

Pathological Studies on Granulomatous Nephritis in Pig

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ABSTRACT: Five hundred and eighty-six kidney samples were screened to establish the diversity of renal disorders in pigs irrespective of age, sex and breed at organised and unorganised farms of Bikaner, Jaipur and Alwar districts of Rajasthan. Out of 586 specimens, total of 154 specimens of kidneys were revealed macroscopic lesions. In two (1.30 per cent) cases of granulomatous nephritis, small sized many granulomas on surface of kidney were processed for further histopathological examination at the Department of Veterinary Pathology, Bikaner. The gross lesion showed miliary granules on the surface kidney. The surface was whitish-grey in colour. The kidney showed yellowish areas surrounded by the large pale zones with the remaining portions of kidneys essentially normal. Histopathological examination revealed multiple nodular aggregations of epithelioid-like macrophages and multinucleate giant cells. Severe expansion of the interstitium by inflammatory cells, consisting predominantly of lymphocytes and eosinophils was present.

Keywords: Granulomatous Nephritis, Pig, Histopathology, Staining.

INTRODUCTION

Pig rearing is one of the significant occupations of weaker and poor sections of the society, specially the tribal population of India (Gupta *et al.*, 2022). Pigs have higher prolificacy, faster growth rate, higher meat conversion ratio and short duration of the gestation period, etc., so pig rearing is efficient way of meat production due to these important inherent traits which thrive in pig farming (Meena, 2019). The Pig population is 9.06 million (1.69%) which has decreased by 12.0% over previous Livestock Census, 2012 (20th livestock census, 2019). Disease has a tremendous impact on the pig industry, which ultimately affects the economy country (Malik *et al.*, 2020). Various pathogenic organisms and toxins enter the blood stream and pass through the kidneys (Sarita, 2016). Kidneys excrete toxic metabolites, retain useful substances by the process of selectively reabsorption (Maurya *et al.*, 2018). Renal disorders bear a major segment of total burden of diseases and are considered to be a most important cause of illness in pig. Granulomatous nephritis is one of the renal disorders affecting kidney of pigs. Granulomatous nephritis of kidney was recorded in 1.30 (2) per cent of cases. Granulomatous inflammation is a distinctive form of chronic inflammation. It is defined by the presence of mononuclear leukocytes and specifically macrophages which appear as epithelioid cells. They may also coalesce to form multinucleate giant cells.

MATERIAL AND METHOD

For the proposed interrogation 586 samples of the kidneys of pig (*Sus scrofa domesticus*) irrespective of age, sex and breed were examined and 154 kidney tissue specimens showing macroscopic lesions were collected from various organised and unorganised slaughterhouses of Bikaner, Jaipur and Alwar districts of Rajasthan. Two samples were showed macroscopic lesions of granulomatous nephritis were further histopathological examination. The kidney samples were properly preserved in 10 per cent formalin and processing of tissues was done by paraffin embedding using acetone and benzene technique (Lillie, 1965). The tissue sections of 4-6 micron thickness were cut and stained with routine staining method of haematoxylin and eosin staining (Luna, 1960; Bancroft *et al.*, 2013).

RESULT AND DISCUSSION

Granulomatous nephritis was reported in 2 (1.30 per cent) cases. A similar occurrence was found as 0.47 per cent in sheep (Sarita, 2016). A higher occurrence was found as 42.3 per cent in the pig (Sarli *et al.*, 2008). The gross lesion was mainly the yellowish areas surrounded by the large pale zones on cortical surface of kidneys and increased size of kidney (King *et al.*, 2014). Small sized many granulomas were scattered on the entire surface of kidney. Microscopically, the granulomatous inflammation was mostly present in the cortico-

medullary junction and outer medulla. In granuloma, multiple nodular aggregations of epithelioid-like macrophages and multinucleate giant cells were present. Inflammatory cells, predominantly of lymphocytes and eosinophils were showed expansion in the interstitium and the glomerular tuft, the bowman's space, and the periglomerular interstitium, similar findings were observed by Cohen and Glossock (1989); Jansen (1993); Jennette (1998). Sometimes, focal infiltration of mononuclear inflammatory cells was accompanied by small granulomas. Interstitial fibrosis and lymphocytic infiltrates with multinucleate giant cells and necrosis of glomerulus were seen. The inflammatory cells infiltrated the tubules and were associated with epithelial cell necrosis (Hong *et al.*, 2007; Sugiyama *et al.*, 2005). In some tubules, the lumen was filled exclusively with inflammatory cells, some tubules are partially atrophic and their complete destruction of some tubules. Most of the tissue parts convert into granuloma and lost originality of tissue (Sarli *et al.*, 2008; Milicevic *et al.*, 2009).



Fig. 1. Gross photograph of kidney showing small sized granulomas on the surface.

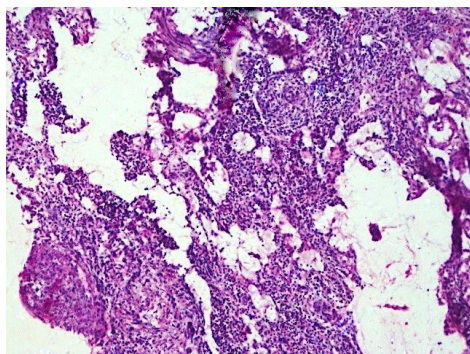


Fig. 2. Microphotograph of kidney showing granulomatous nephritis, centre surrounded by lymphocytes, eosinophils and epithelioid cells. H & E -10x.

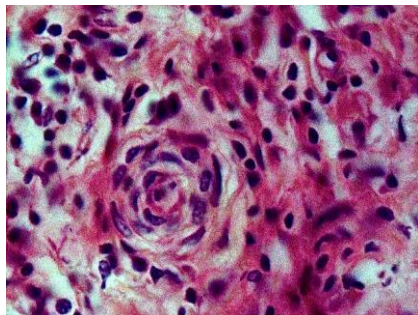


Fig. 3. Microphotograph of kidney showing granulomatous nephritis with epithelioid cells, lymphocytes and eosinophils. H & E -40x.

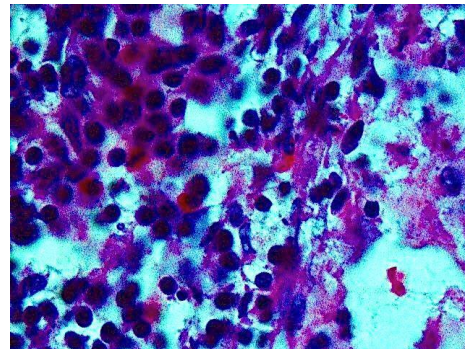


Fig. 4. Higher magnification of Fig 3. H & E-100x.

CONCLUSIONS

The study focused on histopathology of kidneys among pigs. Investigational parameters like tubular degeneration and granulomas were considered as significant changes that occur during advanced stages of chronic kidney disease, compared with early stages of the disease. The histopathology findings can help elucidate the reason behind this condition might be parasitic infection or allergic reactions. These indications will help out to identify therapeutic targets and the stages of disease at which they should be initiated.

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