



A case Leptospirosis and Urethral Obstruction in a 4-Year-Old Russian Shepherd Bitch

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ABSTRACT

Leptospirosis, a disease caused by infectious *Leptospira* bacteria, can be found worldwide in soil and water. There are many strains of *Leptospira* bacteria that can cause disease, and many mammals are susceptible; such as dogs, livestock, wildlife and even humans while urinary tract obstruction is typically caused by stones in the urethra. A 4-year-old Russian Shepherd bitch weighing 46kg was presented to the University of Jos, Veterinary Teaching Hospital with the main complaint of enlarged abdomen and vomiting. The client mentioned that the condition was noticed 2 months prior to presentation. History further revealed that the bitch was fed with commercial poultry feed and it had no vaccination history. On physical examination; the vital parameters were temperature: 39.7°C, pulse rate: 118 beats/minute, respiratory rate: 24 cycles/minutes. Clinical findings include rough hair coat, emaciation, edematous limbs, distended abdomen, anuria, ascites, yellowish ocular mucous membranes and vomiting. Haematological results revealed decreased haemoglobin concentration, packed cell volume and marked leukocytosis coupled with neutrophilia. Biochemical results displayed elevated hepatic enzymes (AST, ALT and ALP) and blood urea nitrogen. The abdomino-pelvic ultrasonography revealed a distinct anechoic area in the right proximal quadrant of the abdomen, diffuse hyperechoic area within the urinary bladder and kinked urethral lumen. Based on the clinical findings and laboratory results obtained, a diagnosis of leptospirosis and urethral obstruction was made and duly managed. However, client was advised to avoid using poultry feeds to feed dogs, observe strict adherence to the use of drugs and prompt presentation of sick pet to the nearest veterinary clinic.

Keywords: Bitch, Leptospirosis, Russian Shepherd, Urethral obstruction

INTRODUCTION

Leptospirosis, a bacterial zoonotic disease affecting many spp of animals, is caused by thin, filamentous, aerobic spirochete bacteria of the genus *Leptospira*. Rodents have been found to play an important role as mechanical vectors or active shedders of leptospiral organism (Domanska-Blicharz *et al.*, 2003). Leptospirosis is a disease that is transmitted via the urine of an infected animal and contaminated materials remain persistently contagious as long as they are wet. Several serovars (>200) of leptospira have been identified globally and the most incriminated pathogenic serovars in canine infections include; *L. canicola*, *L. icterohaemorrhagiae*, *L. grippityphosa*, *L. pomona*, and *L. Bratislava* (Greene, 1998). Leptospiral infections in dogs usually present four distinctive forms including; peracute, subacute, acute and chronic. In addition, leptospirosis in dogs runs an incubation period that varies between 3 and 20 days and is typified by certain

classical clinical signs such as fever, anorexia, lethargy, vomiting, emaciation, dehydration, polydipsia, polyuria, diarrhoea, and jaundice (Greene, 1998).

Conventionally, Leptospirosis is usually diagnosed using the combination of historical information, physical findings, clinical signs, general laboratory results, and confirmatory testing. The well recognized confirmatory tests for leptospiral diagnosis consist of the microscopic agglutination test (MAT) and enzyme-linked immunosorbent assay (ELISA) (OIE, 2000; Cohn, 2003).

In this report, we described a case of canine leptospiral infection combined with urethral obstruction in a Russian Shepherd bitch and its successful management.

CLINICAL CASE

Signalment, History and Clinical Examination

A 4-year-old Russian Shepherd bitch weighing 46kg was presented to the University of Jos, Veterinary Teaching

Hospital with a chief complaint of enlarged abdomen and vomiting. The client mentioned that the condition was noticed 2 months prior to presentation. History further revealed that the bitch was fed with commercial poultry feed and the bitch had no vaccination history. Clinical and diagnostic investigations (haematology, serum biochemistry, urinalysis and abdomino-pelvic) were carried out on the patient.

