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Histopathological findings in glomeruli of sheep in southern region of Rajasthan

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Abstract
The present investigation was conducted to find out occurrence of various Inflammatory conditions in glomeruli of sheep in southern region of Rajasthan on 1075 sheep kidney irrespective of sex, age groups, and breeds collected from carcases of sheep. Out of these, 157 (14.60%) kidney showed gross lesions, which were further subjected to histopathological examinations. Inflammatory conditions in glomeruli were recorded as acute glomerulonephritis (6.4%), chronic glomerulonephritis (5.73%).

Keywords: sheep, kidney, histopathology, glomeruli

Introduction
India ranks 3rd in sheep population and majority of Indian sheep breeds are medium satire. The sheep population in the country is 65.06 million (12.71%) of total livestock population in India contributing 529.08 million kg meat and 48.13 million kg wool production (Livestock Census, 2012)**.** India has a rich diversity of sheep with 44 distinct breeds distributed in the different agro-climatic regions of our country. Most of breed has evolved naturally over centuries through adaption to agro-ecological conditions and this adaptability to the habitat is crucial for sustainable sheep rearing. Most of the pathogenic organism and toxins that gain entrance into blood circulation causes damage to lung, liver and more specifically to kidneys. The reason being one fifth of the total blood volume circulates through the kidneys every minute, thus exposing the same to the circulating pathognomonic agents of all types. The present investigation was carried out to identify the inflammatory condition in the glomeruli of the kidneys of sheep in the southern region of Rajasthan.

Material Methods
In the present investigation total number of 1075 sheep kidneys of irrespective age groups, sex and breeds were examined. Out of these 157 samples showing gross lesions and were further examined histopathologically. The tissue specimens for proposed investigation collected from carcasses of sheep irrespective of sex, age groups and breeds subjected to post-mortem examination to various veterinary clinics and slaughter house and from the field veterinarians of Udaipur Dungarpur, Chittorgarh, and Rajsamand districts of southern Rajasthan. The kidney samples were also collected from the carcasses of sheep submitted to the Department of Veterinary Pathology, College of Veterinary and Animal Science, Navania, Vallabhnagar, Udaipur, for routine post-mortem examinations. Following collection, all the samples were properly preserved in 10% formal saline after cutting into individual parts. The parts of kidney tissue measured 2-5 mm in thickness, presenting the lesions with normal tissue were used for fixation and pathological examinations. For histopathological examination, processing of tissues were performed by using paraffin embedding using acetone and benzene technique (Lillie, 1965) [8]. The tissue sections of 4-6 micron were cut and stained with Hematoxylin and Eosin staining method as a routine (Luna, 1968) [9]. All the samples were examined for gross as well as at microscopic/ histopathological level.

Results and Discussion
The results of the investigation i.e. occurrence and pathological conditions of glomeruli of the kidneys of sheep were presented in table-1.

Table 1: Histopathological findings in glomeruli of sheep in southern region of Rajasthan

Districts and No. of Sample Investigated	Inflammatory conditions of glomeruli	
	Acute Glomerulonephritis (%)	Chronic Glomerulonephritis (%)
Udaipur (N= 53)	3	1
	5.66	1.89
Dungarpur (N=42)	2	3
	4.76	7.14
Chittorgarh (N= 36)	3	2
	8.33	5.56
Rajsamand (N= 26)	2	3
	7.7	11.54
Total no. of sample = 157	10	9
Percentage	6.4	5.73

