Histopathological Spectrum Of Lesions In Nephrectomy Specimens In Tertiary Care Hospital.

*Dr. Sanjay D. Deshmukh, **Dr. Sadhana H.Khaparde, *Dr. B. B. Shinde, ***Dr. Rakesh Khandelwal, ****Dr. Priya Kendre, ****Dr. Priyanka Ingole.

*Professor, **Professor & Head, ***Associate Professor, ****Resident, Department of Pathology, Dr. Vithalrao Vikhe Patil Foundation's Medical College, Ahmednagar

Corresponding Author : Dr. Sadhana H.Khaparde

Mail ID : sadhanahk33@gmail.com

Mobile No.: 9881573633

Address : Department of Pathology, Dr. Vithalrao Vikhe Patil Foundation's Medical College, Ahmednagar

Abstract :

Introduction : The nephrectomy is indicated in unilateral end stage renal diseases due to : chronic infections, obstructive uropathy ,calculus associated with hydro and pyonephrosis. Nephrectomy is also indicated in unilateral renal neoplasms, renal cell carcinoma being the most common tumor. **Aims and Objectives :** The study was undertaken to analyze the spectrum of histopathological lesions in nephrectomy specimens in the surgical pathology section. To attempt clinico- pathological correlation and compare results of our institute with other centers. **Material and Methods** : Over the period of 4 years i.e. June 2014 to June 2018, a total of 32 nephrectomy specimens were received. The histopathological findings were reviewed and relevant data was analyzed. **Results :** Out of the total of 32 nephrectomy specimens, the number of non-neoplastic conditions (17) was slightly higher than neoplastic cases. Chronic pyelonephritis was the most frequent benign lesion. Amongst the neoplastic lesions, renal cell carcinoma accounted for 10 (31.25%) cases with varied histomophological sub-types.

Conclusions : The present series gives an insight into spectrum of histopathological lesions in nephrectomy specimens at tertiary care hospital. It highlights the clinical significance of clinicoradiological and histopathological correlation. **Key Words :** Nephrectomy, Renal cell carcinoma (RCC), Angiomyolipoma (AML),Wilms' tumor (WT), Chronic Pyelonephritis, Xanthogranulomatous pyelonephritis.

Introduction : The kidney can be affected in many pathological conditions, some of them requiring nephrectomy. Nephrectomy is indicated in severe unilateral parenchymal damage which may result from pyelonephritis, nephrosclerosis, calculus, vesicoureteric reflux and congenital dysplasia. Radical nephrectomy is the treatment of choice in renal cell carcinomas. [1]

Chronic pyelonephritis with advanced hydronephrosis is the most frequently encountered non-neoplastic condition, which is attributed to increased incidence of pelvi-ureteric junction obstruction and upper ureteric calculi.[2]

Both benign and malignant tumors are observed in the kidney. The most commonly reported malignant tumor is renal cell carcinoma (RCC) , followed by Wilms' tumor (WT) . RCC accounts for 85% of renal cancers in adults, usually in the sixth and seventh decades of life, with a male preponderance in the ratio of 2 to 3:1.[3]

In the group of neoplastic lesions, RCC was the commonest type in most of the series throughout the world.[4,5] RCC is a heterogeneous group of tumors with different histomorphological and genetic features. Diagnosis of various subtypes of RCC is important, as it impacts the prognosis. Therefore, World Health Organization (WHO) classification of renal tumors is followed for the histopathological diagnostic categorization of the tumors.[6]

The present study was undertaken to review all nephrectomy specimens received in the department of pathology and to evaluate the spectrum of histomorphological lesions and compare our findings with those reported in the literature.

Material and Methods : The present retrospective study was conducted in the Department of Pathology of Dr. Vithalrao Vikhe Patil Foundation's Medical College and Hospital .The radical nephrectomy cases over the period of

4 years i.e. June 2014 to June 2018 were included .The data was obtained from the medical records department and the files in surgical pathology section of the pathology department. As per the institutional protocol, nephrectomy was done in cases with clinico-radiological diagnosis of malignant tumor and nonfunctioning kidney as evidenced by intravenous urogram (IVC), renal scan and other laboratory data.

Nephrectomy specimens received were examined for gross findings and sections from representative lesional tissue were taken. Slides were stained by hematoxylin and eosin (H & E) and available special stains .Histology slides were reviewed by two histopathologists and the final diagnosis arrived. We followed World Health Organization (WHO) classification of renal tumors for the histopathological diagnosis.[6] Fuhrman's nuclear grading system was followed for renal cell carcinoma (RCC).[7]

Results : In this series a total of 32 nephrectomy specimens were encountered over the period of 4 years, in histopathology section of the department of pathology.

