

# Histopathological Evaluation of Surgically Treated Renal Lesions

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## ABSTRACT

**Background:** Nephrectomy is a common procedure in surgical practice. It is indicated in patients presenting with symptomatic chronic infections, obstruction, calculus disease, and severe traumatic injury to renal cell carcinomas.

**Methods:** The present study was conducted in the Department of Pathology and included all nephrectomy specimens received in the department over a period of five years (January 2011 - December 2015). Patient particulars were recorded, which included age, sex, chief complain and clinical findings; investigations such as CT scan, USG, and other relevant investigations were also noted. Meticulous histopathological examination was done and diagnosis was given.

**Result:** Total 124 patients underwent nephrectomy for various renal lesions in the last 5 years. There were 93 (75%) male and 31 (25%) female patients. In 12 patients, tumor was diagnosed on routine abdominal ultrasonographic screening for some other complains. Flank pain was the most common presenting symptom observed in 76 (61.29%) patients, followed by hematuria in 22 (17.54%) patients. On histopathological examination, 94 (75.80%) were non-neoplastic renal lesions and 30 (15.20%) were tumors. In non-neoplastic lesions of total nephrectomy specimens chronic pyelonephritis 70 (56.46%) was the most common type of lesions followed by pyonephrosis 9 (7.26%). There was also presence 4 (3.23%) of cases of Tuberculosis kidney. Overall, RCC was the most common 20 (16.13%) renal tumor.

**Conclusion:** The present study provides a fair insight into the histological patterns of lesions in nephrectomy specimens in our institution and its correlation with studies conducted across the world.

**Keywords:** Histopathology, Surgery, Renal Lesion, Evaluation.

## Introduction

Nephrectomy is a common procedure in surgical practice. It is indicated in patients presenting with a wide range of clinical conditions ranging from symptomatic chronic infections, obstruction, calculus disease, and severe traumatic injury to renal cell carcinomas. Primary renal tumors comprise a wide spectrum of neoplastic lesions of the kidney with patterns, which are relatively distinct among children and adults. A wide variety of both benign and malignant renal tumors may arise from the different components of the renal parenchyma, mostly from the tubular epithelium. Acute histopathological diagnosis of all renal lesions is not possible before their surgical removal. A meticulous and detailed histopathologic examination of tumor nephrectomy specimens is essential for the accurate diagnosis, classification, prognostication and management of the renal lesions. [1-7] In the present study, we aimed to analyze different histopathological varieties of renal lesions of the patients who underwent nephrectomy.

## Materials and Methods

The present study was conducted in the Department of Pathology and included all nephrectomy specimens

received in the department over a period of five years (January 2011 - December 2015). A total of 124 cases of nephrectomy specimen were studied during this period. Patient particulars were recorded, which included age, sex, chief complain and clinical findings; investigations such as CT scan, USG, and other relevant investigations were also noted. At the time of primary reporting, nephrectomy specimens were received fixed in 10% buffered formalin. Gross handling of nephrectomy specimens was done according to the standard protocol for examining nephrectomy specimens. [2, 3, 8, 9] Representative tissue blocks were taken and processed for paraffin embedding, hematoxylin and eosin (H and E) stained and examined by the pathologists. Special stains and immunohistochemistry were also done where needed. Meticulous histopathological examination was done and diagnosis was given. World Health Organization classification of renal tumors was followed for the histopathological diagnostic categorization of the tumors. [10] Fuhrman, et al. nuclear grading system was done for grading the conventional clear cell and papillary variants of renal cell carcinoma (RCC). [11]

## Result

A total of 124 patients underwent nephrectomy for their various renal lesions in the last 5 years. There were 93 (75%) male patients and 31 (25%) female patients; the male to female ratio was 3:1 (**Table - 1**).

In 12 patients, tumor was diagnosed on routine abdominal ultrasonographic screening for some other complains. Flank pain was the most common presenting symptom observed in 76 (61.29%) patients, followed by hematuria in 22 (17.54%) patients (**Table - 2**).

