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SPECTRUM OF LESIONS AND INCIDENTAL FINDINGS IN NEPHRECTOMY SPECIMENS IN A TERTIARY CARE HOSPITAL

Histopathology

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ABSTRACT

Nephrectomy is a common surgical procedure done for various neoplastic and non-neoplastic conditions in Urology. It is done in patients with End stage renal disease (ESRD), irreversible kidney disorders and various renal neoplasms. It can be a partial, simple or radical nephrectomy depending upon the underlying cause. Partial nephrectomy involves removing only part of kidney and leaving rest in body. This is a 3 year (2022-2024) both retrospective and prospective observational study. 44 nephrectomy specimens were received during this time period. Males were affected more as compared to females (M:F 1.2:1) and most common age group affected was 41-50 years (27.2%). Non-neoplastic lesions (84%) were more than neoplastic (15.9%). Chronic Pyelonephritis (CPN) was most common overall (65.9%) and non-neoplastic lesion of kidney. Renal cell carcinoma (RCC) was the m.c neoplastic lesion (09.09%). Clear cell RCC was most common type of RCC. Neoplastic lesions were seen in males only. Xanthogranulomatous pyelonephritis showed a female preponderance. This study provides a wide spectrum of various renal lesions, some of which are rare as well. Histological examination for all nephrectomy specimens is important as it leads to confirmatory diagnosis of neoplastic and non-neoplastic lesions of kidney, which sometimes can be confused clinically and radiologically. This further aids in post-surgical treatment plan of the patients.

KEYWORDS

Nephrectomy, Chronic pyelonephritis, Renal cell carcinoma.

INTRODUCTION

Nephrectomy is a common surgical procedure done for various neoplastic and non-neoplastic conditions in Urology. It is done in patients with End stage renal disease (ESRD), irreversible kidney disorders and various renal neoplasms.

It can be a partial, simple or radical nephrectomy depending upon the underlying cause. Partial nephrectomy involves removing only part of kidney and leaving rest in body. Simple nephrectomy is removal of entire kidney with part of ureter. Radical nephrectomy is removal of entire kidney including fascia, adrenal gland and adjacent fatty tissue. [1]

Common indication for nephrectomy in non-neoplastic conditions would be non-functional kidney due to obstructive nephropathy, hydronephrosis, polycystic kidneys and chronic pyelonephritis. [2] Radical nephrectomy is preferred in case of malignant renal neoplasms. [3] Partial nephrectomy is favoured in bilateral renal malignancy or renal malignancy involving solitary functional kidney. [4]

Renal cell carcinoma (RCC) accounts for 3% of all adult cancers and 85% of all kidney tumours. [4] Out of the subtypes of RCC, clear cell RCC is the most common (m.c.), accounting for 70%. [5] Renal tumors comprise a wide range of benign and malignant neoplasms with distinct features specific for children and adults. Primary Renal Lymphoma (PRL) and Primary neoplasms of renal pelvis are other rare tumors of kidney, accounting for <1% and 7% of all renal tumors, respectively. Urothelial carcinoma (UC) is less common along the upper urinary tract (renal pelvis and ureter) with an incidence of 5-10%. [6]

A meticulous histopathological evaluation of every nephrectomy specimen is required to look for occult tumour masses and in case of known malignancy it is required for staging and subtyping. This helps in establishing further treatment protocol for patients.

This study was taken up to study the histopathological spectrum of various kidney lesions leading to nephrectomy.

MATERIALS AND METHODS

Study Design- This is a retrospective and prospective observational study done over a period of 3 years (1st January 2022 to 31st December, 2024).

Study Place- Department of Pathology, Medical College in Western Uttar Pradesh

Ethical Clearence- Study was done after ethical clearance from the ethical society of the college.

Sampling Method And Sample Collection- All the nephrectomy specimens received during this study period were taken up for study.

Inclusion Criteria- All the patients undergoing nephrectomy irrespective of gender and age.

Exclusion Criteria-

a) Needle biopsies not to be included.
b) Patients not willing to be part of study.

Methodology-

1. A record of detailed patient history, indication and type of surgery was maintained.
2. For retrospective cases, records were maintained from the patient data and H&E slides already available in our department.
3. Detailed gross study and grossing was done for all the nephrectomy specimens received in 10% neutral buffered formalin.
4. H&E staining was performed in all the specimens for routine microscopy. Special stains like PAS, ZN were performed as and when required.
5. At the end of three years, a 2.5 months period was taken for the data compilation and analysis.