Table I. Vital parameters of dog on the day of presentation

Parameters	Patient's values	*Normal values
Temperature (°C)	38.3	37.5 - 39.4
Pulse (Beats/min)	118	65 - 120
Respiratory (Count/min)	24	15 - 30

*(Hassan & Hassan, 2003)

HAEMATOLOGICAL, SERUM BIOCHEMICAL, PARASITOLOGICAL, URINALYSIS AND ULTRASONOGRAPHIC EVALUATIONS

Two millilitres (2ml) of blood was collected from the bitch's cephalic vein into sterilized EDTA and plain tubes for estimation of haematological and biochemical parameters such as Hb, PCV, WBC and its differentials, hepatic (AST, ALT, ALP, TP, Albumen and globulin) and renal (BUN and CREATININE) markers respectively using the method reported by Folarin *et al.* (2023). Also, part of the blood and fecal materials were screened for haemoparasite and oocyst respectively using the method of Pam *et al.* (2013). In addition, urine sample was collected for complete routine urinalysis of parameters like urine appearance, colour, specific gravity, pH, glucose, protein, bilirubin, ketones, urobilinogen, blood, nitrate, leucocyte and ascorbic acid following the procedure of Tanko *et al.* (2024). A portion of the urine was tested for the presence of motile leptospiral organism under dark field microscope.

Abdomino-pelvic ultrasonography was carried out using ultrasound (Dawei DW-VET2, Germany) with 3.5 MHz transducer.

RESULTS

PHYSICAL EXAMINATION

On physical examination, the following vital parameters were recorded; temperature: 39.7°C, pulse rate: 118 beats/minute, respiratory rate: 24 cycles/minutes (Table I). Clinical findings (Plate 1) include rough hair coat, emaciation, edematous limbs, distended abdomen, anuria,

ascites, yellowish ocular mucous membranes and vomiting.

HAEMATOLOGY

The haematological analysis (Table II) showed decrease haemoglobin concentration and packed cell volume. However, there was marked leukocytosis coupled with neutrophilia. Also, there was no parasites or oocysts in the blood.

BIOCHEMICAL RESULTS

There was a remarkable increase in the hepatic enzymes (AST, ALT and ALP) and Blood urea nitrogen. However, the serum proteins (globulin, globulin and total protein) and creatinine levels were markedly reduced compared to the reference values (Table III).

URINALYSIS

The urinalysis (Table IV) revealed moderate presence of blood and mild leucocytes within the urine and was negative for all other parameters. Also, with the use of dark-field microscope, motile leptospiral organism were detected from the urine sample.

ULTRASONOGRAPHY

The abdomino-pelvic ultrasonography revealed a distinct anechoic area in the right proximal quadrant of the abdomen suggestive of massive fluid around the liver (Yellow asterisk; Plate II A&B). Beside this, there was a diffuse hyperechoic area (Plate IIC; red asterisks) within the urinary bladder lining suggestive of concentrated materials. Also, there was kinking of urethral lumen (Plate IID). The combination of the findings

Table II. Haematological results of a Clinically Sick Russian Shepherd Bitch with Leptospirosis and Urethral obstruction

Parameters	Patient's values	*Reference value
HB (g/d)	9.5	12-18
PVC (%)	24	25-55
WBC x 10 ⁹ /L	25,800 (25)	6-17
Neutrophils (x10 ⁹ /L)	94 (23.5)	3.6-13.1
Band (x10 ⁹ /L)	01 (0.25)	0-5
Lymphocyte (x10 ⁹ /L)	01 (0.25)	0.72-5.1
Monocytes (x10 ⁹ /L)	00	0.18-1.7
Eosinophils (x10 ⁹ /L)	04 (1)	0.12-1.70
Basophils (x10 ⁹ /L)	00	Rare

from both the physical examinations, haematology, serum biochemistry, urinalysis, dark-field microscopy and ultrasonography guided our diagnosis to rule out pregnancy and tumorous conditions and hence aided our conclusion that the bitch had hepato-renal cellular damages and urethral injury and the case was therefore diagnosed as leptospirosis. This then informed our decision to medically manage the condition.

