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Circulatory disturbances in kidney of goats (*Capra hircus*)

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Abstract

From November 2020 until October 2021, the study was conducted. A total of 638 goat kidneys from various age groups, breeds, and sexes were studied throughout this time. 158 kidney samples from these typical samples exhibited gross lesions, prompting histological analysis. Circulatory abnormalities made up 20.88 percent of all pathological diseases seen, followed by congestion (9.49 percent), hemorrhages (8.86 percent), and infarction (2.53 percent).

Keywords: Circulatory disturbances, histopathology, and goat

Introduction

The kidney, ureter, urinary bladder, and urethra make up the urinary tract. An important component of the urinary system is the kidney and urine bladder. In compared to other ruminants, sheep and goat urinary system diseases have been reported less frequently (Benavides *et al.*, 2015) [8]. Small ruminants rarely experience kidney illness as a major issue clinically, however coincidental renal problems can frequently be found at necropsy (Jones *et al.*, 2012; Benavides *et al.*, 2015) [1, 8]. Renal congestion (Saiyari *et al.*, 1996) [20], infarction (Bamnele *et al.*, 2014) [14], cystic kidney (Krotec *et al.*, 1996) [15], intertubular hemorrhages (Sankarappa and Rama Rao, 1982) [2], hyaline degeneration (Mensua *et al.*, 2003) [18], and renal amyloidosis (Mensua, 2003) [18], ureteritis and cystitis (Kumari, 2016) [16], glomerulonephritis (Wisloff *et al.*, 2003) [22], interstitial nephritis (Akter *et al.*, 2015), pyelonephritis (Elias, 1993) [10], renal abscess (Babu *et al.*, 1988) [5], urolithiasis (Kannan & Lawrence, 2010) [13], etc.

Due to the desert, hills, and lack of water in Rajasthan, there is a shortage of agricultural land. So, for these peoples, livestock becomes crucial as a reliable source of revenue. Goats are a major source of livelihood and income for farmers because they are used by the majority of them. The importance of raising goats in a healthy, productive environment cannot be overstated if one hopes to reap the greatest benefits from the practice. However, both viral and non-infectious disorders can affect goats. Numerous poisons and harmful organisms enter the bloodstream and pass through the kidneys. Consequently, the diagnosis of urinary and their management will unquestionably enhance goat's ability to boost the country's economy. As a result, the current study will be done to investigate at the prevalence of different urinary system problems in goats in this region of the nation.

Materials and Methods

Goat (*Capra hircus*) kidney samples were obtained for the deliberate experiment from slaughterhouses in the Bikaner district and surrounding region. Additionally, tissue samples were taken from goat carcasses that were sent to the College of Veterinary and Animal Science in Bikaner for post-mortem investigation by the Department of Veterinary Pathology. 158 samples were collected in 10% buffered formalin for histological analysis, along with the observed pattern and shape of the lesions. The portions of the afflicted tissue that were 2 to 5 mm thick and displayed the lesions alongside healthy tissue were used for fixation and additional histological analysis. The acetone and benzoene procedure was used to mechanically prepare the tissue samples for paraffin embedding. For histological analysis, tissue samples with a thickness of 4-6 microns were cut into slices and stained using the haematoxylin and eosin method.

Results and Discussion

Regardless of age, sex, or breed, a total of 638 goat kidney specimens were evaluated in the current experiment. Out of these 638 samples, 158 kidney samples that were thought to have abnormalities were processed further for histological analysis, which revealed a number of overlapping diseases.

1. Congestion

In 15 (9.49%) cases, this occurrence was noted. Ismail *et al.* (2015) ^[11] showed a higher incidence of 20% cases in calves and 11.57% in camel kidney, respectively.

Grossly, kidneys were slightly enlarged and dark red in colour (Fig.1). The predominant gross pathological alterations that were seen in the kidney were congestion of the corticomedullary junction and medulla, a tiny, deformed surface with adherent capsules, and dilated calyces. These findings were a near approximation to Dadhich (1996) ^[9]. Microscopically, blood was present in the majority of the vessels, particularly the capillaries, and the glomeruli displayed congested blood vessels and capillaries. In the intertubular area and Bowman's capsule, there weren't many RBCs (Figs. 2 and 3). This recording was consistent with the findings of Ismail *et al.* (2015) ^[11].

2. Haemorrhages

The occurrence of this phenomenon was noted in 14 (8.86%) cases. Dadhich (1996) ^[9] noted a somewhat similar rate of 12 (7.54%) cases, and Kiran *et al.* (2021) ^[14] recorded a greater incidence of 18.63% cases in sheep kidneys.

Grossly, the cortex and medulla were hemorrhagic on the cut surface (Fig. 4). The most frequent findings in the damaged kidneys were observed to be hyperaemia, petechial, and ecchymotic hemorrhages. The capsule was tense but easily slipped off. These results were well corroborated by Oryan *et al.* (2015) ^[19] and Jat (2016) ^[12]. Microscopically, convoluted tubules showed modest degenerative alterations and hemorrhages came from the congested medullary arteries (Fig. 5). There were intact RBC's present within the intertubular space and subcapsular region (Fig. 6). These results were consistent with Jat's (2016) ^[12] observation.

3. Infarction

In 4 (2.53%) cases, this incident was noted. Aktar *et al.* (2015) ^[4] reported a greater incidence of 4% cases in goat kidneys, while Akram (2001) ^[3] reported a lower incidence of 0.46% cases in goats.

