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## Occurrence and Pathology of Pyelonephritis in Pig

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### Abstract

During present investigation, total number of 586 kidney of pigs were examined macroscopically. Out of which, total 154 specimens of kidneys showing macroscopic lesions were processed for further histopathological examination. Histopathological examination revealed pyelonephritis 0.65 per cent specimens. Grossly, the kidneys were enlarged and congested and presence of small and large greyish white nodules on the surface of the kidneys along with the capsule could be stripped off easily. Renal calyces were dilated with red, ulcerated wall and filled with a greasy purulent mass. The renal papilla showed hyperaemia and cortical haemorrhages. Microscopically, the cavity of Bowman's capsule, glomerular tuft and surrounding tissues showed infiltration of neutrophils. Glomerular loops were also filled with polymorphonuclear cells and few mononuclear cells. There was marked cellular infiltration in the renal tubules and interstitial connective tissue and tubular epithelial cells necrosis was also seen. Looking to the immediate need of understanding the various pathological conditions involved in urinary diseases and for providing timely diagnosis.

**Keywords:** Pigs, kidneys, histopathology, pyelonephritis

### Introduction

The indigenous pig has been the basis used for pig production for a long period of time and play an significant role in the economy of marginal owners and poor pig raisers (Singhal *et al.*, 2019) [8]. Pig raising is adopted as compensable adjunct to the farming of other livestock (Smitha, 2003) [9].

Kidneys are one of the important parts of urinary systems in the body which excretes toxic metabolites, regulates blood volume and blood pressure, controls level of electrolytes and metabolites, retains useful substances by the process of selectively reabsorption and adjustment of blood pH (Sarita 2016) [7]. Among the various common disorders affecting pigs, urinary disorders are more frequent and renal diseases has been considered to be the most important cause of illness. Pyelonephritis is one of the renal pathological disorder occurs in the pigs. Pyelonephritis was recorded in 0.65 per cent cases.

### Materials and Methods

#### a. Source and collection of samples

For the proposed interrogation, samples of the kidneys of pig (*Sus scrofa domestica*) irrespective of age, sex and breed were collected from various organized and unorganized slaughter houses of Bikaner, Jaipur and Alwar district of Rajasthan. During post-mortem examination, the samples were thoroughly examined grossly for any alterations in morphology in terms of size, shape, color, location, consistency and presence of cysts, abscesses, tumors, other growths and lesions etc. and screened by visual examination and gross palpation. The kidney tissue specimens were collected from the carcasses of pig, submitted to the Department of Veterinary Pathology, college of Veterinary Science, Bikaner. Those samples showing macroscopic lesions were used for further histopathological examination.

#### b. Processing of tissue samples

Following collection, all the kidney samples were properly preserved in 10 per cent formalin after cutting the affected parts and whole organ. The parts of affected tissue measured 2-5 mm thickness and presenting the lesions with normal tissue were used for fixation and further histopathological examination. For histopathological examination, processing of tissues was done by paraffin embedding using acetone and benzene technique (Lillie RD, 1965) [5].

The tissue sections of 4-6 micron thickness were cut and stained with routine staining method of hematoxylin and eosin staining.

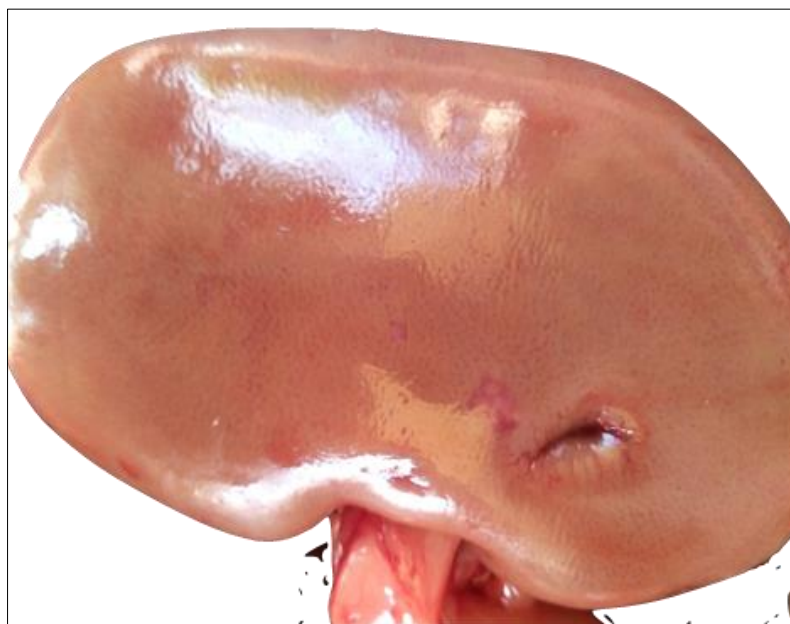
**c. Staining of tissue sections**

The kidney tissue sections were stained using haematoxylin and eosin method for histopathological evaluation (Luna G 1960) [6] (Bancroft JD, Suvarna, SK, Layton C. Bancroft’s 2013) [2]. Following deparaffinization, the sections were dehydrated using serial changes in ethanol and stained using Harris haematoxylin. After differentiation and follow up staining with Eosin, the slides were dehydrated and then permanently mounted using DPX. As far as possible, results were recorded by gross observations and microscopic examination.

