

Morphological Spectrum of Renal Lesions: An Autopsy Study

Sainath K Andola¹, Pratima Manohar Pattar², Umesh SR³, Anuradha G Patil⁴

How to cite this article:

Sainath K Andola, Pratima Manohar Pattar, Umesh SR, et al. Morphological Spectrum of Renal Lesions: An Autopsy Study. Indian J Forensic Med Pathol. 2020;13(2):297-302.

Abstract

Context: Renal diseases are responsible for a great deal of morbidity and mortality. The autopsy study throws immense light on pathogenesis of disease, reveals hazardous effects of violence on various organs and lastly often reveals the cause of death.

Aims: To study the histomorphological spectrum of renal lesions in autopsies and an attempt is made to establish the cause of death.

Design: Observational type of study

Materials and Methods: A prospective study was conducted from July 2016 to June 2018 in the department of pathology. A total of 210 kidneys of adult medico legal autopsies performed during the period were included in our study. The stained microscopic sections were examined by two histopathologists independently.

Statistical Analysis: Descriptive analysis using IBM SPSS Statistics for Windows, Version 22.0.

Results: The age ranged from 4 to 80 years. Majority of the cases were in the age group of 21-30 years with a mean age of 33.40 years and the M:F ratio was 1.8:1. Out of 210 cases, 103 cases (49.1%) showed tubulo-interstitial and vascular lesions, 92 cases (43.81%) showed near normal histology of kidney and 15 cases (7.1%) showed glomerular lesions.

Conclusions: The tubulo-interstitial lesions were more common than glomerular lesions in medicolegal autopsies. The incidental finding in this study highlights the importance of gross and microscopy examination of each organ in detail from each autopsy irrespective of the cause of death.

Keywords: Autopsy; Histomorphology; Renal lesions.

Authors Affiliation: ¹Former Dean & Director, Professor, ⁴Professor & HOD, Department of Pathology, M.R Medical College, Kalaburagi, Gulbarga, Karnataka 585105, India. ²Tutor, Department of Pathology, ESIC Medical College, Kalaburagi, Gulbarga, Karnataka 585106, India. ³Professor & HOD, Department of Forensic Medicine, GIMS, Kalaburagi, Gulbarga, Karnataka 585105, India.

Corresponding Author: Pratima Manohar Pattar, Tutor, Department of Pathology, ESIC Medical College, Kalaburagi, Gulbarga, Karnataka 585106, India.

E-mail: pratimapattar@gmail.com

Received on 13.03.2020, Accepted on 19.05.2020

Introduction

Autopsy provides normal as well as diseased human tissue for morphologic studies. It provides the opportunity to discover new diseases, to evaluate toxic effects of drugs and therapies.

Renal diseases are responsible for a great deal of morbidity and mortality. Chronic kidney disease (CKD) is now recognized as a major global public health problem and is an independent risk factor for cardiovascular disease.^{1,2} CKD can lead to progressive loss of renal function, and may terminate in End Stage Renal Disease.^{3,4}

Although glomerulonephritis is the most important cause of chronic renal insufficiency, vascular diseases and tubulointerstitial diseases are also seem to be the leading causes.^{5,6} The most common cause for acute kidney injury in violent death is ischemic acute tubular injury.^{7,8}

In view of the above and with limited data on autopsy studies related to renal system, this study was undertaken to detect the renal system findings in all adult autopsy cases.

Materials and Methods

A prospective study conducted from July 2016 to June 2018 (2 years) in the department of pathology of a tertiary care hospital, Kalaburagi. A total of 210 kidneys of adult medico legal autopsies performed during the period were included in the study. Clinical data were recorded as per the proforma. Virchows technique of en block dissection was carried out. The kidneys were removed by blunt dissection in the plane between the renal capsule

and the perinephric fat. Then weight of the kidneys and detailed external gross assessment was done.

The kidneys were then bisected and the cortex, medullary pyramids and pelvis were examined. Tissues were fixed in 10% formalin by dissecting into thin (3–5 mm) bread-loaf slices. The formalin fixed tissues were sampled from cortico-medullary region and were further processed by automatic processor. The section of 3 microns were obtained from paraffin embedded tissue samples and were stained with haematoxylin and eosin. The special stains were done as and when required. The microscopic sections were studied and special stains carried out when required.

Results

The age ranged between 4 and 80 years. Majority of cases were seen in the age group of 21–30 years (67 cases, 32.0%) with mean age being 33.40 ± 12.81 years and the male to female ratio was 1.8:1 (Table 1).

