

# Histopathological Spectrum of Nephrectomy Specimens: Single Center Experience



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## Abstract

**Background:** The kidneys are by and large a very resilient organ. The renal parenchyma though subjected to repeated trauma/insults of the noxious environment, they are the last to respond. The kidneys are affected by various disease processes some resulting in permanent damage leading to surgical removal of the organ i.e. nephrectomy. Indications for nephrectomy are varied including irreversible damage by chronic infections, obstructive causes including strictures & calculus disease, vesicouretric reflex, congenital dysplasia, nephrosclerosis, cystic disease, dysplasia's and also severe traumatic injury, non-corrective renal artery disease leading to renovascular hypertension. Common indication for nephrectomy would be obstructive nephropathy, hydronephrosis and chronic pyelonephritis according to studies. Nephrectomy procedure may show geographic variations with variable urological causes. Indications for nephrectomy may show geographic variations with different urologic causes in different countries worldwide.

**Objective:** Objective of this study is to observe the spectrum of histopathological lesions in nephrectomy cases received in our department and then to know the indications for the same in our community practice. We also studied the age and sex distribution, neoplastic and non-neoplastic distribution of cases along with other histomorphologic features. Ours is a tertiary care center in southern part of India catering to both urban and rural population.

**Materials and Methods:** The present study was done for a period of 1 year from January 2017 to January 2018 which included all the nephrectomy specimen received in the department of pathology, Institute of Nephrourology, Bangalore, India. It is a retrospective study. A total of 71 nephrectomy cases were included in the study period. Patient particulars including age, sex, clinical diagnosis along with radiological details like USG and CT findings along with gross morphology and microscopic details were noted from the data available with our department. Representative bits taken were processed according to standard operating protocols. Sections were cut at 3-4 microns and stained with Hematoxylin and Eosin. PAS (Periodic acid Schiff) stain to look for fungal elements and ZN (Ziel Nielson) stain for Acid fast bacilli was done wherever needed. Immunohistochemistry (IHC) was not done.

**Results:** During the study period we received a total of 71 nephrectomies. Numbers of male patients were 38 (53.53%) and numbers of female patients were 33 (46.47%). Most common affected age group was 4<sup>th</sup> to 5<sup>th</sup> decade with 19 cases contributing to 26.76% of total cases. Least affected age group was 1<sup>st</sup> decade with only one case (1.40%). Number of non-neoplastic cases was 63 (88.73%) and neoplastic cases were 8 (11.26%). Neoplastic cases further included 25% of benign tumors and 75% of malignant tumors. Among the non-neoplastic inflammatory diseases affecting nephrectomies most common lesion was chronic pyelonephritis with hydronephrosis (32.39%). Among the malignant tumors, Clear cell renal cell carcinoma was most common tumor.

**Conclusion:** Nephrectomy is an accepted surgical procedure for non functioning kidneys due to various pathological disease processes. Most common affected age group was 4<sup>th</sup> to 5<sup>th</sup> decade. Non-neoplastic lesions were most common cause for nephrectomies. Chronic pyelonephritis with hydronephrotic changes being the most common cause. Severe traumatic injury and emphysematous pyelonephritis are relatively rarer causes. Clear cell renal cell carcinoma being the common among malignant tumors. Other benign and malignant lesions being rare.

**Keywords:** Nephrectomy; Chronic Pyelonephritis; Hydronephrosis; Clear Cell Renal Cell Carcinoma

**Abbreviations:** IHC: ImmunoHisto Chemistry; ZN: Ziel Nielson; CRCC: Clear Cell Renal Cell Carcinoma; SCC: Squamous Cell Carcinoma; TCC: Transitional Cell Carcinoma; RS: Renal Sarcoma; IFTA: Interstitial Fibrosis and Tubular Atrophy; PAS: Periodic Acid Schiff

## Introduction

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damage leading to surgical removal of the organ i.e. nephrectomy. Indications for nephrectomy are varied including irreversible damage by chronic infections, obstructive causes including strictures & calculus disease, vesicouretric reflex, congenital dysplasia, nephrosclerosis, cystic disease, dysplasia's and also

severe traumatic injury, non-corrective renal artery disease leading to renovascular hypertension. Common indication for nephrectomy would be obstructive nephropathy, hydronephrosis and chronic pyelonephritis according to studies. Nephrectomy procedure may show geographic variations with variable urological causes. Indications for nephrectomy may show geographic variations with different urologic causes in different countries worldwide. Bold objective of this study is to observe the spectrum of histopathological lesions in nephrectomy cases received in our department and then to know the indications for the same in our community practice. We also studied the age and sex distribution, neoplastic and non-neoplastic distribution of cases along with other histomorphologic features. Ours is a tertiary care center in southern part of India catering to both urban and rural population.