Analysis of the histopathological diagnosis of 124 nephrectomy specimens is given in (**Table - 3**). On histopathological examination, 94 (75.80%) were non-

neoplastic renal lesions and 30 (15.20%) were tumors. In non-neoplastic lesions of total nephrectomy specimens, chronic pyelonephritis 70 (56.46%) was the most common type of lesions followed by pyonephrosis 9 (7.26%). Overall, RCC was the most common 20 (16.13%) renal tumor. On the other hand, RCC was found to be the most common malignant renal tumor. Among the RCC, conventional, clear cell variety was found to be the most common histopathological variety followed by the papillary type, chromophobe type RCC (**Figures - 1, 2, 3**). There was also presence 4 (3.23%) of cases of Tuberculosis kidney (**Figure - 4**). There was also presence of one (0.8%) case of well differentiated squamous cell carcinoma of renal pelvis (**Figure - 5**) and 2 (1.60%) cases of angiomyolipoma.

**Table 1: Gender-wise distribution of benign and malignant lesions.**

Lesions	Males		Females	
	No.	%	No.	%
Benign	71	76.34	23	74.19
Malignant	22	23.66	08	25.81
<b>Total</b>	<b>93</b>	<b>100</b>	<b>31</b>	<b>100</b>

**Table 2: Clinical presentation in patients undergoing nephrectomy.**

Clinical features	No. of patients	%
Flank pain	76	61.29
Fever	04	3.22
Lump in abdomen	07	5.64
Burning micturition	12	9.67
Hematuria	22	17.54
Vomiting	03	2.64
<b>Total</b>	<b>124</b>	<b>100</b>

**Table 3: Distribution of nephrectomy specimens according to histopathological lesions.**

Lesion	No. of cases	%
Chronic pyelonephritis	70	56.46
Xanthogranulomatous Pyelonephritis	05	4.04
Pyonephrosis	09	7.26
Traumatic kidney damage	06	4.84
Tuberculosis kidney	04	3.23
Wilms' tumor	06	4.84
Renal cell carcinoma	20	16.13
Squamous cell carcinoma	01	0.80
Angiomyolipoma	02	1.60
Renal sarcoma	01	0.80

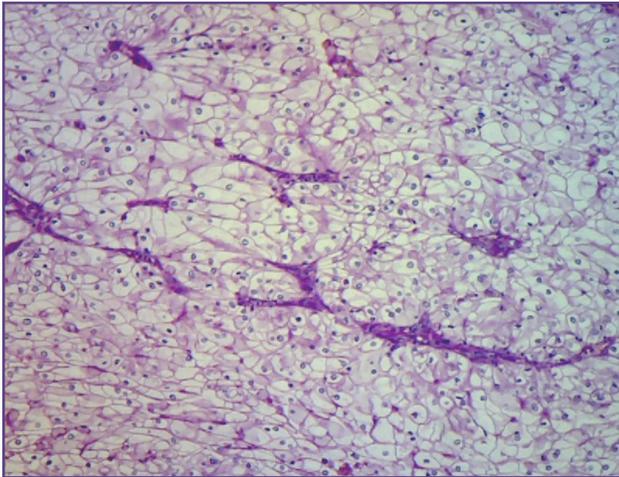


Fig. 1: Renal cell carcinoma of clear cell type (H & E Stain, 10X).

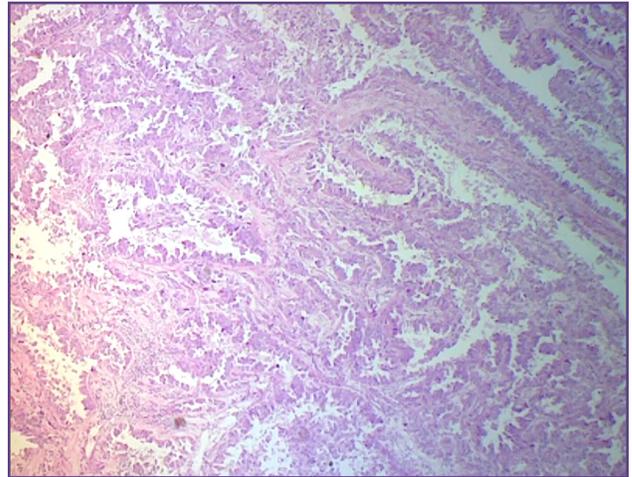


Fig. 2: Papillary type of renal cell carcinoma (H & E Stain, 10X).