Table 1: Age and sex distribution of medicolegal autopsies

Age in years	Males	Females	Total	Percentage (%)
1–10	04	02	06	2.8
11–20	12	10	22	10.5
21–30	45	22	67	32.0
31–40	28	29	57	27.1
41–50	38	05	43	20.5
51–60	05	05	10	4.7
61–70	02	01	03	1.4
71–80	02	-	02	1.0
Total	136 (64.8%)	74 (35.2%)	210	100.00

Among 210 cases, 92 cases (43.8%) showed near normal histology and 118 cases (56.2%) showed pathological changes; out of which 103 cases (49.1%) showed non-glomerular lesions which were more common than the glomerular lesions

(15 cases, 7.1%) (Table 2). In the present study incidental findings were seen among which one case was of adult polycystic kidney disease with chronic pyelonephritis (Fig. 1) and the other case was renal aspergillosis (Fig.2).

Table 2: Distribution of renal lesions in medicolegal autopsies

Sl. No	Microscopic findings	No of cases	Percentage (%)
1.	Glomerular lesions	15	07.1
2.	Tubular & interstitial lesions	95	45.2
3.	Vascular lesions	07	3.4
4.	Adult polycystic kidney disease	01	0.5
5.	Normal histology	92	43.8
	Total	210	100.00

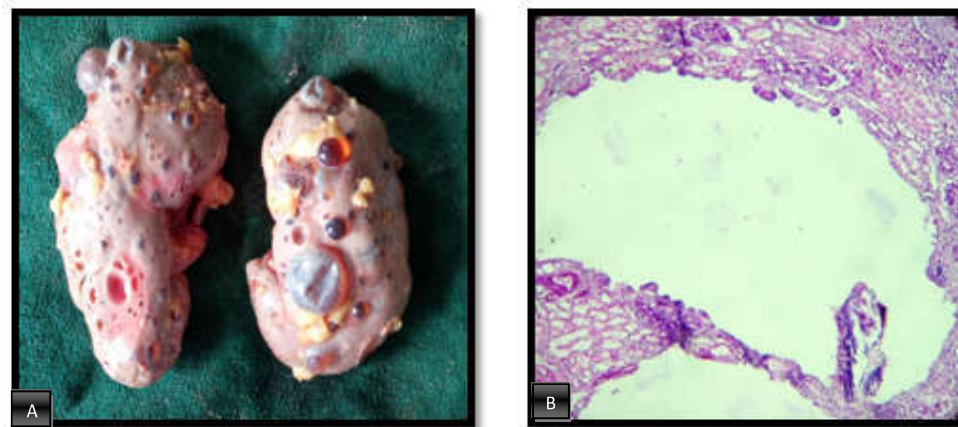


Fig. 1: Adult polycystic kidney disease (A) Bilateral enlarged kidneys with varying sized cysts, (B) cysts lined by flat epithelium (H&E 10X).

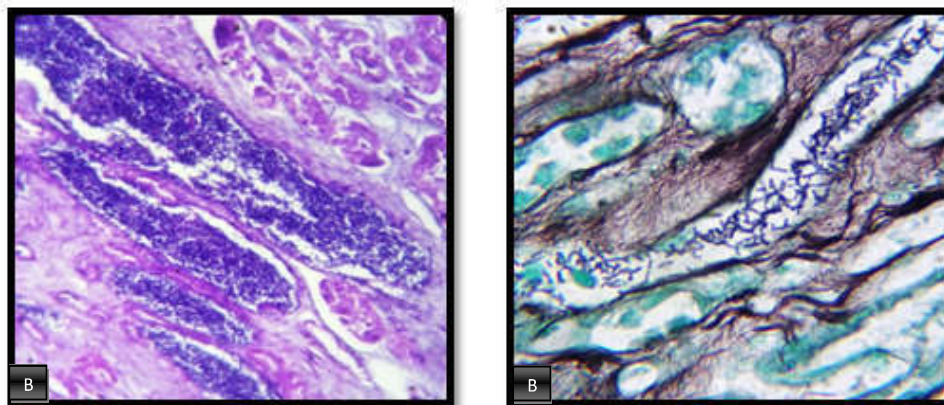


Fig. 2: Renal aspergillosis. (A) Tubules and vascular spaces filled with fungal hyphae (H&E 40X), (B) Fungal hyphae stained black (GMS 40X).

The spectrum of glomerular lesions seen were glomerular congestion (9 cases, 4.3%), periglomerular fibrosis (4 cases, 1.9%) and focal global glomerulosclerosis (2 cases, 0.9%). The non-glomerular lesions included tubule-interstitial and vascular lesions of kidney; among which acute

tubular necrosis (Fig. 3) (79 cases, 37.7%) was seen in the majority of cases followed by chronic interstitial nephritis (Fig. 4A) (12 cases, 5.7%) and benign arteriosclerosis (Fig. 4B) (7 cases, 3.3%) (Table 3).

