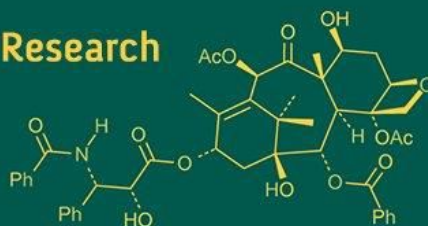


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Dr. Krushnakant Wagh
M.V.Sc., U.G.C.-NET,
Department of Veterinary
Medicine, PetVet Veterinary
Clinic, Sadguru Apartment,
Near Vegas Residency,
Chickenghar, Kalyan, Thane,
Maharashtra, India

Case report: Clinical management of leptospirosis in dog

Dr. Krushnakant Wagh

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Abstract

Leptospirosis, is considered one of important zoonotic disease globally. Prevalence of leptospirosis has increased in recent years. In region with high density population as that of Mumbai, where close dwelling allowing more interaction of rodents, pets and humans thereby, breeding threat of leptospirosis. Here dog named “Leo” presented at PetVet Veterinary clinic, Kalyan with complaint of Haematemesis (Plate 2), pyrexia, inappetence, lethargy, Abdominal pain, intense yellow urine physically dog was active and alert, had mild dehydration (3-4%), lymph node was slightly swollen, temperature was 106 °F. The body coat was bereft of any ectoparasite infestation. While palpating abdomen dog exhibited pain and hepatomegaly was also suspected. The Haematological reports revealed leucocytosis, normocytic and normochromic anaemia as well as base line value of thrombocytes. Elevation in the S.G.O.T and S.G.P.T values with increase in serum globulin was also noted in the biochemical analysis. Marginal increase in Blood urea nitrogen and Creatinine was also evident from kidney function test reports (Table 1). The Canine leptospirosis-Q-PCR test report indicated that dog was positive for leptospirosis with critical threshold (CT) value of 21.0. Line of treatment included, double anti-biotic regime, antacid, anti-emetic, multivitamin and intravenous saline infusions for 5 days followed by oral antibiotic and supportive therapy for 15 days. The results of tests (post-operatively) indicated near normal values of all the hemato-biochemical parameters. The Canine leptospirosis-Q-PCR test report indicated that dog was negative for leptospirosis with critical threshold (CT) value more than 34.0 which is inferred as negative result. Thus it is concluded that dog was successfully treated against leptospirosis.

Keywords: Leptospirosis, zoonotic disease, prevalence, Mumbai

Introduction

Leptospire, which infect both humans and animals, are filamentous spirochetes that are 0.1 to 0.2 µm diameter by 6 to 12 µm long [Nelson and Couto, 2014] ^[9]. Globally recognized as a zoonotic illness, leptospirosis is caused by pathogenic spirochetes belonging to the genus *Leptospira*. Infections are common in both domestic and wild animals [Bal *et al.*, 1994] ^[3]. Between 2006 and 2008, a total of 100 blood and 18 urine samples from suspected dogs and rats were gathered from Mumbai, India. Leptospiral DNA was found in five urine samples and two blood samples from rodents. Fourteen (19.7%) out of the 71 rodent and dog samples that were tested for anti-*Leptospira* antibodies tested positive. Numerous nations have reported finding seropositive dogs, and the most common serovars differ between nations and even within individual countries. The more than 250 distinct serovars of pathogenic leptospire are known to infect dogs, with *Canicola*, *Icterohaemorrhagiae*, *Pomona*, *Bratislava* *Grippotyphosa*, and *Australis* being the most often occurring serovars [Koteeswaran, 2006] ^[2]. The degree of an illness may vary depending on species differences in the host's intrinsic defense against infection. Anorexia, temporary tiredness, and nonspecific sickness are characteristics of mild disease. Patients present with differing degrees of severity. Azolemia (e.g., vomiting, dehydration, diarrhea, polyuria, and polydipsia; +/- oliguria and anuria) is usually linked to severe illness [Moore, 2011] ^[4].