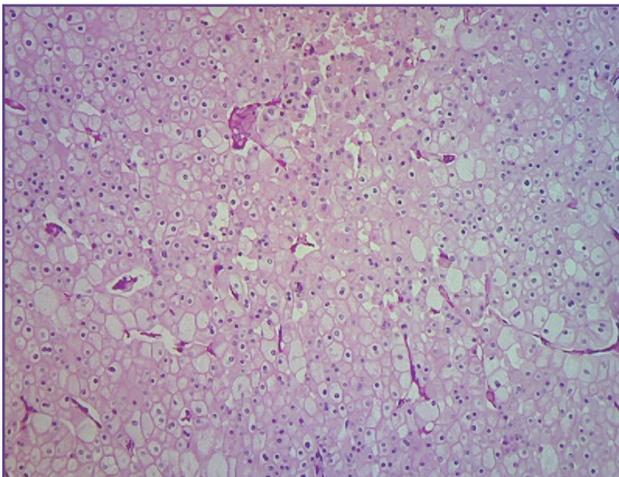


Fig. 3: Cells with abundant eosinophilic cytoplasm in chromophobe RCC (H & E Stain, 10X).

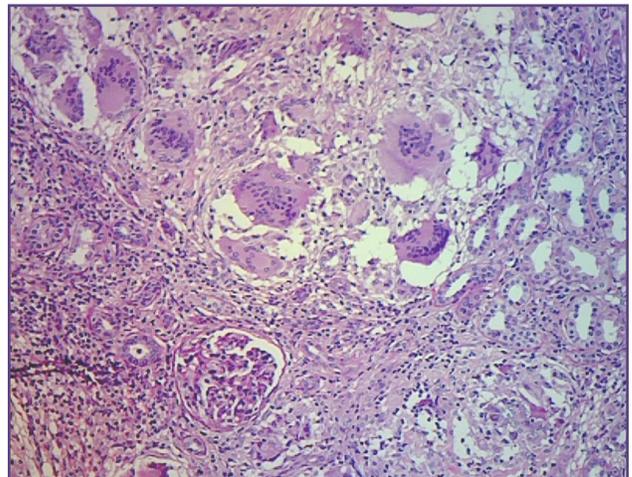


Fig. 4: Granuloma formation in Tuberculosis of kidney (H & E Stain, 10X).

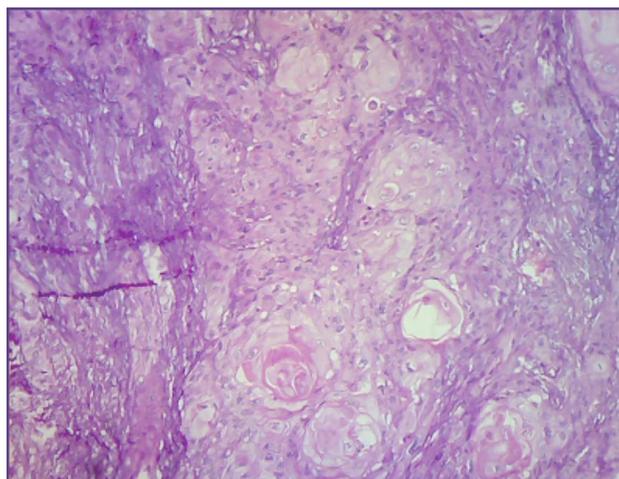


Fig. 5: Well differentiated Squamous cell carcinoma of renal pelvis (H & E Stain, 10X).

## Discussion

In the present study, out of the 124 nephrectomy specimens studied, 75.80% had benign lesions and 15.20% had malignant lesions. Thus, benign lesions comprised the vast majority of the cases in our study. The similar findings were observed in the study by Mohammad Rafique in which 76.6% had benign lesions and 23.4% had malignant lesions.<sup>[12]</sup> The ratio of M:F is 3:1 in our study which was in concordance with El Malik, et al.<sup>[13]</sup> reported 61% nephrectomy specimens in males and 39% in females with M:F = 1.9:1.