Table 3: Distribution of non-glomerular (Tubulo-interstitial vascular) lesions

Sl. No	Lesions	No of cases	Percentage (%)
1.	Acute tubular necrosis (Ischemic)	59	57.8
2.	Acute tubular necrosis (Toxic)	20	19.7
3.	Tubulointerstitial nephritis	03	2.9
4.	Chronic Interstitial nephritis	12	11.8
5.	Renal aspergillosis	01	0.9
6.	Benign arteriosclerosis	07	6.9
	Total	102	100.00

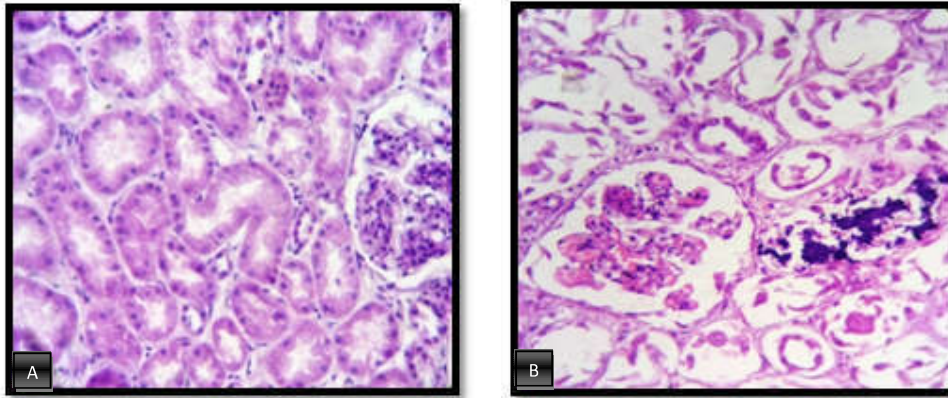


Fig. 3: Acute tubular necrosis (ATN) (A) Ischemic: diffuse necrosis of tubular epithelium (H&E 40X), (B) Toxic nephrosis: Desquamation of tubular epithelial cells and microcalcification (H&E 40X).

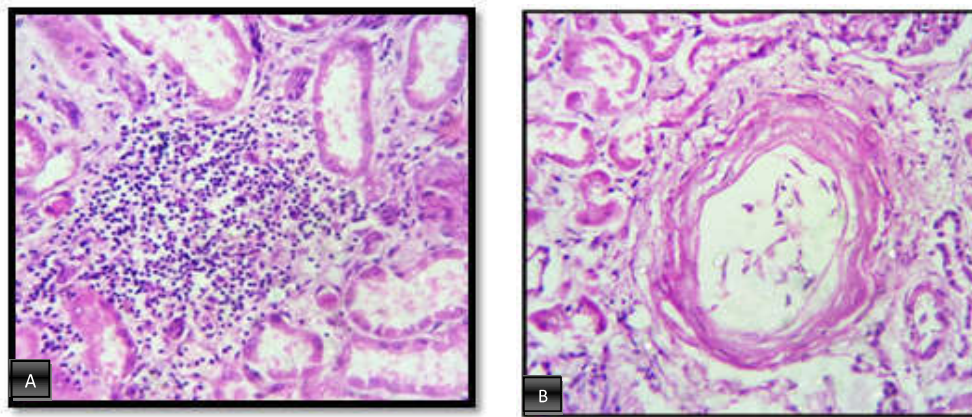


Fig. 4(A): Chronic interstitial nephritis- chronic inflammatory infiltrates in the interstitium with tubular atrophy (H&E 40X), (B) Benign arteriosclerosis- shows thickened and hyalinized vessel wall (H&E 40X).

The acute tubular necrosis (ATN) was divided into two types as ischemic and toxic. However, forty four cases (55.7%) of ischemic ATN were

seen in burns cases and majority of the toxic ATN (18 cases, 22.8%) were seen in poisoning cases (Table 4).

Table 4: Distribution of cases of Acute tubular necrosis

Mode of death	Ischemic	Toxic	Total	Percentage (%)
Burns	44	-	44	55.7
Poisoning	-	18	18	22.8
Snake bite	-	02	02	02.5
Hanging	01	-	01	01.3
Road traffic accident	11	-	11	14.0
Post operative death	02	-	02	02.5
Death during sleep	01	-	01	01.2
Total	59 (74.6%)	20 (25.4%)	79	100.00

Discussion

Autopsy provides normal as well as diseased human tissue for morphologic studies. It provides

the opportunity to discover new diseases, to evaluate toxic effects of drugs and therapies. Further it plays an important role in establishment of diagnosis and whenever possible determines the possible cause of the death.

