

Pathological Study of Renal Lesions in the Condemned Bovine Kidneys in Ziaran Slaughter-house

Short Communication

Tavassoly*, A.

Pathology Dept., Faculty of Veterinary Medicine, Tehran University, P.O.Box 14155-6453, Tehran, Iran

Received 17 Oct 2002; accepted 26 Feb 2003

Summary

During six months, Oct to Mar 2000, 300 cases of condemned bovine kidneys were randomly submitted to the pathology laboratory for diagnosis of renal diseases. The macroscopical and microscopical features of various types of bovine renal diseases were described. The frequency rate of macroscopical lesions was included 6 renal cysts, 7 hydronephrosis, 3 pyelonephritis, 165 white spotted kidney, 82 large pale kidney, 15 small shrunken kidney, 4 congestion, 3 pale infarction and 15 without any lesions. Histopathologic study of these cases with H&E stain, revealed that the important lesions were occurred in interstitial tissue of kidney. The frequency rate of microscopic lesions was included 6 renal cysts, 7 hydronephrosis, 3 pyelonephritis, 165 acute multifocal or diffuse interstitial nephritis, 80 nephrosis, 1 glomerulonephritis, 1 amyloidosis, 15 nephrosclerosis, 4 congestion, 3 infarction and 15 without any lesions.

Key words: kidney, cow, pathology

Introduction

The kidney is a structurally complex organ that has evolved to subserve a number of important functions excretion of the waste products a variety of metabolism, regulation of body water and salt, maintenance of appropriate acid and base balance

* Author for correspondence. E-mail: abtavasoli@yahoo.com

and secretion of a variety of hormones and autocooids. Diseases of the kidney are as complex as its structure but dividing them into those that affect the three basic morphologic components; glomeruli, tubules, interstitium; facilitates their study. This traditional approach is useful because the early manifestations of disease that affect each of these components tend to be distinctive. Further, some components appear to be more vulnerable to specific forms of renal injury: for example, tubular and interstitial disorders are more likely to be caused by toxic or infectious agents. Nevertheless, some disorders affect more than one structure. In addition, the anatomic interdependence of structures in the kidney implies that damage to one almost always secondarily affects the others. Chronic renal disease can able to destroy all three components of kidney, culminating in chronic renal failure, and what has been called, end-stage contracted kidneys (Mc Gavin *et al* 2001, Carlyle *et al* 1997, Jubb *et al* 1993, Cotran & Rabbins1997, Sastry Ganti 1983).

This abattoir survey on condemned bovine kidney lesions in Ziaran slaughterhouse can be a good model of renal disorders and clinical diseases of kidney in the bovine farms around the Tehran and Qazvin provinces.

Materials and Methods

300 cases of condemned bovine kidneys were randomly submitted to pathology lab for diagnosis of renal disease. At the first pathologist registered the macroscopic lesions of these kidneys. The important criteria that used in the examination were included size, thickness and degree of adherence of the capsule, color, contour and turgidity of the kidneys. Lesions visible on the surface were evaluated on cut surface to assess whether they are superficial or extend deeply into the underlying parenchyma. The degenerative and inflammatory changes in the kidney and also, dilatation, inflammation, calculosis, etc of renal pelvis were scored.

For microscopics study, the kidney samples were cut at 4mm in diameter and fixed in a 10% buffered formaline solution. After processing, the tissue samples

were sectioned with 7micron thickness and stained with hematoxyline and eosin (Lee 1968). In addition, the frequency rate of microscopic lesions was registered.

Results and Discussion

The frequency rates of macroscopic and microscopic lesions of condemned bovine kidney were summarized in table 1.

Table 1. *Type and frequency rates of macroscopic and microscopic lesions of condemned bovine kidney, Ziaran slaughter-house*

Type of macroscopic lesions	Freq%	Type of microscopic lesions	Freq%
Renal cysts	2	Renal cysts	2
Hydronephrosis	3.5	Hydronephrosis	3.5
Pyelonephritis	1	Pyelonephritis	1
White spotted kidney	55	Acute multifocal or diffuse interstitial nephritis	55
Large pale kidney	27.3	Nephrosis	26.6
Small shrunken kidney	5	Glomerulonephritis	0.33
Congestion	1.3	Amyloidosis	0.33
Pale infarction	1	Nephrosclerosis	5
Without any lesions	5	Congestion	1.3
		Infarction	1
		Without any lesions	3

White spotted kidney is a focal, nonsuppurative, interstitial nephritis in cow. These spots are the aggregation of leukocytes, in interstitium of kidneys. Occasionally these spots may bulge from surface of kidney. Affected kidneys are enlarged and pale and have a smooth capsular surface. Histopathologic study of these cases with H&E stain revealed that the important lesions were occurred in interstitial tissue of kidney (Figures 1-6).