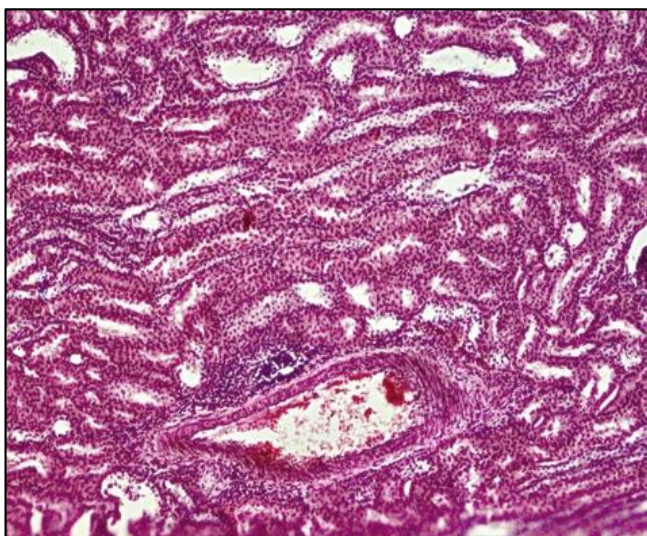
**Result and Discussion**

Pyelonephritis was recorded in 0.65 (1) per cent case. A

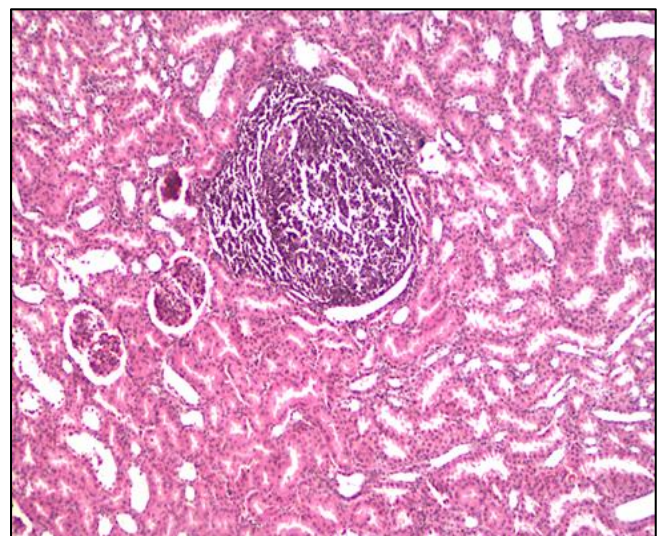
nearby higher incidence was recorded by Baik and rim (1989) [1] as 1.4 per cent in pig and Sreevidya (2017) [10] as 1.61 per cent in pig. Lower incidence by Chauhan *et al.* (1985) [3] as 0.32 per cent in pig. Grossly, kidney was enlarged and the capsule could be stripped readily. Minute and somewhat elevated, large grey-whitish foci which were surrounded by a distinct hyperaemic zone. On section cutting, the wall of calyces was red and ulcerated. Small sized abscesses were seen at cranial portion of the kidney. The pelvis was widely dilated and filled with pus. (Sreevidya 2017) [10]. Microscopically, the pelvis epithelium was infiltrated with neutrophils. The tubular wall and interstitial tissue were necrosed. There were large numbers of cellular casts in the renal tubules. Polymorphonuclear cells were found as radiating streaks in the straight tubules. The infiltration of polymorphonuclear cells were present in the cavity of Bowman’s capsule, glomerular tuft and surrounding tissue. (Isling *et al.* 2010) [4].



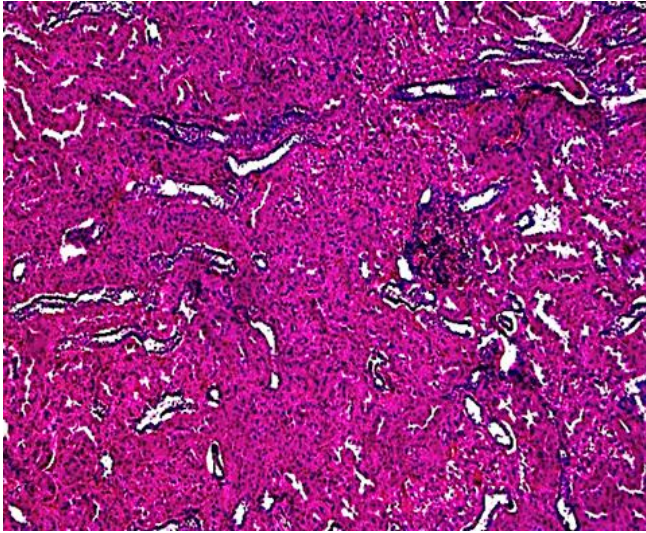
**Fig 1:** Gross photograph of kidney showing pyelonephritis.



**Fig 2:** Microphotograph of kidney showing pyelonephritis, tubules filled with polymorphonuclear cells at medullary region. H & E - 400x



**Fig 3:** Microphotograph of kidney showing abscess, thick cellular detritus in the centre surrounded by cellular infiltration consisting mainly polymorphs and lymphocytes with few macrophages. H & E -400x



**Fig 4:** Microphotograph of kidney having pyelonephritis showing cellular infiltration in renal parenchyma. H & E 100X

### Conclusion

The study considering the severity of pyelonephritis in the vital organ i.e., kidney and it can be concluded that this condition is serious pathological malady in domestic animals resulting in economic loss of the rural farmers.

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