The kidneys are often affected by chronic inflammatory lesions, neoplasms, toxic effects of various drugs and metabolic disorders. Pathologic examination of renal tissue in autopsy throws light on renal histologic changes in the general population and might provide useful information for preventing chronic renal diseases that tend to be asymptomatic which may often go undiagnosed.

In present study, the spectrum of renal lesions were analysed. However, the distribution of renal lesions varies with geographic area, age, gender, environmental, nutritional and genetic factors and socioeconomic status of the population.

In present study, the microscopic findings in 43.8% of cases were close to normal histology which correlates with the study conducted by Usta et al.¹⁰ (41.8%). However, the glomerular lesions accounted in present study (7.1%) were less when compared to Usta et al.¹⁰ (41.8%) and Sandhu et al.¹¹ (16.6%) which could be attributed due to the assessment of histopathological changes with histochemical methods without the guidance of immunofluorescence microscopy.

The non-glomerular (tubulo-interstitial and vascular) lesions (48.6%) were more common than glomerular lesions (7.1%) in present study which correlates with the study by Berinde et al.⁹ (6.5%) and Sandhu et al.¹¹ (34.1%). Among the non-glomerular lesions, tubulo-interstitial lesions were the commonest accounting for 95 cases (45.2%) which was comparable with Sandhu et al.¹¹ (34.1%).

The present study revealed acute tubular necrosis (ATN) to be the commonest renal lesion accounting for 37.6% which could be explained by large number of burns cases, poisoning and snake bite.

The main disease which determines renal vascular lesions is arterial hypertension, whose prevalence increases with age.¹² Diabetes is another cause of arteriolar renal lesions. However, the clinical data regarding history of diabetes and hypertension for this study were not available. In the present study the vascular lesions accounted for only 3.4% which may be because majority of the cases were in the age group of 21–30 years.

In the present study incidental findings were seen among which one case was of adult polycystic kidney disease with chronic pyelonephritis. In a study conducted by Berinde et al.⁹ also found 3 cases of polycystic kidney disease as an incidental finding. Another incidental finding was one case of renal aspergillosis.

The present study provided satisfactory data in respect to morphological spectrum of various renal lesions in an autopsy study. However, it does not reflect the actual incidence of renal lesions in a population.

Conclusion

The present study emphasizes the importance of autopsy which throws immense light on pathogenesis of disease, reveals hazardous effects of violence on various organs and lastly often reveals the cause of death.

The incidental findings in this study highlights the importance of gross and microscopical examination of each organ in detail from each autopsy irrespective of the cause of death.

References

1. Levey AS, Atkins R, Coresh J. et al. Chronic kidney disease as a global public health problem: approaches and initiatives: A position statement from Kidney Disease Improving Global Outcomes. *Kidney Int* 2007;72:247–59.
2. Schiffrin EL, Lipman ML, Mamm JF. Chronic kidney disease: effects on the cardiovascular system. *Circulation* 2007;116:85–97.
3. McClellan W. Epidemiology and Risk Factors for Chronic Kidney Disease. *Med Clin N Am* 2005;89:419–45.
4. Curtis B, Levin A, Parfrey P. Multiple Risk Factor Intervention in Chronic Kidney Disease: Management of Cardiac Disease in Chronic Kidney Disease Patients. *Med Clin N Am* 2005;89:511–23.
5. Covic A, Schiller A, Volovat C, et al. Epidemiology of renal disease in Romania: A 10 year review of two regional renal biopsy databases. *Nephrol Dial Transplant* 2006;21: 419–24.
6. Horvatic I, Tisljar M, Bulimbasic S, et al. Epidemiologic data of adult native biopsy proven renal diseases in Croatia. *Int UrolNephrol* 2013;45:1577–87.
7. Solez K, Morel-Maroger L, Sraer JD. Morphology of “acute tubular necrosis” in man: analysis of 57 renal biopsies and a comparison with the glycerol model. *Medicine (Baltimore)* 1979;58:362–76.
8. Pauksakon P, Fogo AB. Autopsy Renal Pathology. *Surgical Pathology Clinics* 2014 Sep;7(3):321–55.

9. Berinde AM et al. Assessment of chronic kidney disease based on necropticmicroscopical examination in violent death cases. Romanian Journal of Legal Medicine 2009; (3):205-212
10. Usta U et al. Histopathological and immune alterations in autopsied kidneys. Saudi Medical Journal 2014;35(10):1331-38.
11. Sandhu VK, Puri A, Singh N. Histomorphological Spectrum of Renal Lesion in An Autopsy Study. Annals of Pathology and Laboratory Medicine July-August, 2017;4(4).
12. Ninomiya T, Kubo M et al. Prehypertension Increases the Risk for Renal Arteriosclerosis in Autopsies: The Hisayama Study. J Am SocNephrol 2007;18:2135-42.