**Materials and Methods**

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**Results**

**Table 1:** Age wise distribution of nephrectomy cases.

Age Distribution	Total Number	Percentage
0 to 10	2	2.81%
11 to 20	5	7.04%
21 to 30	12	16.90%
31 to 40	10	14.08%
41 to 50	19	26.76%
51 to 60	13	18.30%
61 to 70	7	9.85%
71 to 80	3	4.22%

During the study period we received a total of 71 nephrectomies. Number of male patients were 38 (53.53%) and number of female patients were 33 (46.47%) (Table 1). Most common affected age group was 4<sup>th</sup> to 5<sup>th</sup> decade with 19 cases contributing to 26.76% of total cases. Least affected age group was 1<sup>st</sup> decade with only one case (1.40%). Number of non-neoplastic cases was 63 (88.73%) and neoplastic cases were 8 (11.26%) (Table 2). Neoplastic cases further included 25% of benign tumors and 75% of malignant tumors. Histopathological spectrum of lesions among non-neoplastic lesions are mentioned below in the (Table 3). Among the non-neoplastic inflammatory diseases affecting nephrectomies most common lesion was chronic pyelonephritis with hydronephrosis

(32.39%). Severity of interstitial fibrosis and tubular atrophy was divided as minimal (<10%), mild (10% to 25%), moderate (25-50%) and severe degree (>50%) (Table 4).

**Table 2:** Distribution of neoplastic and non-neoplastic lesions.

Malignant tumors	75%
Clear cell RCC	3
SCC, Pelvis	1
TCC, Pelvis	1
Spindle cell sarcoma	1

Benign tumors	25%
Oncocytoma	1
Angiomyolipoma	1

**Table 3:** Histopathological spectrum of lesions.

Histopathological Lesions	Total Number	Percentage
Hydronephrosis	16	22.53%
CPN with Hydronephrosis	23	32.39%
CPN	3	4.22%
Xanthogranulomatous pyelonephritis	10	14.08%
Granulomatous pyelonephritis - TB	3	4.22%
Clear cell RCC	3	4.22%
SCC, Pelvis	1	1.40%
TCC Renal pelvis	1	1.40%
Spindle cell sarcoma	1	1.40%
Oncocytoma	1	1.40%
Angiomyolipoma	1	1.40%
RTA Patchy cortical necrosis	2	2.81%
Pyonephrosis	4	5.63%
Emphysematous pyelonephritis	2	2.81%

**Table 4:** Distribution of IFTA in non-neoplastic cases.

IFTA	Total Number	Percentage
Minimal <10%	7	11.11%
Mild IFTA	11	17.46%
Moderate IFTA	11	17.46%
Severe IFTA	34	53.96%

**Discussion**

The present study consist of 71 nephrectomy cases were analyzed. Majority of patients belonged to the age group of 4<sup>th</sup> to 5<sup>th</sup> decade. Youngest patient in our study was 4 years old and the oldest patient was 76 years old. This is in concordance with the study done by Kotta Devender Reddy et al. and Dr Ajay Kumar where the maximum number of patients were in 4<sup>th</sup> decade [1,2]. This is variable with other studies done by Swarnalatha Ajmera et al. and shanmugaswamy et al. Where the most common age group