RESULTS

All the nephrectomy specimens were total nephrectomy. Out of 44 nephrectomy specimens, non-neoplastic lesions (84%) were more common than neoplastic lesions (15.9%). In neoplastic lesions, all cases were malignant and no benign case was there in our study. [Table 1]

Table 1- Distribution Of Neoplastic And Non-neoplastic Lesions In Nephrectomy Specimens

Non- neoplastic	37	84.09%
Neoplastic	07	15.9%

Chronic pyelonephritis was most common non-neoplastic lesion (65.9%) and clear cell RCC was m.c neoplastic entity (09.09%). [Table 2]

Table 2- Spectrum Of Lesions In Nephrectomy Specimens

	No of cases	%age
Non-neoplastic		
Chronic Pyelonephritis	29	65.9%
Xanthogranulomatous Pyelonephritis	03	06.8%
Renal Tuberculosis	01	02.27%
Traumatic Kidney	02	04.5%
Pyonephrosis	02	04.5%
Neoplastic		
Renal Cell Carcinoma	04	09.09%
Papillary Urothelial Carcinoma	01	02.27%
Lymphoma Kidney	01	02.27%
Multilocular cystic Renal neoplasm of low malignant potential	01	02.27%

The m.c affected age group by kidney lesions was 41-50 years and males were affected more as compared to females (M:F- 1.2:1). Even in the age group of 41-50 years, males were still more in number. The youngest patient was 10 years old and the eldest was 72 years old. Neoplastic lesions were more common between age group of 41-50 years followed by 51-60 years. While non-neoplastic lesions were commonly seen in age group of 31-40 years followed by 41-50 years. [Table 3,4,5,6]

Table 3- Age Distribution Of Nephrectomy Specimens

Age group	Number of cases	%age
0-10	01	2.27%
11-20	02	4.5%
21-30	07	15.9%
31-40	10	22.7%
41-50	12	27.2%
51-60	08	18.18%
61-70	03	6.8%
>70	01	2.27%

Table 4- Gender Distribution In Different Age Groups

Age group	Males	Females
0-10	01	00
11-20	01	01
21-30	04	03
31-40	06	04
41-50	07	05
51-60	03	05
61-70	02	01
>70	00	01

Table 5- Sex Distribution Of Nephrectomy Specimens

	No. of cases	%age
Male	24	54.5%
Female	20	45.45%

Table 6- Age Wise Distribution Of Neoplastic And Non-neoplastic Lesions

Age	Non-neoplastic	Neoplastic
0-10	01	
10-20	02	
21-30	07	
31-40	10	
41-50	08	04
51-60	06	02
61-70	02	01
>70 years	01	

Non-neoplastic lesions were overall common in both males and females. However, neoplastic lesions were more common in males while none of the females showed any neoplastic lesion. [Table 7]

Table 7- Gender Wise Distribution Of Neoplastic And Non-neoplastic Lesions

	Non-neoplastic	Neoplastic
Male	17	07
Female	20	0

Amongst females CPN was the m.c lesion leading to nephrectomy. And all the 3 cases of xanthogranulomatous pyelonephritis were seen in females only. Amongst males, CPN was the m.c non-neoplastic and clear cell RCC was the most common malignant cause of nephrectomy. [Table 8]

Table 8- Gender Wise Distribution Of Various Renal Lesions

	Males	Females
Chronic Pyelonephritis	13	16
Xanthogranulomatous Pyelonephritis	00	03
Renal Tuberculosis	01	00
Pyonephrosis	01	01
Traumatic Kidney	02	00
Renal Cell Carcinoma	04	00
Papillary Urothelial Carcinoma	01	00
Lymphoma Kidney	01	00
Multilocular cystic Renal neoplasm of low malignant potential	01	00

DISCUSSION

In present study, out of 44 nephrectomy specimens 37(84%) were non-neoplastic and 07(15.9%) were neoplastic. Similar observations were made by Vinay et al [2], Chandanwale et al [8], Aiman et al [9], R et al [10] and Hansdah et al [11]. Neoplastic lesions were more common in study published by Narang et al [4].

CPN was m.c entity leading to nephrectomy followed by RCC. CPN was also m.c non-neoplastic lesion followed by xanthogranulomatous pyelonephritis, pyonephrosis, traumatic kidney and renal tuberculosis. Clear cell RCC was m.c malignant condition.

These observations were similar to Vinay et al [2], Chandanwale et al [8], Aiman et al [12] and Reddy et al [13]. All the cases of xanthogranulomatous pyelonephritis were females showing a female preponderance [2,12,13]. However, the age group for xanthogranulomatous pyelonephritis ranged from 21-50 yrs. This is similar to findings by Aiman et al [9] and Popat et al [14]. In current study, there was a single case of renal tuberculosis and two cases of traumatic kidney lesions. Traumatic kidney was seen in young adults only. Hence, the need for early diagnosis and better treatment is advocated here as early intervention can easily save kidney in non-neoplastic conditions.