In Monaghan and Hannan study (1983) the type and prevalence of renal disease were carried out at the Dublin abattoir in 1979-80. Of 4166 cattle surveyed, 173

(4.2%) had kidneys rejected for gross abnormalities. The most common reason for rejection was focal interstitial nephritis (60.1%). In another study at an abattoir in Italy, Marcato and Bettini (1990) found 120 grossly abnormal kidneys from 1500 cows after they slaughtered. The same result on microscopic examination was also reported.

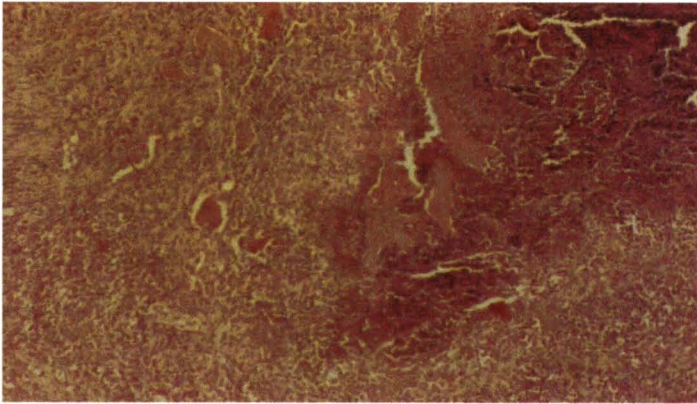


Figure 1. *Multifocal interstitial nephritis: Aggregates of lymphocytes, plasma cells and monocytes are randomly scattered throughout the interstitium. Tubules had degenerative and necrotic changes in epithelium (H&E×100).*

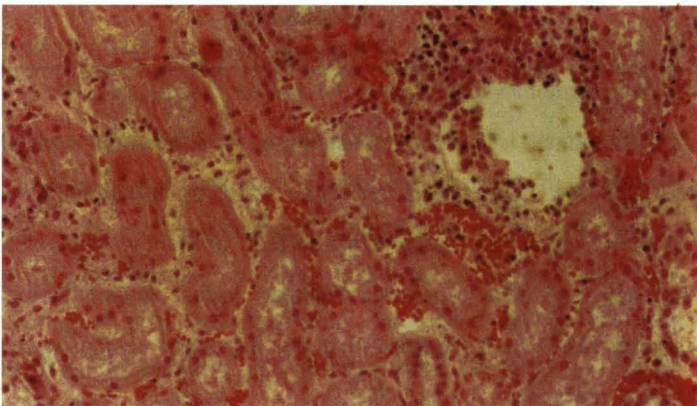


Figure 2. *Acute diffuse interstitial nephritis: Infiltration of mononuclear leukocytes in interstitium with epithelial necrosis and hemorrhage in kidney are obvious (H&E×100).*

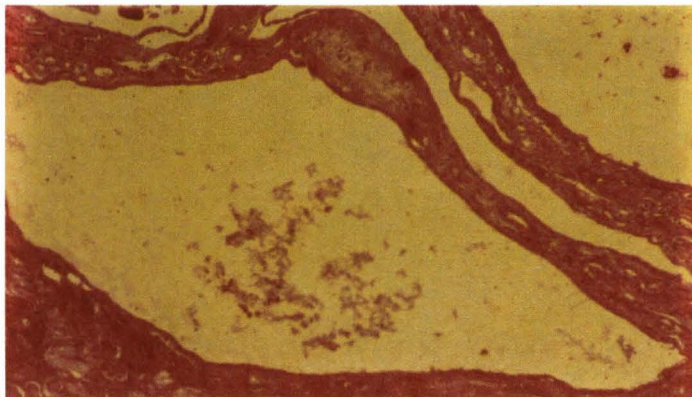


Figure 3. *Polycystic kidney: The cysts are variably sized spherical, thin-walled and lined by flattened epithelium, and they contain clear watery fluid (H&E×100).*

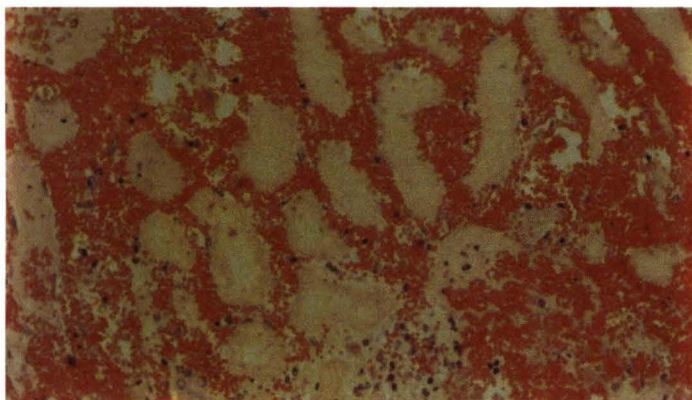


Figure 4. *Renal infarction: Acute renal corticomedullary infarct with a central zone of coagulation necrosis surrounded by a zone of hyperemia and hemorrhage (H&E×250).*