affected is 5<sup>th</sup> to 6<sup>th</sup> decade[3,4]. However, in a study done by Aimen et al. Most common age group affected is 2<sup>nd</sup> to 3<sup>rd</sup> decade[5]. In our study there was male preponderance with M:F ratio of 1.15:1. This finding was in correlation with studies done by Kotta Devender Reddy et al., Ashima N et al., Swarnlatha Ajmera et al., Dr Bharti et al., Which have showed male predilection[1,3,6,7]. In a study done by Shanmugaswamy K et al., There was equal male and female preponderance[4]. In our study, non-neoplastic lesions (Figure 1) were most common with 63 cases (88.73%) than neoplastic lesions 8 cases (11.26%). Similar findings were seen with studies of Kotta Devender Reddy et al., Ashima N Amin et al., Shanmugaswamy K et al., Dr Ajay Kumar where non-neoplastic lesions were most common indications for nephrectomy[1,2,4,5]. In present study, chronic pyelonephritis with hydronephrosis was the most common lesion followed by hydronephrosis and Xanthogranulomatous pyelonephritis.

This was in concordance with study by Ashima N Amin where chronic pyelonephritis with hydronephrosis was the most common lesion followed by multicystic renal dysplasia[5]. Chronic pyelonephritis was also the most common lesion in other studies like Kotta Devender Reddy et al. Aiman et al., Dr Bharti Devi et al., Shanmugaswamy et al. & Dr Ajay Kumar[1-6] This is in variation with findings of study done by Muhammad Raffique where the most common indication for nephrectomy cases in non-neoplastic lesion was renal stone disease[8]. In our study we had 10 cases (14.08%) of Xanthogranulomatous pyelonephritis. Our findings were comparable with studies done by Aiman et al. (8 cases, 5.7%), Kotta Devender Reddy et al., (8 cases, 10.4%). In our study out of 10 cases of Xanthogranulomatous pyelonephritis, 6 patients were females showing female preponderance[1,7]. We had 3 cases (4.22%) of Tuberculous pyelonephritis. This was comparable with Kotta Devender Reddy et al. 6 cases i.e. 7.8%, Ashima N Amin - 3 cases i.e. 4.3%, Dr Bharti Devi thaker 1 case i.e. 1.4 [1,5,6] However in studies done by Swarnalath Ajmera and Shanmugaswamy et al there were no cases of tuberculous pyelonephritis [3,4].

injury. We have 2 cases of emphysematous pyelonephritis who were known diabetic patients which is exclusive in the fact that no there is no mention of these cases in any of the above referred studies. In our study among neoplastic lesions majority were malignant (75%) comprising 3 cases of Clear cell renal cell carcinoma (cRCC) and 1 each case of Squamous cell carcinoma (SCC), Transitional cell carcinoma (TCC) and Renal sarcoma (RS).



Figure 2.

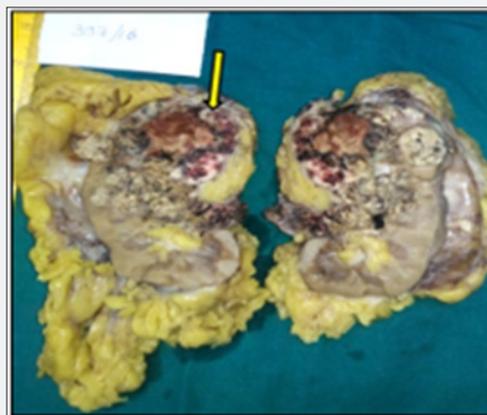


Figure 3.

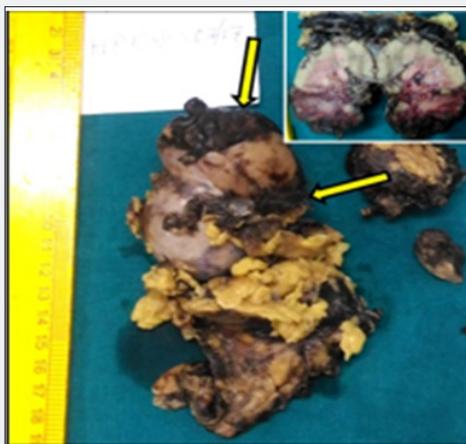


Figure 4.

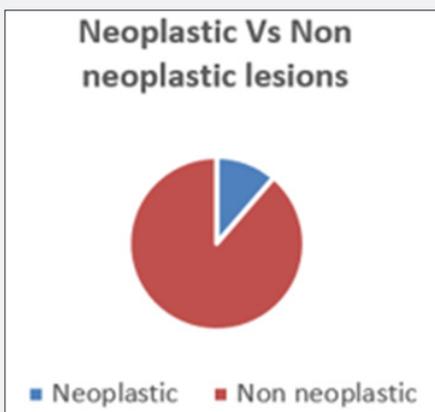


Figure 1.

