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Case Report

Occurrence of Bilateral Pyelonephritis in Horses

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Abstract

Pyelonephritis was reported in horses presented for postmortem examination at Department of Veterinary Pathology, College of Veterinary Science, Hyderabad. Clinically, horses had history of colic, anorexia, apathy, stranguria and death. Pyelonephritis was diagnosed based on the necropsy lesions. Grossly, gelatinisation of fat, ballooning of intestines, haemorrhages on the base of the heart, congestion and dilated calyces of kidneys and pus in the renal pelvis were noticed. Congested liver, haemorrhagic mesentery, congestion and consolidated lungs were also noticed. Impression smears of kidneys stained by Gram' s stain and cultural examination revealed the presence of Escherichia coli, Klebsiella spp and Staphylococcus spp. Histopathological examination of kidneys revealed necrotic tubules, atrophy of glomerulus and massive infiltration of mononuclear cells (MNC).

Keywords: *Escherichia coli*, Horses, *Klebsiella* spp., Pyelonephritis, *Staphylococcus* spp.

Introduction

Pyelonephritis is a suppurative bacterial infection of the renal pelvis and parenchyma, is often a consequence of an ascending urinary tract infection secondary to urinary stasis (Jennifer Tainer, 2007). Pyelonephritis occurs due to common bacterial isolates include Escherichia coli spp, Klebsiella spp and Staphylococcus spp. Clinically, animals show anorexia, dysuria and stranguria. Abnormal high values of Blood Urea Nitrogen (BUN), creatinine, potassium, calcium and depletion of sodium can be observed in such cases. Determination of glomerular filtration rate and effective renal plasma flow indicated a severe decrease in renal filtration and perfusion (Held et al., 1986). Carrick and Pollitt (1987) reported enlarged kidneys with firm and pitting consistency and ureters showed mild enlargement with doughy consistency upon rectal examination in pyelonephritis. Macroscopically, abscess in the renal pelvis, congestion and dilatation of renal calyces in kidneys are common.

The present study deals with the rare occurrence of the pyelonephritis in horses.

Materials and Methods

Two horses were presented for postmortem examination at the Department of Veterinary Pathology, College of Veterinary Science, Hyderabad. At the time of postmortem examination, impression smears of kidney were taken and stained with Gram's stain (Mc Clelland, 2001). Sterile swabs from the pus/abscess of the kidneys were collected for cultural examination. The kidney slices (1×1 cm3) were collected and fixed in 10% neutral buffered formalin (NBF) soon after necropsy. The tissues were dehydrated in different alcohol concentrations (70, 80, 95 and 100%). The processed tissues were cleared in xylene and embedded in paraffin for preparation into fine blocks. Blocks were sectioned with a microtome to a size of 5 µm, afterwards they were dewaxed and the tissue sections were stained using haematoxylin and eosin (H and E) stain (Bancroft *et al*., 1990).

Results and Discussion

Clinically, the horses showed anorexia, weight loss, dysuria, stranguria, severe colic and death. Grossly, both the kidneys and associated ureters were enlarged with severe nephropathy. The capsule was fibrotic with uneven cortical surface. Cut surface of both the kidneys revealed abscess, pasty white pus in the renal pelvis and parenchyma; loss of corticomedullary demarcation and pyelectasia was also noticed (Fig. 1 and 2). Haemorrahages on the mesentery and at the base of the heart were also evident (Fig. 3 and 4).

Gram's stained impression smears from kidneys revealed Gram negative bacilli and Gram positive cocci. Sterile swabs from the abscess of the kidneys were collected for cultural examination and selective media revealed colonies of *E.coli* on EMB agar with metallic sheen (Fig.5), *Klebsiella* sps on nutrient agar (Fig.6) and *Staphylococcus* colonies on Mannitol salt agar (Fig.7).

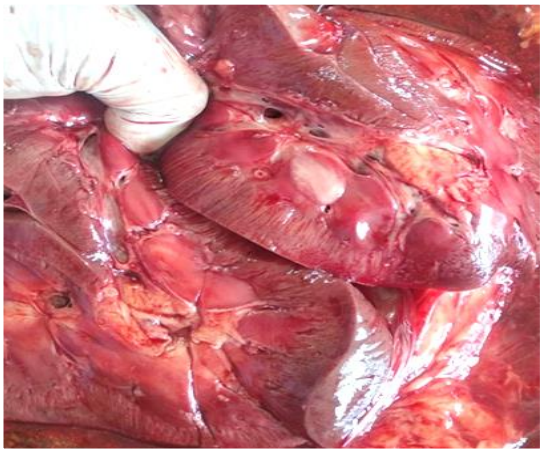

Fig.1: Cut surface of the kidney showing abscess, purulent material, congestion and dilated calyces

Fig.2: Cut surface of the kidney showing white creamy pus

Fig.3: Haemorrhages on mesentery

Fig.4: Haemorrgahes at the base of the heart

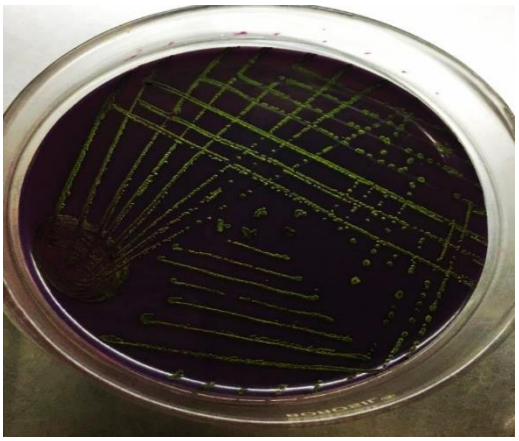

Figure 5: Colonies of *E.coli* on EMB agar with metallic sheen.