On histology examination various types and combinations of interstitial nephritis, amyloidosis, nephrocalcinosis, and nephrolithiasis, and pale kidneys were observed. Gruys (1979) discussed the distribution and origin of amyloid in 100 abnormal kidneys. Amyloid was present in the medulla of 62 kidneys.

According to the result of this study the most important reason for condemned bovine kidneys was acute multifocal or diffuse interstitial nephritis, which has been similar to the other abattoir studies.

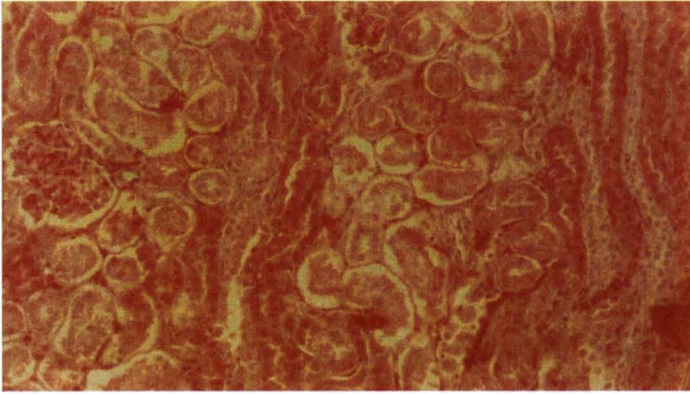


Figure 5. *Acute Tubular Necrosis (ATN) or nephrosis: Coagulate necrosis occurred in many of proximal tubules in cortex of kidney (H&E×100).*

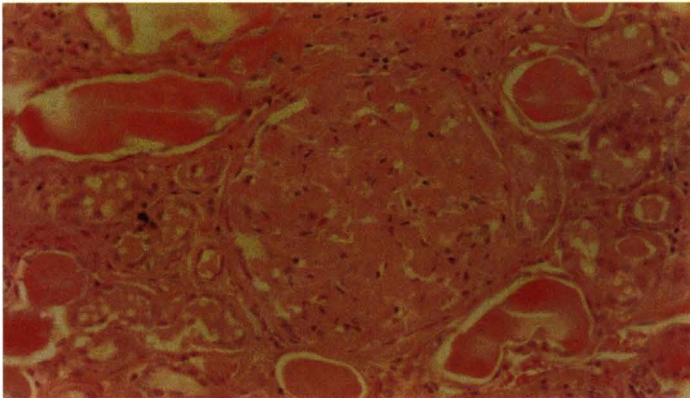


Figure 6. *Renal Amyloidosis: Eosinophilic hyalinized amorphous and extracellular amyloid deposit in a glomerulus, this affected glomerulus was enlarged, and hyaline casts were observed in tubules (H&E×250).*

References

- Carlyle, J.T., Doncan, H.R. and King Norval, W. (1997). *Veterinary Pathology* (6th edn.). Pp:50-54, 1111-1149. William & Wilkins.
- Gruys, E. (1974). Bovine renal amyloidosis. *Veterinary Pathology* 11:461.
- Jubb, K.V.F., Kennedy, P.C. and Palmer, N. (1993). *Pathology of Domestic Animals* (4th edn.). Vol 2. Pp:450-500. Academic Press, Inc.

Kumar, V., Cotran, R.S. and Robbins.S.L. (1997). *Basic Pathology* (6th edn.). Pp:437-473. W.B. Sanders Company.

Lee, L.G. (1968). *Manual of Histologic and Special Staining Techniques* (3rd edn.). P:135.

Marcato, P.S., Bettini, G. (1990). Kidney disease found in cows at meat inspection. *Praxis veterinaria Milano* 11:326-29.

McGavin, D.M., Corlton, W.W. and Zeachary, J.F. (2001). *Thomson's Special Veterinary Pathology* (3rd edn.). Pp:235-276. Mosby, Inc.

Monaghan, M.I., Hannan, J. (1983). Abattoir survey of bovine kidney disease. *Veterinary Records* 113:55-57.

Sastry Ganti, A. (1983). *Veterinary Pathology* (6th edn.). Pp:377-400. CBS Publishing.