Acute Glomerulonephritis condition was observed in 10 kidneys (6.4%) and occurrence of this condition was observed in Udaipur, Dungarpur, Chittorgarh and Rajsamand 5.66%, 4.76%, 8.33% and 7.7% respectively. Gross findings revealed that the affected glomeruli were visible as fine red dots in cortex. Cortex appeared darker than medulla with occasional petechial haemorrhage. In some cases kidneys were slightly enlarged, pale, soft and oedematous. On sectioning, thick cortex sprinkled with minute hemorrhages. As far as microscopic examination is concerned the glomeruli showed increased cellularity due to proliferation and swelling of the cells of the glomerular tuft along with infiltration of polymorphonuclear leucocytes which occupied the capsular space (fig.1). In some, extravasated RBC's, migrated leucocytes and homogenous eosinophilic material were also seen in the capsular space (Fig.2). In the adjacent area tubules showed hyaline degeneration with leucocytic infiltration.The overall occurrence of this condition was observed in 10 cases (6.4%). A higher occurrence 8.05% was recorded by Sarita (2016) [15], and a similar occurrence 6.2% was recorded by Mahouz *et al.* (2015) [10]. Microscopically Glomeruli also showed increased cellularity due to proliferation and swelling of the cells of the glomerular tuft along with infiltration of polymorphonuclear leucocytes which occupied the capsular space. In some, extravasated RBC's, migrated leucocytes and homogenous eosinophilic material were also seen in the capsular space. In the adjacent area tubules showed hyaline degeneration with leucocytic infiltration. It is in conformity with the findings of Huang Youde and Chen Huaitao (2001) [18], Mathur *et al.* (2004) [11], Mahouz *et al.* (2015) [10], Aktar *et al.* (2015) [1].

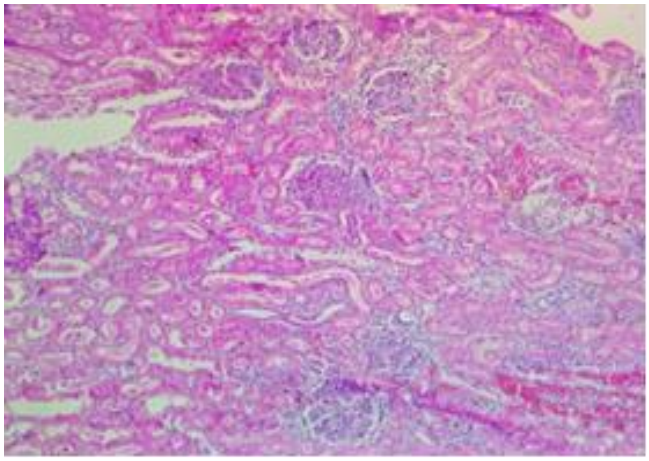

Fig 1: Acute glomerular nephritis, showing extravasted RBCs migrated leucocytes and homogenous eosinophilic. H&E-10X

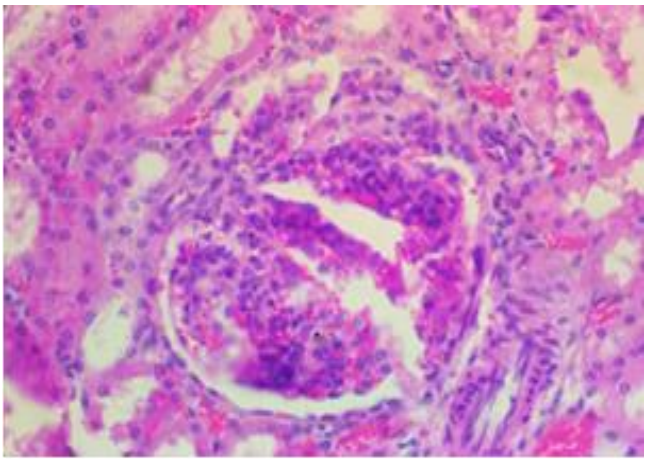

Fig 2: Acute glomerular nephritis glomeruli showing increased cellularity due to proliferation and swelling of the cells of the glomerular tuft along with infiltration of polymorphonuclear leucocytes H&E-40X