Table III. Serum Biochemical Profiles of a Clinically Sick Russian Shepherd Bitch with Leptospirosis and Urethral Obstruction

Parameters	Patient's Values	Reference Values
AST	100u/l	8.9 - 49u/l
ALT	170u/l	8.2 - 57u/l
ALP	327.0g/dl	10.6 - 101u/l
TP	3.84u/l	6.8 - 7.5g/dl
ALBUMIN	1.66g/dl	2.6 - 4.0g/dl
GLOBULIN	2.40G/dl	3.0 - 3.5g/dl
UREA	25.11mg/dl	8.8 - 26mg/dl
CREATININE	0.24µmm/L	0.5 - 1.6µmm/L

*(Kahn & Line, 2010)

Table IV. Urinalysis results of a clinically sick Russian Shepherd bitch with leptospirosis and urethral obstruction

Parameters	Patient's values
Appearance	Slightly Cloudy
Colour	Yellow
Specific Gravity	1.030
pH	6.0
Glucose	Negative
Protein	Negative
Bilirubin	Negative
Ketones	Negative
Urobilinogen	Negative
Blood	++
Nitrate	Negative
Leucocyte	+
Ascorbic acid	Negative

MANAGEMENT

Abdominocentesis, a procedure for draining the ascites, was carried out with the guidance of ultrasonography by inserting 2-gauge needle into the abdomen to drain its excessive fluid. The constricted urethral passage was assessed with a catheter. Thereafter, supportive care and antibiotic were instituted as follows; 25mg Furosemide 4mg/kg (7.4ml) was injected i/v for 5/7, 25mg Spironolactone tabs 4mg/kg (3 tabs) PO for 2/52, 500,000iu Penicillin G inj. 40,000iu/kg (9.2ml) i/v for 5/7, 100mg Doxycycline tabs 5mg/kg (2.5 tabs) PO for 2/52, 100 mg Magnesium trisilicate PO for 5/7 and Vitamin B complex inj. 5ml i/m for 5/7. The bitch health improved significantly with the treatment (Plate IV). Thereafter, the client was advised to always present cases promptly to the nearest veterinary clinic, avoid using poultry feed to feed dogs and to strictly adhere to the use of drugs as prescribed.

DISCUSSION

The observed alteration in haematological parameters including reduced PCV and Hb concentration values coupled with neutrophilic leukocytosis in the bitch can be attributed to toxins released by leptospiral organisms, which has been established to be capable of precipitating erythrocyte damage (Ananda *et al.*, 2008). The continuous haemolysis would eventually favour high bilirubin level in the blood and this could have been responsible for the observed jaundiced mucous membranes in this bitch.

Hepatocellular injury is caused by injury primarily to the hepatocytes and typified by increased serum levels of hepatic enzymes (ALT, AST, LDH, SDH and GGT) which are recognized biochemical markers of hepatocellular injuries. In general, the elevated serum levels of the highlighted enzymes give an insight to the degree of hepatocellular membrane damage and subsequent leakage of intracellular enzymes (Pratt and Kaplan, 2007). Therefore, the increased serum hepatic enzymes observed in this case suggested a damage to the liver architecture of the bitch. Similarly, the blood urea nitrogen and creatinine levels which are indicators of renal dysfunction (Adejuwon *et al.*, 2014) were markedly elevated in this case relative to their respective reference values. The deranged hepato-renal markers recorded in this bitch might be due to damage elicited by endotoxins produced by leptospiral organisms.

The serum profiles of total protein and albumin levels are crucial for evaluating a wide range health disorder and provide an accurate information on the blood protein synthesis capacity of the liver (Friedmann *et al.*, 1996; Ecksall, 2008).

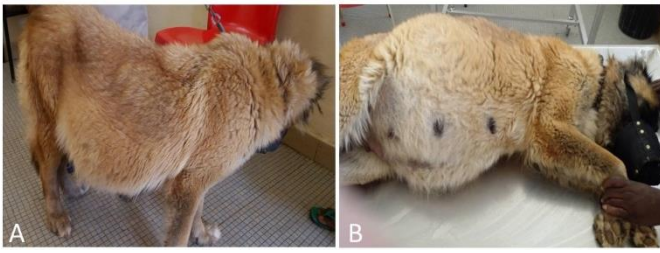


Plate I. A&B. Bitch on presentation (A) and on examination table (B).



