

## Short Paper

# Abattoir survey of bovine pyelonephritis

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## Summary

In order to investigate the prevalence and detection of etiological agents of pyelonephritis in Shahrekord abattoir, 404 kidneys of slaughtered cattle (207 female and 197 male) were inspected. Kidney samples, which had gross changes were obtained for histological examination. Urine and renal tissue samples were also collected aseptically for microbiological examination. In histological examination pyelonephritis were observed in 3 cases (0.74%), one of which occurred in a 7-year-old cow and the others in bulls less than 2-year-old. In microbiological examination *E. coli* was isolated from urine and renal tissues in 2 cases and *Staphylococcus aureus* isolated only from renal tissue in the other case.

**Key words:** Pyelonephritis, Cattle, Abattoir

## Introduction

Pyelonephritis is a specific infection of the urinary tract of cattle, caused by some bacteria, particularly *Corynebacterium renale*, characterized by chronic purulent inflammation in the bladder, ureters and kidneys (Radostits *et al.*, 2000). *E. coli*, *Proteus sp.*, *Klebsiella sp.*, *Staphylococcus sp.*, *Streptococcus sp.* and *Pseudomonas aeruginosa* are also common causes of lower urinary tract infection and pyelonephritis in all species (McGavin *et al.*, 2001). Pyelonephritis may exist without clinical signs of disease. Frequently the acute infection is undiagnosed, resulting in chronic infection characterized by vague signs of weight loss, anorexia and decrease in milk production in affected cattle (Rehbn *et al.*, 1989).

The aim of this study was to investigate the prevalence of pyelonephritis and detection of bacterial agents of pyelonephritis in slaughtered cattle in Shahrekord abattoir.

## Materials and Methods

In this study, which was carried out through winter (2001) to spring (2002), the

kidneys of 404 slaughtered cattle (207 female and 197 male) were inspected. The number, age and gender of animals were recorded. Kidney tissue samples, which had gross changes were obtained from 87 cattle and placed in 10% formalin buffered for histological examination. Urine samples from the bladder and renal tissues were also collected aseptically for microbiological examination. Urine samples centrifuged at 1500 rpm for ten min then sediments streaked on sheep blood agar and incubated for 24-72 hrs at 37°C. Tissue samples were extracted aseptically and cultured as urine samples. Suspected colonies of common agents of pyelonephritis followed by microscopic examinations and appropriate biochemical tests (Quinn *et al.*, 2002).

For histological examination fixed tissue samples were embedded in paraffin wax, sectioned in 5 microns and stained with Haematoxylin and Eosin.

## Results

In histological examination pyelonephritis was observed in 3 cases, one in a 7-year-old cow and two in bulls less than 2-year-old. The lesions included a marked

neutrophil infiltration in the renal pelvis, urinary tubules and interstitial connective tissue with tubular epithelial cells necrosis and tubular destruction (Fig. 1). Clumps of polymorphonuclear leukocytes were visible in casts in collecting tubules. Grossly, the lesions included the presence of pus and

necrotic material in the renal pelvis, necrosis of the medulla and irregular scarring of the renal cortex. In bacteriological examination of the affected kidneys *E. coli* was isolated from urine and renal tissue in 2 cases. In the other case *Staphylococcus aureus* was isolated only from renal tissue.

**Fig. 1: Pyelonephritis. Note the aggregation of neutrophils in the urinary tubules and interstitium with tubular destruction. (H&E stain, ×132)**

## Discussion

Pyelonephritis is a widespread disease but clinical cases appear sporadically and the disease seldom constitutes an important problem in a herd or an area (Radostits *et al.*, 2000). In a survey of Dublin abattoir (Monaghan and Hannan, 1983) 4.2% of 4166 cattle had kidneys rejected for gross abnormalities, 3.5% of those (0.2% of the total) because of pyelonephritis. In another survey the overall prevalence for the disease was 1.6% for 2089 cows in seven farms (Marcusfeld *et al.*, 1989). The prevalence of the disease were reported as 0.25% in the abattoirs around Tehran (Hajikolaii, 1999). We did not find a marked difference in prevalence (0.74%) of the disease in comparison to other reports.

Although *C. renale* is the most common etiological agent of pyelonephritis in cattle (Radostits *et al.*, 2000) but *S. aureus* and *E. coli* were the causative agents of the disease in our study. That is the case in some other reports, as isolation of *S. aureus* in 22.5% of

urine samples of slaughtered cattle (Fatihu, 1997) and *E. coli* from 9 cases of pyelonephritis (Rehbun *et al.*, 1989). Importance of *E. coli* in cattle pyelonephritis have been reported (Divers *et al.*, 1982; Marcusfeld *et al.*, 1989; Hajikolaii, 1999).

Detection of the disease in a cow and lack of observation of the disease in heifers in the present study is in agreement with other reports (Monaghan and Hannan, 1983; Marcusfeld *et al.*, 1989). It seems that some stresses such as pregnancy, parturition, dystocia, post parturient uterine diseases and high milk production may act as important predisposing factors for entrance of organisms into urinary tract and producing the disease.

In contrast to most reports, in the present study pyelonephritis was more detected in bulls than cows. Considering that the present study was an abattoir survey and there was not any information about the history of slaughtered animals, it is possible that the affected bulls had some urinary tract abnormalities, such as congenital anomalies

or stenosis due to urinary calculi or early castration, which caused reflux of infected urine to renal pelvis. Hydronephrosis and pyelonephritis associated with an anomalous vas deferens in a 2-year-old Limousin bull has been reported (Tyler *et al.*, 1991).

## References

- 1- Divers, TJ; Crowell, WA; Duncan, JR and Withlock, RH (1982). Acute renal disorders in cattle: a retrospective study of 22 cases. *JAVMA*, 181(7): 694-697.
- 2- Fatihu, MY (1997). Bacterial flora of urinary bladder of cattle in Zaria Nigeria. *Rev. Elev. Med. Vet. Pays Trop.*, 50(3): 204-206.
- 3- Hajikolaii, MRH (1999). A clinical and practical study on prevalence of pyelonephritis in cattle slaughtered at Tehran abattoirs. Thesis for degree of doctorate in Veterinary Science. Tehran University. PP: 61-78.
- 4- Marcusfeld, O; Nahari, N; Kessner, D and Adler, H (1989). Observation on bovine pyelonephritis. *Br. Vet. J.*, 145: 573-579.
- 5- McGavin, MD; Carlton, WW and Zachary, JF (2001). *Thomson's special veterinary pathology*. 3rd. Edn., Mosby, St. Louis. PP: 264-266.
- 6- Monaghan, MLM and Hannan, J (1983). Abattoir survey of bovine kidney disease. *Vet. Rec.*, 113(16): 55-57.
- 7- Quinn, PJ; Markey, BK; Carter, ME; Donnelly, WJ and Leonard, FC (2002). *Veterinary microbiology and microbial disease*. London, Blackwell Science, PP: 43-48, 106-113.
- 8- Radostits, OM; Gay, CC; Blood, DC and Hinchcliff, KW (2000). *Veterinary medicine*. A Text book of the disease of cattle, sheep, pigs, goats and horses. 9th. Edn., London, W. B. Saunders Co., P: 491.
- 9- Rehman, WC; Dill, SG; Perdrizet, JA and Hatfield, CE (1989). Pyelonephritis in cows: 15 cases. *JAVMA*, 194(7): 953-955.
- 10- Tyler, JW; Smith, BP and Irvine, J (1991). Hydronephrosis and pyelonephritis associated with an anomalous vas deferens in a bull. *JAVMA*, 198(5): 871-872.