

CLINICOPATHOLOGY OF URAEMIA IN DOG-CASE REPORT

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Introduction

Uraemia is a toxic syndrome resulting from renal insufficiency and characterized by the retention of urea (Shastri, 1983). Uraemia occurs due to loss of functional renal tissue and is usually progressive process which impairs the proper functioning of the kidney and waste materials that should go into the formation of urine become absorbed into the blood instead. The disease may occur in animals of all ages but is much more common in old ones (Merck Veterinary Manual, 2008).

Materials and Methods

A nine year old Doberman male dog was admitted to Bhai Sakarbai Dinshaw Petit Hospital for Animals, Mumbai for treatment. Laboratory investigation *viz.* serum biochemical analysis for BUN (Blood urea nitrogen) and creatinine was done at Department of Pathology, BVC, Mumbai using Automatic analyser. In addition, complete blood count *viz.* haemoglobin (Hb), packed cell volume (PCV), total erythrocyte count (TEC), total leucocyte count and reticulocyte count and urine analysis was carried out manually. In spite of treatment, dog died after one week and was presented for post mortem examination to Department of Pathology, Bombay Veterinary College (BVC), Mumbai.

Result and Discussion

Clinically, dog showed polydipsia, polyuria, dehydration, vomition, lethargy, oral ulceration and diarrhoea before death. The clinical sign were observed over one week period. Serum BUN and creatinine was 112.4 (mg/dl) and 4.45 (mg/dl), respectively. From clinical signs such as vomition, ulceration in mouth and elevated serum levels of BUN and Creatinine, the condition was diagnosed as Uraemia. Similarly, the earliest clinical signs commonly attributable to renal dysfunction are polydipsia and polyuria (Merck Veterinary

Manual, 2008), which are not observed until the function of approximately two-thirds of the nephrons has been impaired. Some authors have categorized kidney renal failure in to 4 stages. Present case of uraemia reflects stage IV as there was severe azotemia with clinical signs (Merck Veterinary Manual, 2008). Azotemia is a term used to indicate an increase in non protein nitrogenous material in the blood due to extra renal factors (Shastri, 1983). Elevated serum levels of BUN and creatinine indicates kidney damage (Benjamin, 2001). Recent findings have suggested that renal protein leak and elevated serum creatinine is not only a marker of severity of renal disease but also potentially a cause of renal injury.

CBC finding revealed decreased haemoglobin (5.6 gm %), packed cell volume (19%) and total erythrocyte count (2.6×10^6 / cu. mm). Erythrocytic indices revealed normocytic hypochromic anaemia. The erythrocyte sedimentation rate (ESR) was increased (45mm/hr). Total leucocytes and differential leucocytes count was within normal range. Platelets were reduced on smear. The occurrence of anaemia due to nephritis has been documented (Merck Veterinary Manual, 2008; Shastri, 1983). Kidneys produce hormones, namely erythropoietin, which stimulates the bone marrow to produce new red blood cells. Uraemia occurs when more than 70% of kidney parenchyma is damaged (Benjamin, 2001). Hence, the hormone erythropoietin excretion is impaired resulting in to anaemia (Merck Veterinary Manual, 2008). Increased ESR has been suggested in chronic interstitial nephritis (Benjamin, 2001) which is observed in the histopathological examination of kidney.

Physical examination revealed turbid urine with 6.5 pH. Chemical analysis of urine showed presence of blood and protein. Other parameters were negative. Microscopic examination of urine revealed presence of

granular casts (3/hpf), leucocytes (8-9/hpf), pus cells (20-25), red blood cells (2-3/hpf), urinary bladder cells (3-4/hpf) and epithelial cells (2-4/hpf). Presence of blood and protein in urine indicates kidney damage. Moreover, cloudy urine

with bladder cells, pus cells indicates bacterial infection of urinary bladder and kidney. The present finding indicates that the urinary bladder and kidney were inflamed



Fig. 01: Urinary bladder showing pus in urine

Fig. 02: Urinary bladder showing mucosal ulceration and congestion

which is also supported by gross lesions observed during post mortem examination of dog. These findings are supported by earlier studies of various

authors (Benjamin, 2001; Merck Veterinary Manual, 2008).

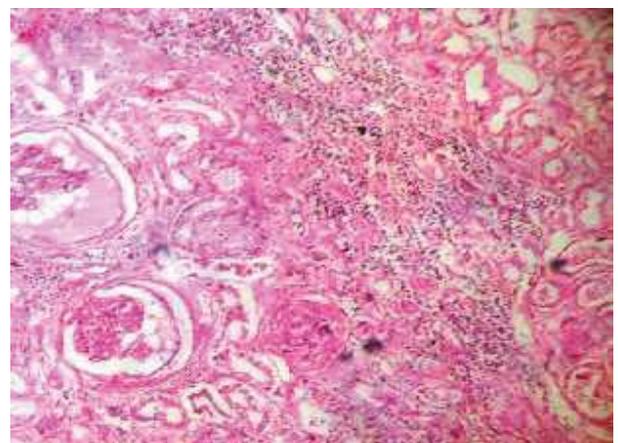


Fig. 03: Gastric mucosa showing ulceration

Fig. 04: Section of kidney showing interstitial nephritis

In necropsy, external examination revealed pale mucus membrane. Internal examination revealed frothy exudate in terminal distal portion of trachea near bronchi. Lung revealed pneumonia with frothy exudate. Heart showed right ventricle dilatation with thickened left ventricular wall. The entire chambers of heart showed blood clots. Kidney was firm and mildly contracted and was hard to cut. Surface of kidney was pale with white necrotic foci. Bladder was full of urine

containing pus with thickened, congested and ulcerated mucosa (Fig. 1 and 2). Prostate gland was enlarged and inflamed. Post-mortem examination of digestive system revealed severe ulcers under tongue. Gastric mucosa showed edema, erosions, vascular congestion and mucosal haemorrhages (Fig. 3). Liver was enlarged, congested with white necrotic foci. Mesentery showed vascular congestion. Histopathological examination of kidney

revealed interstitial nephritis (Fig. 4). Section of kidney also showed interstitial fibrosis at few places. Glomeruli were hyperplastic and showed edema. Urinary bladder and prostate gland showed severe mucosal inflammation with mononuclear cells infiltration, particularly neutrophils. Section of liver showed vascular and sinusoidal congestion. Similarly, Peters *et al.* (2005) recorded higher prevalence of gastric histopathological changes compared with the control dogs in renal failure. They were of the opinion that gastric histopathology appears to be common in dogs with renal failure and is associated with increasing severity in the serum biochemistry data. The Gross and microscopic lesion observed in various organ due to uraemia in the present study has been documented (Merck Veterinary Manual, 2008; Peters *et al.* 2005).

Summary

A case of uraemia was diagnosed in dog on the basis of kidney function test and classical lesions seen after necropsy. Blood biochemical

parameters revealed high level of BUN (112.4mg/dl) and serum creatinine (4.45 mg/dl). CBC finding revealed decrease in Hb, PCV, TEC and increase in ESR with normocytic hypochromic anaemia. Necropsy examination dog revealed ulcer under tongue, haemorrhagic gastritis, and pale contracted kidney with focal necrotic areas and cystitis with cloudy urine. Histopathological study revealed interstitial nephritis and cystitis.

References

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