On the afflicted kidney, there were grossly visible pale yellowish dry lesions with a black necrotic region (Fig. 7). The red areas of hemorrhage, which were pale in color, sunken, and mushy, were characteristics of the kidneys. Wedge-shaped infarct regions were visible on the cut surface. These results have a strong relationship with those of Aktar *et al.* (2015) ^[4] and Thikiem (1992) ^[21]. Coagulative necrosis of the tubular epithelium and an infiltration of polymorphonuclear and mononuclear leucocytes into the interstitial space have both been observed in some cases (Fig.8). The nuclei of the cells were not visible, and the epithelial cells appeared uniform. Dadhich (1996) ^[9] and Aktar *et al.* (2015) ^[4] both noted related findings.



Fig 1: Gross photograph of kidney showing severe congestion

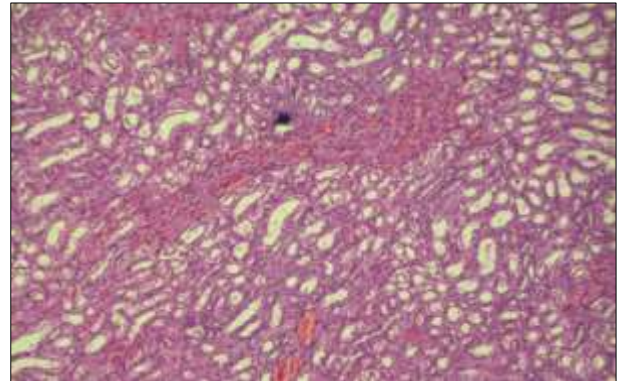


Fig 2: Photomicrograph of kidney showing congestion. Intertubular blood vessels are extensively distended and engorged with blood. H & E-100x

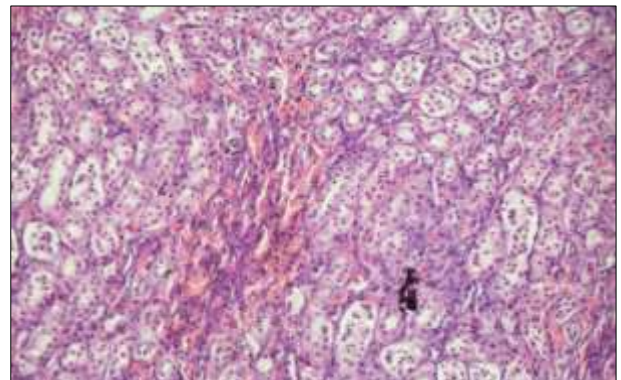


Fig 3: Photomicrograph of kidney showing congestion with hydropic degeneration in tubules. H & E-200x



Fig 4: Gross photograph of kidney showing haemorrhages

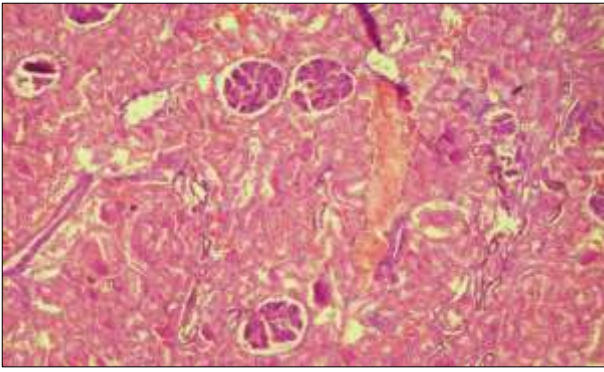


Fig 5: Photomicrograph of kidney showing severe congestion and haemorrhages in the intertubular spaces and glomeruli. Mild degenerative changes are also seen in tubules and glomeruli. H & E-100x

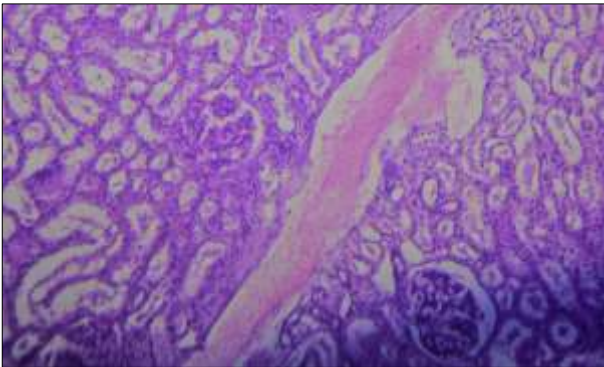


Fig 6: Photomicrograph of kidney showing haemorrhage, swollen and degenerated glomeruli. Eosinophilic material filled tubules and glomeruli are also seen. H & E-200x



Fig 7: Gross photograph of kidney showing infarcted black necrotic area

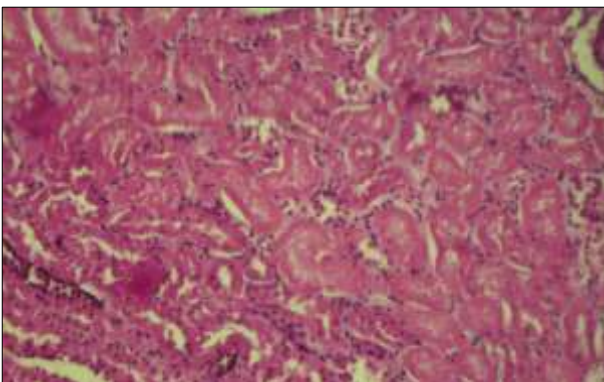


Fig 8: Photomicrograph of kidney showing coagulative necrosis in tubular epithelium and infiltration of polymorphonuclear and mononuclear leucocytes in interstitial space. H & E-200x

Conclusion

It is a severe conditions of small ruminants that responsible for causing huge economic losses (wool, milk and meat) worldwide. Therefore, it can only be prevent by balanced diet. Eventually from the overall results of this inquisition, it could be concluded that: In the present study, the predominant pathomorphological conditions in kidney were degenerative changes.

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