue is essential for the development of renal lesions (Visith *et al*., 1980; Chandrasekaran and Pankajalakshmi, 1997 and Vijayachari *et al*., 2001) had proved that dark field microscopy after differential centrifugation is useful in the early diagnosis of leptospirosis and thereby could prevent later complications like jaundice.

For detection of serum leptospiral antibodies, the microscopic agglutination test (MAT) was preferred. Identification of the infecting serovar based on the MAT response early in infection is, however, problematic because of the paradoxical effects observed in the serological response to early leptospirosis (Faine *et al*., 2000). The first line of treatment of leptospirosis is to provide the dog with a suitable antibiotic. Penicillin and their derivatives are the antibiotics of choice in eliminating leptospiremia, but they do not eliminate the carrier state (John and Greene, 2004). In addition to antibiotic therapy, intravenous and subcutaneous fluids are giving to as supportive care (Adin and Cowgill, 2000). Brunner and Mayer (Brunner and Meyer, 1950) had proved that chronic renal infections with leptospira in hamsters and dogs may be successfully cured with streptomycin as canine leptospirosis is usually treated after the parasite has already disappeared from the blood. Once penicillin therapy has been completed and azotemia has resolved, other antibiotic classes (i.e., tetracycline, erythromycin, aminoglycosides, fluoroquinolones) should be administered to eradicate the carrier state. Doxycycline (2.5 to 5 mg/kg PO q12h for 2 weeks) is used most commonly in this situation. Doxycycline can also be used in the initial leptospiremic phase, assuming the animal can tolerate oral medications (John and Greene, 2004). Strict kennel sanitation, rodent control, and strict isolation of infected animals are all appropriate to decrease exposure to and the spread of leptospirosis in endemic areas.

Conclusion

In the present case reports, early recognition and timely administration of appropriate antimicrobials for leptospirosis yielded good response. Educating the owner about the zoonotic impact of leptospirosis and awareness about vaccination helps in preventing the disease. To avoid human exposure and infection, veterinary personnel must maintain strict sanitation when managing cases of canine leptospirosis.

Fig 1: Deep yellow colored urine of Dog 2.

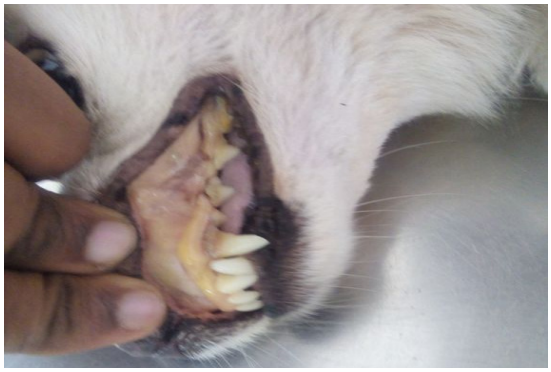

Fig 2: Icteric oral mucous membranes in Dog 1.

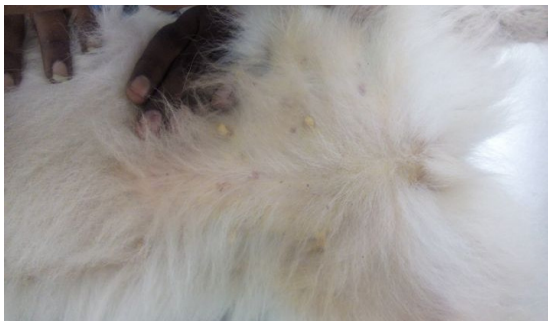

Fig 3: Icteric skin of ventral abdomen in Dog 1.

Fig 4: Icteric conjunctival mucous membranes in Dog 2.

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