In the present study, the most common clinical feature that the patients presented with was flank pain 76 (61.29%) patients. This was followed by hematuria 22 (17.54%) patients and burning micturition. A majority of patients who presented with hematuria had malignant lesions. These observations were comparable to those in the study conducted by Popat, et al.<sup>[14]</sup> and El Malik, et al.<sup>[13]</sup>

In the present study, the most common indication for nephrectomy was chronic pyelonephritis (56.46%), followed by renal cell carcinoma (16.13%). Chronic pyelonephritis has been reported as the most common clinical indication in the studies by Popal, et al.,<sup>[14]</sup> El Malik, et al.,<sup>[13]</sup> and Ibrahim Ghalayeni.<sup>[15]</sup> Nine cases of pyonephrosis were observed to comprise 7.26% of nephrectomy specimens.

In the present study, 8 (5.7%) cases of xanthogranulomatous pyelonephritis were seen. Popat, et al.<sup>[14]</sup> observed 2 cases (2.5%), El Malik, et al.,<sup>[13]</sup> 6 cases (1.1%), and D'Costa, et al.<sup>[16]</sup> found 10% cases of xanthogranulomatous pyelonephritis in 188 nephrectomy specimens. Among the cases of xanthogranulomatous pyelonephritis in the present study, 2 were male and 3 female. Thus, a female predilection was noted. A similar female predilection was observed by Parsons, et al.<sup>[17]</sup> and KB Koh.<sup>[18]</sup>

In the present study, a total of 30 (23.4%) malignant lesions were observed; of these, a vast majority comprised renal cell carcinomas, i.e., 20 (66.67%) cases. This was similar to the findings of Mohammad Rafique<sup>[12]</sup> who observed that the majority of malignant neoplasms (97%) of the kidney were renal cell carcinomas. Popat, et al.,<sup>[14]</sup> in their study, found that 70% of malignant lesions were accounted for by renal cell carcinomas. Among renal cell carcinomas, a majority of cases (72%) were seen in males and 28% in females. Grossly, majority of tumors (61%) involved the upper pole, followed by 37% tumors that involved the whole of the kidney. This was similar to the results by Popat, et al.<sup>[14]</sup> who found majority of the tumors (57%) involving the upper pole of the kidney.

In our study, microscopically, the clear cell type of renal cell carcinomas were the predominant type of tumor observed, involving 14 cases. This was followed by granular cell type in 3 cases and papillary type in 3 cases. Fuhrman nuclear grading<sup>[11]</sup> revealed 10 cases showing Grade 2 nuclear features and 5 cases depicting Grade 3 nuclear features. Thus, majority of cases showed Grades 2 and 3 nuclear features. This is similar to the findings of Popat, et al.,<sup>[14]</sup> who observed that all cases of conventional renal cell carcinomas showed Grades 2 and 3 nuclear features.

Two cases (1.60%) of angiomyolipoma were seen in our study. Both the patients were female and presenting with pain and lump in the right lumbar region. No evidence of tuberous sclerosis was found in the patient. Popat, et al.<sup>[14]</sup> reported two cases (2.5%) of angiomyolipoma falling in the age group of 40-60 years. In our study, the patients with angiomyolipoma were having age of 45 and 56 years respectively. None of the patients showed features of tuberous sclerosis. El Malik, et al.<sup>[13]</sup> reported 2 cases (1.6%) of angiomyolipoma in a female patient with tuberous sclerosis. Thus a wide range of lesions were encountered when nephrectomy specimens are subjected to histopathological examination.

## Conclusion

The present study provides a fair insight into the histological patterns of lesions in nephrectomy specimens in our institution and its correlation with studies conducted across the world. A wide range of lesions are encountered on histopathology of nephrectomy specimens, many of which may be misdiagnosed clinically and radiologically; therefore, it is mandatory that every nephrectomy specimen be subjected to a detailed histopathological examination for a clinico-morphological correlation to ensure proper management.

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**Financial or other Competing Interests:** None.