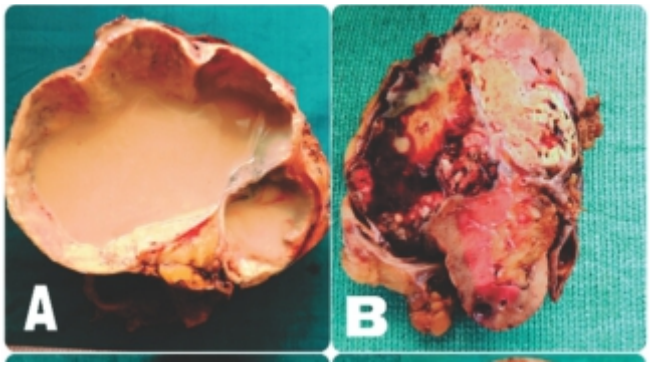
The age range of the cases was from 2 years to 75 years . The maximum percentage of patients were observed in 4th to 7th decade [Table 1]. From these 32 nephrectomy cases, 17(53.13%) were non-neoplastic, while 15(46.87%) were neoplastic lesions as shown in [Table 2]. The distribution of lesions according to various histopathological diagnosis is depicted in table [Table 3].

Among the non-neoplastic conditions, chronic pyelonephritis was observed in 11(34.37 %) cases, leading to nonfunctioning kidney. Out of these 7 cases, on imaging studies revealed calculous obstructive uropathy and in 4 cases pelviureteric junction block was implicated as the etiology. In two cases, there was history of flank pain, burning micturition and pyuria. In both the cases, gross examination revealed severe hydronephrotic kidney filled with pus i.e. pyonephrosis [Fig :1A]. There were two cases with gross and microscopic evidence of xanthograulomatous pyelonephritis. A solitary case of extensive unilateral damage due to caseating tuberculosis was observed in this study. This series also includes a case of unilateral nonfunctioning aplastic kidney due to renal artery stenosis in a 2 year old female child.

In the group of neoplastic lesions, malignant tumors were more common (14 cases) compared to benign tumors. Renal cell carcinoma (RCC) was the most common malignant tumor. In RCC, 8 were conventional clear cell type while 2 showed histopathological features of chromophobe type,and one case each of papillary and sarcomatoid RCC. On gross examination, clear cell RCC cases showed variegated appearance with yellow colored areas with foci of hemorrhages and necrosis [Fig:1B]. Microscopically all tumors predominantly showed cords and nests of clear cells with rich capillary network [Fig:2A]. Grossly, chromophobe RCC showed a well-circumscribed solitary mass with greyish yellow cut surface [Fig:1C]. Microscopically Chromophobe RCC showed tumor cells having distinct cell borders, and central round to oval nuclei with perinuclear halo [Fig :2 B]. A case of Papillary RCC revealed papillae lined by a single layer of tumor cells with scant pale cytoplasm and small hyperchromatic nuclei without prominent nucleoli [Fig: 2C].

Two cases of Nephroblastomas (Wilms' Tumor) presented with solitary, large, and sharply demarcated tumor mass. The cut surface was soft, fleshy, lobulated, yellow-tan, with focal areas of hemorrhages or necrosis.[Fig :1D] Microscopically both showed classic triphasic morphology with blastemal, epithelial tubule formation and mesenchymal components [Fig:2D]. Two cases of transitional carcinoma were encountered during the period of study.

Amongst the benign tumors we had one case of angiomyolipoma (AML). This case of AML presented with acute abdominal pain going into shock. Radiological examination revealed mass in the left kidney. Total nephrectomy specimen showed giant AML with intratumoral hemorrhages.



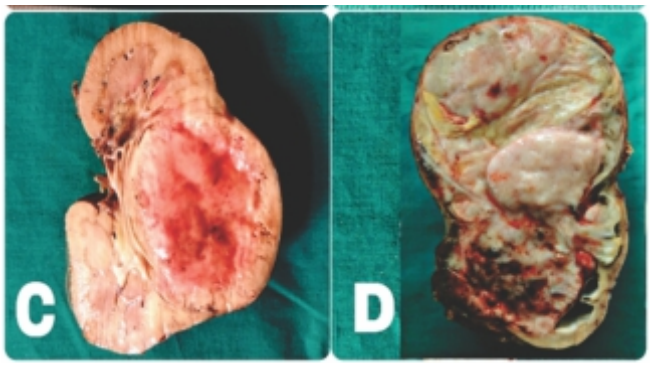


Fig : 1 Gross Photograph A=Pyonephrosis markedly dilated pelvicalyceal system and thin renal cortex filled with thick, creamy yellowish pus.