Our study also included 2 cases of cortical necrosis i.e. (Figures 2-4) Severe traumatic kidney injury as a result of road traffic accident. In Rahul mannan study [9] a single case of nephrectomy due to post traumatic kidney was studied. Rest of the study mentioned above did not have any nephrectomy cases secondary to severe traumatic

RCC being the most common malignant tumor in adults, we reported 3 cases out of 6 malignant tumors. This is in comparison with the studies done by Aimen et al. [4,5,7]. One case of RCC was associated with liver metastasis. Among benign we had 1 each case

of Oncocytoma and Angiomyolipoma with an incidence of 1.4 % each. Similar findings were noted in study done by Shanmugaswamy et al. & Kotta Devender Reddy [1,4]. Additional glomerular pathological findings were Kimmelstiel Wilson's nodules in one of the diabetic patients and focal segmental glomerulosclerosis in other hydronephrotic patient. There are few studies referring the medical kidney diseases in nephrectomy cases. Truong et al. Studied in detail about diagnosing the non-neoplastic lesions in nephrectomy specimens and found that most frequent of them were hypertensive nephrosclerosis and diabetic nephropathy [10]. Interstitial fibrosis and tubular atrophy (IFTA) was seen in 63 cases (88.73%). It was comparable with the findings of Shanmugaswamy et al. where interstitial fibrosis was 91.7% and tubular atrophy was seen in 87.5% of the cases [4] (Figures 5-7).

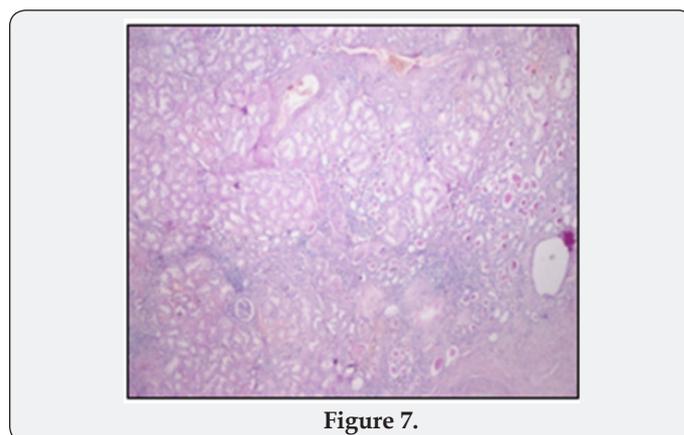


Figure 7.

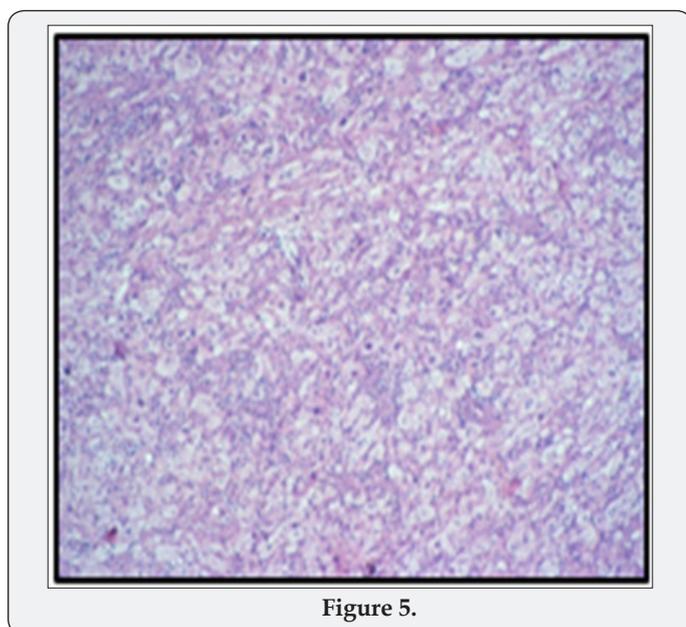


Figure 5.