Chronic Glomerulonephritis was observed in 9 cases (5.73%) and occurrence of this condition was observed in Udaipur, Dungarpur, Chittorgarh and Rajsamand 1.89%, 7.14%, 5.56% and 11.54% respectively. Gross examination of the kidneys of sheep carcases revealed that the kidneys were shrunken and contracted. The capsules were adherent and had granular surface. Cut cortical surface was narrowed and cortico-medullary markings were obscured. As far as microscopic examination is concerned, **i**n some cases, where original proliferation of endothelial cells of glomerular tuft resulted in scarification and obliteration of tuft, preserving the capsular space (fig.3). While in some, where original proliferative phase was epithelial, the fibrosis completely obliterate the capsular space. The adjacent renal paranchyma revealed fibrosis along with lymphocytic infiltration (fig.4) large number of tubules were replaced by scar tissue while some of the tubules were dilated. In some cases the glomeruli was completely encircled with fibrotic tissue. The overall occurrence of this condition was observed in 9 cases (5.73%) and a similar occurrence 5.21% was recorded by Pajouhesh & Sazandegi (2017) [13]. Microscopically original proliferation of endothelial cells of glomerular tuft resulted in scarification and obliteration of tuft, preserving the capsular space. While in some, where original proliferative phase was epithelial, the fibrosis completely obliterate the capsular space. The adjacent renal paranchyma revealed fibrosis along with lymphocytic infiltration and large number of tubules were replaced by scar tissue while some of the tubules were dilated. In some cases the glomeruli was completely encircled with fibrotic tissue. These observations were in agreement with those described

by Oo *et al.* (2016) [12], Rao *et al*. (2006) [14], Mathur *et al.* (2004) [11], Frelier *et al.* (1990) [5]. A similar occurrence 10.68% was reported by Ali and Aljaboori (2017) [2] at Diyala abattoirs.A higher incidence was reported by Sarita (2016) [15] 30.33 at Bikaner Rajasthan and Farshad and Hooshang (2016) [4] 71.13 percent at Yasuj city.A lower incidence was recorded by Pajauhesh and Sazandegi (2007) [13] 0.3 percent at Brujen abattoir, Hatipoglu and Erer (2010) [6] 3.13 at Konya, Turkey and Bhavya Priyanka (2017) [3] 5.42 percent at NTR College of Veterinary Science, Gannavaram.As we have seen a wide range of difference between the incidence reported at India and other parts of world that may be possibly due to seasonal variation, nutritional status, stress factors, management practices, geographical and climatic differences.

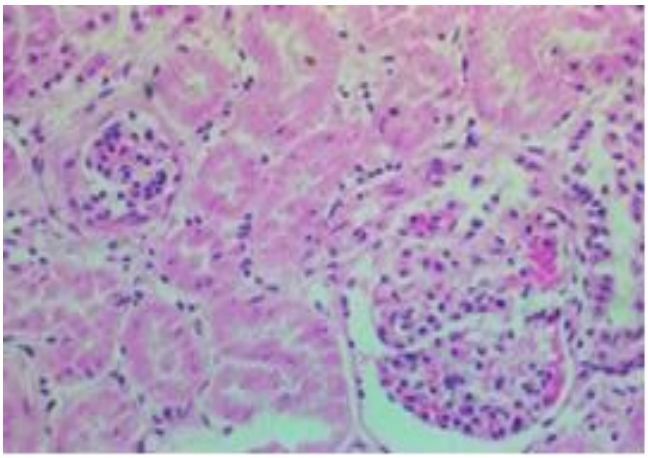

Fig 3: Chronic glomerular nephritis original proliferation of endothelial cells of glomerular tuft resulted in scarification and obliteration of tuft with coagulative necrosis of nearby tubules. H&E-40X

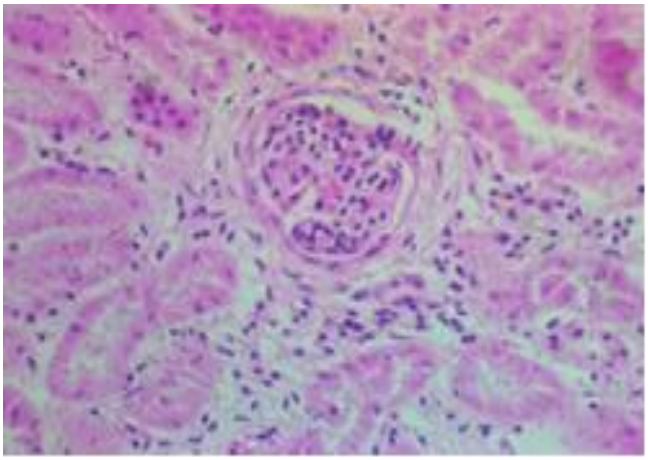

Fig 4: Chronic glomerular nephritis, periglomerular fibrosis along with coagulative necrosis of nearby tubules. H&E-40x

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