Bal *et al.* (1994) ^[3] report that PCR is increasingly being used as a diagnostic method for infectious illnesses. Nowadays, the primary diagnostic procedure for leptospiuric dogs is thought to be polymerase chain reaction (PCR) (Zakeri *et al.*, 2010) ^[5]. For the majority of dogs, fluid therapy is necessary; severe diuresis for renal involvement would be necessary. Dialysis may improve a dog's chances of surviving if they have anuric or oliguric renal

Corresponding Author:
Dr. Krushnakant Wagh
M.V.Sc., U.G.C.-NET,
Department of Veterinary
Medicine, PetVet Veterinary
Clinic, Sadguru Apartment,
Near Vegas Residency,
Chickenghar, Kalyan, Thane,
Maharashtra, India

failure. During the first treatment phase, dogs should receive ampicillin intravenously administered at a dose of 22 mg/kg every eight hours. During the acute stage of an infection, certain quinolones can be used in conjunction with penicillins to treat leptospires, especially if additional gram-negative bacteria are included on a different list. In one trial, 83% of sick dogs that received concurrent administration of ampicillin and enrofloxacin survived [Adin *et al.*, 2000] ^[6].

Case History

Dog named “Leo” (Plate 1), Breed- Mongrel, Sex-Male, Age- 11 months weighing 15 kg’s completely vaccinated against Canine parvovirus, Canine distemper, Canine parainfluenza, Canine Hepatitis and 4 strains of leptospirosis, presented at PetVet Veterinary clinic, Kalyan, with complaint of Haematemesis (Plate 2), pyrexia, inappetence, lethargy, Abdominal pain, intense yellow urine. Dog vomited (blood spot laden) twice before first presented to clinic. As per owner dog has history of sniffing and drinking effluent water, visiting unhygienic places.

Physical examination

Dog was active and alert, had mild dehydration (3-4%), lymph node was slightly swollen, temperature was 106 °F. The body coat was bereft of any ectoparasite infestation. While palpating abdomen dog exhibited pain and hepatomegaly was also suspected. Stool passage was normal and devoid of any variation in consistency and colour, but urine was intense yellow in nature.

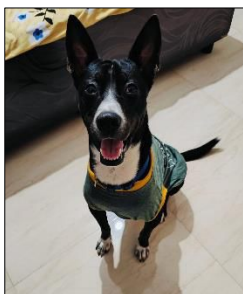


Plate 1: Dog name “Leo”



Plate 2: Haematemesis as sign presented by dog.



Plate 3: Urine sample collected from dog-intense yellow colour urine

Clinical investigation- Since the dog haematemesis, intense yellow urine and swollen lymph node accompanied by above mentioned symptoms, the blood and urine sample were drawn to access haematological and biochemical alterations. Since the dog had the habituated of drinking and dwelling in the unhygienic places having many rodents, the peripheral blood was also sent for PCR suspecting leptospirosis. The Haematological reports revealed leucocytosis, normocytic and normochromic anaemia as well as base line value of thrombocytes. Elevation in the S.G.O.T and S.G.P.T values with increase in serum globulin was also noted in the biochemical analysis. Marginal increase in Blood urea nitrogen and Creatinine was also evident from kidney function test reports (Table 1). The Canine leptospirosis-Q-PCR test report indicated that dog was positive for leptospirosis with critical threshold (CT) value of 21.0. Urine analysis report indicated presence of bacteria in urine sample with acidic pH of Urine (6.0).

Table 1: Haemato-biochemical values of Canine leptospirosis suspected dog (Pre-therapy)

Test	Unit	Result
Haemoglobin	g %	6.5
RBC count	Million/cu.mm	4.2
Total WBC count	/cumm	19800
Platelet count	×1000/ cumm	150
Blood Urea Nitrogen	mg/dl	53.3
Creatinine	mg/dl	3.9
Alkaline Phosphatase	IU/L	160.4
Bilirubin Total	mg/dl	0.2
Bilirubin Direct	mg/dl	0.1
Bilirubin Indirect	mg/dl	0.1
S.G.O. T	IU/L	78.8
S.G.P. T	IU/L	100.3
Total Proteins	gm/dl	7.3
Albumin	gm/dl	2.77
Globulin	gm/dl	4.56

Due to presence of hyperthermia and swollen lymph node, the canine blood parasite Q-PCR panel 2 was also conducted, to rule out any tick-borne infection to the dog. The report of this panel yielded negative report, thereby dog was administrated with treatment against leptospirosis.

Therapeutic management against canine leptospirosis

Penicillins are given orally or via parenteral means as soon as possible to eradicate leptospirosis from the bloodstream in dogs suffering from leptospirosis (Prescott, 1991) ^[7]. Use of antibiotics at a early infection reduces the extent of organ damage throughout the course and speeds up healing (Baldwin *et al.*, 1987) ^[8]. Since the dog was vomiting occasionally and wasn’t able to tolerate per oral medicines, doxycycline was slated to be given after 5 days of penicillin and enrofloxacin combination. Along with double antibiotic regime, required fluid therapy and multivitamins was administered through intravenous infusion.