The most common age group affected by overall kidney lesions was 41-50 years. This is in concordance with studies published by Vinay et al [2], Chandanwale et al [8] and Hansdah et al [11]. In study by Aiman et al [9] m.c age group was 21-30 years while 51-60 years was common age group in study by Ajmera et al [12].

The youngest patient was 10 years with traumatic kidney lesion and eldest was 72 years female CPN. For non-neoplastic lesions slightly younger age group, 31-40 years, was seen to be affected more (22.7%). However, this finding was in contrast to studies by Chandanwale et al [8] and Aiman et al [9]. This could be due to poor access to better healthcare in our population under study, hence leading to nephrectomies in comparatively younger age group.

Males were slightly more commonly affected as compared to females for overall kidney lesions (1.2:1). Also, malignancy was also common in males (100%). In our study, all cases in females were non-neoplastic. This is similar to the findings published by Vinay et al [2], Narang et al [4], Ajmera et al [12] and Reddy et al [13].

RCC was m.c renal neoplasm and clear cell RCC was its m.c subtype. Malignant neoplasms were more common as compared to benign neoplasms; 100% malignant in present study.

The age ranged from 41-70 years. Males were affected more as compared to females. This was similar to findings by Thakur et al [1], Vinay et al [2], Chandanwale et al [8], Aiman et al [9] and Popat et al [14].

We had 1 case of lymphoma kidney which was PRL and reported as diffuse large B-cell lymphoma. It was seen in a 53 years old male patient who presented with flank pain. It was CD 19 and CD 20 positive with high ki 67index. Primary renal lymphomas are rare tumors forming <1% of all renal masses. [15]

Similar, findings were noted by Nasrollahi et al. [16] CNS involvement is commonly seen in PRL. Hence, diagnosing it very important for further follow-up of the patients.[15] [figure 1,2]

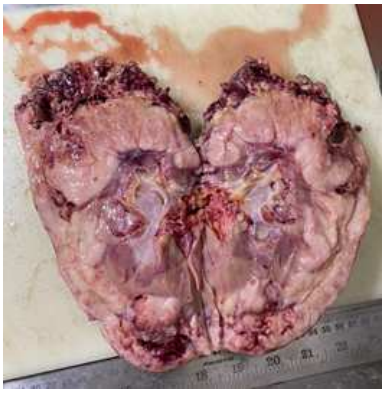

Figure 1- Gross of lymphoma kidney showing diffusely involved renal parenchyma.

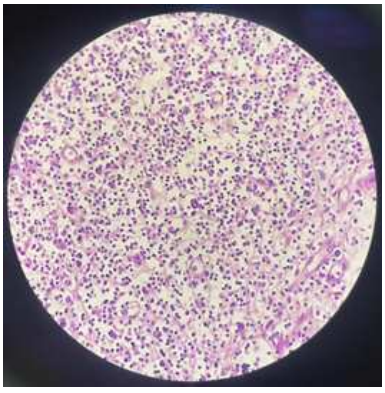

Figure 2- Singly scattered large atypical lymphoid cells. (H&E,10x)

1 case of Papillary urothelial neoplasm of renal pelvis was seen. Gross showed papillary projections diffusely involving the renal pelvis and ureter. Microscopy showed malignant tumor arranged in papillary pattern with transitional cell type morphology. Incidence of UC generally peaks in ages of 70-90 years. [6] But in our study, the patient was of lower age group 47 years.

Another rare tumor, multilocular cystic renal neoplasm was also seen in single patient. It comprises of multiple cystic spaces separated by thin fibrous septae. The tumor cells were monomorphic with clear cytoplasm. Similar case was also reported by Narang et al. [4] [figure 3,4]

Figure 3- Gross specimen showing a multicystic tumor at upper pole of kidney.

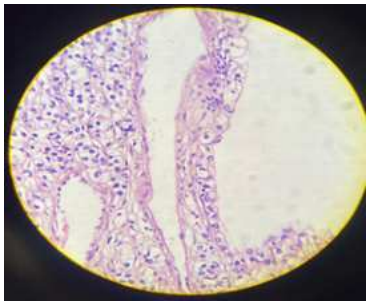

Figure 4- Cystic space lined by cells with clear cytoplasm and bland nuclei. (H&E, 40x)

CONCLUSION

This study provides a wide spectrum of various renal lesions, some of which are rare as well. Histological examination for all nephrectomy specimens is important as it leads to confirmatory diagnosis of neoplastic and non-neoplastic lesions of kidney, which sometimes can be confusing clinically and radiologically. This further aids in deciding the extent of surgery and post-surgical treatment plan of the patients.

Conflict Of Interest

No conflict of interest to declare.

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