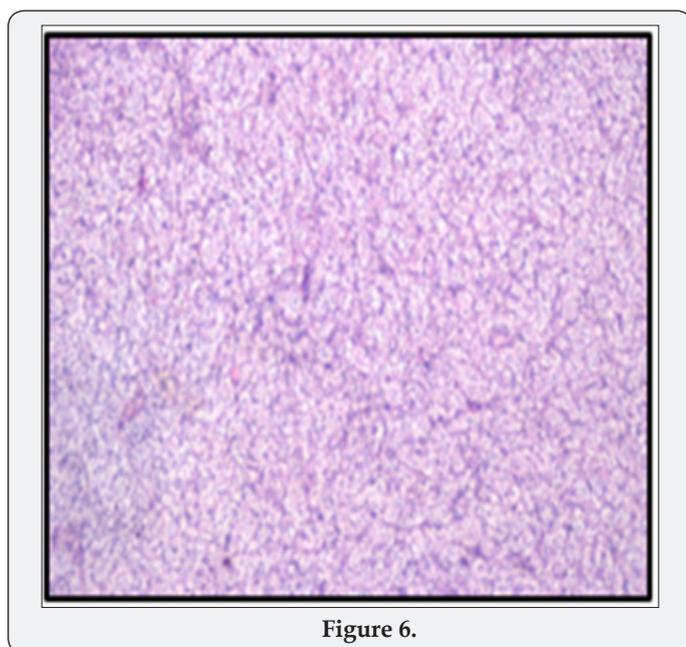


Figure 6.

## Conclusion

Nephrectomy is an accepted surgical procedure for non-functioning kidneys due to various pathological disease processes. Most common affected age group was 4<sup>th</sup> to 5<sup>th</sup> decade. Non-neoplastic lesions were most common cause for nephrectomies. Chronic pyelonephritis with hydronephrotic changes being the most common cause. Severe traumatic injury and emphysematous pyelonephritis are relatively rarer causes. Clear cell renal cell carcinoma being the common among malignant tumors. Other benign and malignant lesions being rare.

## References

1. Reddy KD, Gollapalli SL, Chougani S, Shivalalitha Sidagam, Amanulla Khan Mohammed, et al. (2016) A clinic-morphological spectrum of nephrectomy specimens-an experience from a tertiary care hospital. *Int J Health Sci Res* 6(11): 67-72.
2. Ajay Kumar (2017) A histopathological study of non neoplastic lesions in nephrectomy specimens. *Int J Med H Res* 3(2): 137-138.
3. Swarnlatha Ajmera, Rohit Ajmera (2017) Histopathological spectrum of lesions in nephrectomies- A five year study. *Int J Sci Res* 6(7): 44-46.
4. Shanmugasamy K, Anandrajvaithy, Venkatraman K, Dhananjay S, Kotasthane (2017) Histopathological spectrum of nephrectomy specimen in a tertiary care centre: with an emphasis on chronic pyelonephritis. *Ann Path Lab Med* 4(5): 573-578.
5. Aiman A, Singh K, Yasir M (2013) Histopathological spectrum of lesions in nephrectomy specimens. A five year experience in a tertiary care hospital. *J Sci Soc* 40(3): 148-154.
6. Ashima N Amin, Pushpalatha Pai, Krishnaraj Upadyaya (2015) A Histopathological spectrum of nephrectomy specimens in a tertiary hospital in southern India. *Int J Biol Med Research*. 6(3): 5173-5178.
7. Bharti Devi Thaker, Kailash Singh (2017) A histopathological review of Nephrectomy specimens Received in a Tertiary care hospital-A retrospective study. *J Med Sci Cl Res* 5(6): 23807-23810.
8. Rafiq M (2007) Nephrectomy: Indications, complications and mortality in 154 consecutive patients. *J Pak Med Assoc* 57(6): 308-311.
9. Mannan R, Kaur H, Singh PA, Misra V, Mehrotra R, et al. (2015) Histopathological spectrum of renal lesions: A 3 year prospective study of a tertiary care teaching centre. *Int J Den Med Res* 1(6): 11-13.
10. Truong LD, Shen SS, Park MH, Krishnan B (2009) Diagnosing nonneoplastic lesions in nephrectomy specimens. *Arch Pathol Lab Med* 133(2): 189-200.

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