- Inj Ampicillin and Cloxacillin @25 mg/kg diluted in 100 ml of Inj Normal Saline- Intravenous
- Inj D25- 30-40 ml-Intravenous
- Inj Ranitidine @1mg/kg- Intravenous
- Inj Metoclopramide @0.3mg/kg-Intravenous
- Inj Ascorbic Acid 2.5ml-Intravenous
- Inj Conciplex 2ml-Intravenous
- Inj Enrofloxacin @2.5mg/kg -Intramuscular

This line of treatment was continued for 5 days. Dog showed considerable improvement in terms of appetite, reduction in vomiting and body temperature. Line of treatment was shifted towards per oral medications including doxycycline as antibiotic

- Tab Doxycycline @6mg/kg P/O B.i.d. for 15 days
- Tab Lisybin large 1 tablet B.i.d for 15 days
- Syrup Creatofix 5ml B.i.d for 15 days.

Post therapeutic evaluation

Post medical therapy, dog was active and alert when presented to the clinic, body temperature was normal, normal sized lymph nodes, normal appetite and urine output. The blood sample was again drawn to analyse haematological, biochemical changes as well as the canine leptospirosis-Q-PCR test. The results of tests indicated near normal values of all the hemato-biochemical parameters (Table 2). The Canine leptospirosis-Q-PCR test report indicated that dog was negative for leptospirosis with critical threshold (CT) value more than 34.0 which is inferred as negative result. Thus it is concluded that dog was successfully treated against leptospirosis.

Table 2: Haemato-biochemical values of Canine leptospirosis suspected dog (post-therapy)

Test	Unit	Result
Haemoglobin	g %	9.5
RBC count	Million/cu.mm	5.5
Total WBC count	/cumm	8000
Platelet count	×1000/ cumm	175
Blood Urea Nitrogen	mg/dl	23.3
Creatinine	mg/dl	1.9
Alkaline Phosphatase	IU/L	101.4
Bilirubin Total	mg/dl	0.2
Bilirubin Direct	mg/dl	0.1
Bilirubin Indirect	mg/dl	0.1
S.G.O. T	IU/L	48.8
S.G.P. T	IU/L	54.3
Total Proteins	gm/dl	5.9
Albumin	gm/dl	3.0
Globulin	gm/dl	2.9

Discussion

Even though leptospirosis was only sometimes recorded in the 1980s, it is now known to be one of the most serious waterborne zoonotic illnesses in the world and a major cause of acute renal failure in dogs. There are now over 200 serovars known to exist.

In dogs, serovars *Icterohaemorrhagiae* and *Canicola* were common from the 1950s to the 1970s, but over the last 20 years, *Grippityphosa* and *Pomona* have taken over. Between 2006 and 2008, a total of 100 blood and 18 urine samples from suspected dogs and rats were gathered from Mumbai, India. After heavy rains, areas of standing water increase, which can lead to greater exposure to all waterborne bacteria. Bacteria's helical structure makes it easier for them to penetrate damaged epithelium or mucous membranes. Leptospire are attracted to vascular endothelium, the biliary tract, and renal proximal tubules. Leptospiral lipopolysaccharides and other components of the outer membrane are most likely the origin of cellular damage from sickness. They may also spread to the spleen, central nervous system, eyes, and genital tract. Lethargy, anorexia, and vomiting were the most prevalent nonspecific clinical signs of leptospirosis. Scleral injection detection,

indications of stomach ache, acute beginning, normal renal architecture of thrombocytopenia and azotemia in connection with the relevant background information and signalling should indicate a leptospirosis diagnosis. The diagnosis ought to be conformed in accordance with the MAT results. Even with the right antibiotic treatment, leptospirosis can be lethal.

Dogs suffering from moderate to severe organ damage have mortality rates ranging from 10% to 30%, but many dogs exposed to leptospirosis only show sporadic or nonspecific clinical indications. Annual vaccines are advised against four serovars (*Grippityphosa*, *Pomona*, *Icterohaemorrhagiae*, and *Canicola*) due to their great efficacy. Generally speaking, vaccination against just two of the serovars does not result in cross-protection and is not advised.

Conclusion

The canine leptospirosis dog 'leo' was diagnosed with disease with Q-PCR and was treated according to standard line of treatment. Inj Ampicillin and Cloxacillin @25mg/kg I/v, Inj Enrofloxacin @2.5mg/kg -I/m and Tab Doxycycline @6mg/kg P/O B.i.d. for 15 days was found to be effective against canine leptospirosis management.

Conflict of interest

Author declares that there is no conflict of interest.

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