Plate III. The physical appearance of bitch after 3 weeks of treatment

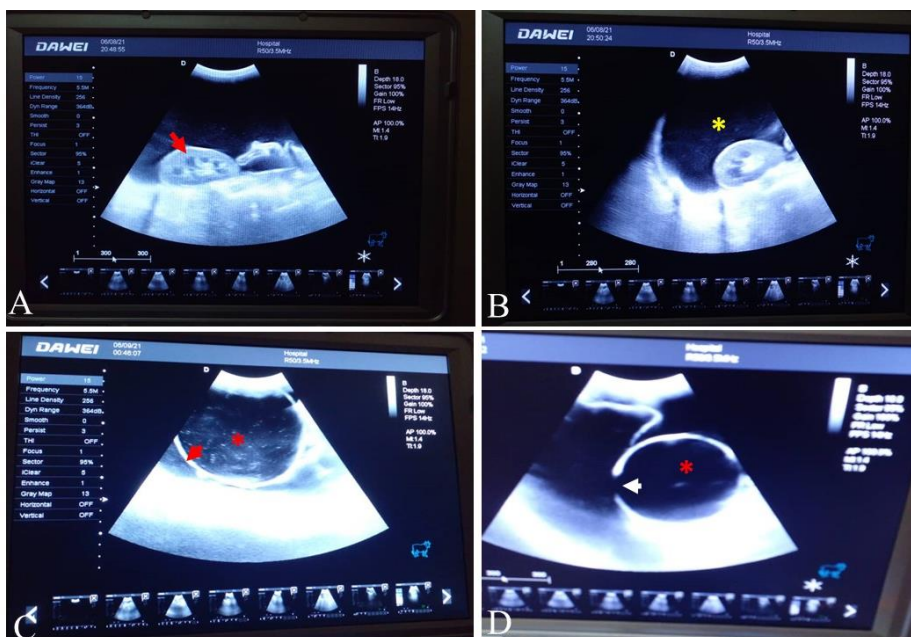


Plate II A-D. Ultrasonographs of the liver and urinary system. A - markedly enlarged renal cortex (red arrow) B – oedematous liver as revealed by the distinct anechoic area (yellow asterisks). C – engorged and inflamed bladder with concentrated material as revealed by diffuse hyperechoic areas in the mural lining of urinary bladder (red asterisk). Also note the markedly thickened urinary bladder wall as shown by hyperechoic outline (red arrow) D. Distended and inflamed urinary tract with kinking of the urethra (white arrow).

Hence, the observed reduction in the serum levels of total proteins, albumin and globulins compared to the respective reference values portend a serious morpho-functional derangement in the liver.

The moderate presence of blood and mild leucocytes in the urine sample submitted for urinalysis indicated a probable urinary tract trauma or infection which further validate the ultrasonography results of presence of concentrated materials within urinary bladder lining and kinked urethral lumen. The

urinalysis profile recorded concurs with urinalysis profile reported in dog and cat by Yadav *et al.* (2020).

The dark-field microscope, a quick test for the detection of leptospirosis infection in dogs (Brown *et al.*, 1996; O'Keefe, 2002), was employed to detect the motile leptospiral organism in this bitch. This detection along with other results such as haematology, serum biochemistry, urinalysis and ultrasonography provided useful information to arrive at confirmatory diagnoses of leptospirosis and urethral obstruction.

CONCLUSION

This report is a presentation on leptospirosis and urethral obstruction in a 4-year-old Russian Shepherd bitch as evidenced by haematological, serum biochemical, urinalysis and ultrasonographic results. The conditions were typified by marked hepato-renal cellular damage and kinked urethral lumen. These sets of morpho-functional alterations in the bitch were duly managed and client was advised to avoid using poultry feeds to feed dogs, observe strict adherence to the use of drugs and prompt presentation of sick pet to the nearest veterinary clinic.

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