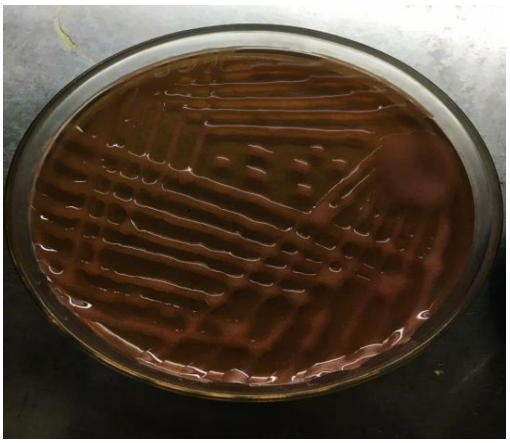

Figure 6: *Klebsiella* colonies on nutrient agar.

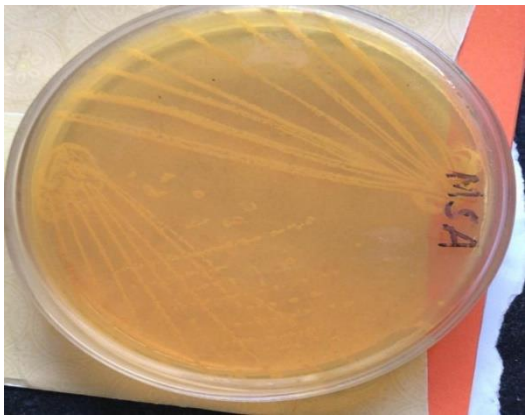

Figure 7: *Staphylococcus* colonies on Mannitol salt agar.

Histopathological sections of kidney revealed diffuse glomerulosclerosis (swollen, distorted and shrunken glomeruli), periglomerular infiltration**,** perivascular and tubular infiltration of mononuclear cells (Fig.8), cystic dilation of tubule, intertubular haemorrhages, degeneration and necrosis of glomerular and tubular epithelium (Fig.9). And also vacuolar degeneration in tubules, basement membrane was thickened, proteinaceous casts, congestion of renal capillaries, hazy and pyknotic nuclei with areas of abscessation (micro abscess formation) and slightly fibroblast proliferation were observed.

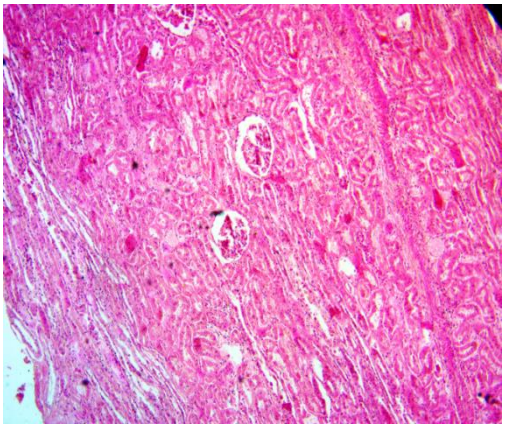

Figure 8: Photomicrograph of kidney revealed shrunken glomeruli, Perivascular and tubular infiltration of mononuclear cells.

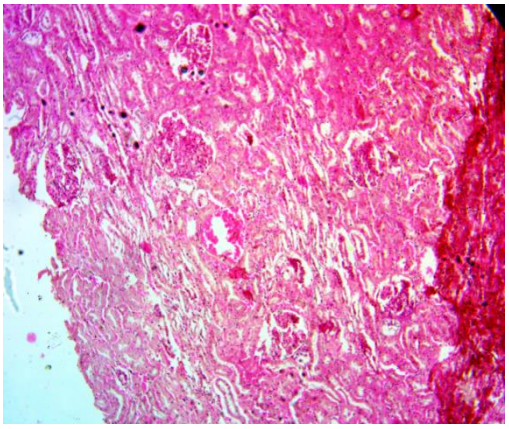

Figure 9: Photomicrograph of kidney revealed degeneration and necrosis of glomerular and tubular epithelium.

Microabscess in the renal pelvis was due to presence of pyogenic bacteria which also release endotoxins leading to vasodilatation, perforation of blood vessel causing congestion and haemorrhages. Lungs were congested and consolidation due to haematogenous infection. The present case was diagnosed as pyelonephritis caused by *Escherichia coli*, *Staphylococcus* spp and *Klebsiella* spp. The similar findings were also noticed by Kelvin *et al*. (1999) and Jennifer (2007).

Conclusion

Pyelonephritis in horse was diagnosed based on characteristic gross lesions; impression smears staining, cultural and histopathological findings. For prevention, if we found the cause *i.e.* if an abrupt change in diet caused colic, make sure to make dietary changes gradually in the future. Some other preventative measures include: Do not make sudden changes to the horse's diet, feed the horse on a regular schedule even on the weekends, feed the appropriate amount of forage (at least 40-50% of the total diet), keep feed boxes and hay racks as well as the feedstuffs clean and free of mold and dust, keep feed off the ground to avoid sand ingestion, check teeth frequently for dental problems that may cause chewing issues, provide adequate exercise and practice an effective parasite control program.

Conflict of Interests

The author expresses no conflict of interest with any other individual or organisation regarding the information discussed in the manuscript.

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