B = Renal cell carcinoma variegated appearance, yellow areas with foci hemorrhages and necrosis.

C = Chromophobe RCC,well-circumscribed solitary mass with greyish yellow cut surface.

D=Wilms' tumor, fleshy, lobulated, yellow-tan ,with focal areas of hemorrhage or necrosis.

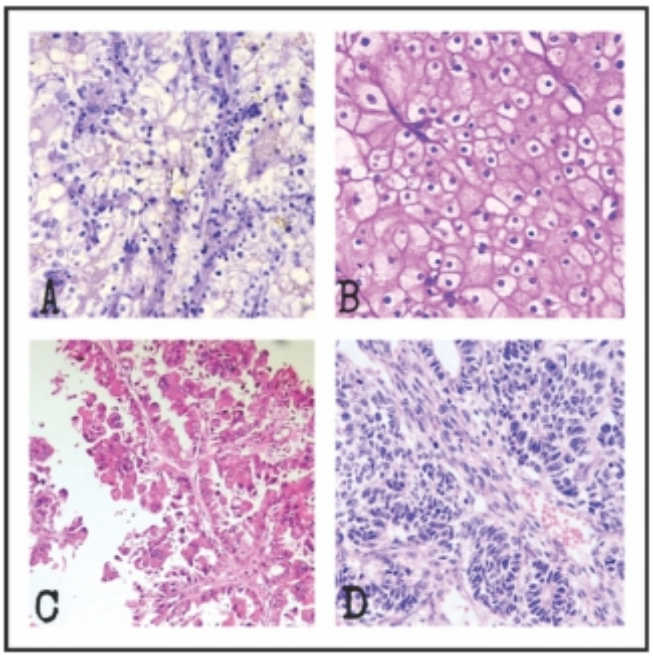


Fig 2 Photomicrograph : A) Clear cell RCC H&E X100. B) Chromophobe RCC H&E X 100. C) Photomicrograph Papillary RCC H&E X 100. D) Wilm's tumor H&E X40.

Table -1 : Age wise distribution of the kidney lesions in nephrectomy specimen on the basis of Histopathological types - (n=32)

Age group	No. of cases	Percentage (%)
0-10 Years	2	6.25%
11-20 Years	1	3.12%
21-30 Years	1	3.12%
31-40 Years	-	-
41-50 Years	8	25%
51-60 Years	4	12.5%
61-70 Years	11	34.37%
>70 Years	5	15.62%
Total	32	100%

Table-2 : Distribution of lesions in nephrectomy specimen (n=32)

Lesions	No. of cases	Percentage (%)
Non-neoplastic lesions	17	53%
Neoplastic lesions	15	47%
Total	**32**	**100%**

Table-3 : Distribution of various lesions according to Histopathological types.

Sr. No	Histopathological lesions	Number (n)	Percentage(%)
1	Chronic pyelonephritis	11	34.37%
2	Pyonephrosis	2	6.25%
3	Xanthogranulomatous pyelonephritis	2	6.25%
4	TB pyelonephritis	1	3.12%
5	Aplastic kidney due to renal artery stenosis	1	3.12%
6	Renal cell carcinoma (RCC)	10	31.25%
7	Transitional cell Carcinoma	2	6.25%
8	Wilms' tumour	2	6.25%
9	Angiomyolipoma	1	3.12%
	Total	**32**	**100%**

Discussion: : There is a geographic variation as regards the indications for nephrectomy which reflects the facilities of health care and socioeconomic status of the population. The age range of 2 to 75 years and peak incidence between 4 to 7 th decade of life observed in this series compares well with other reports. [2,8]

Relative preponderance of non-neoplastic lesions as compared to neoplastic condition as noted in our study is in accordance with previous series. [2,5,9]

In non-neoplastic nephrectomy cases, most common finding was end stage renal disease attributed to chronic obstructive uropathy due to stones or pelvi-ureteric junction block. Similar observations have been made in many series.[8,9] Occurrence of renal calculi in significant number of cases may be due to various factors like: diet, sedentary life and genetics. Features and proportion of other lesions like xanthogranulomatous pyelonephritis, tuberculosis compared well with findings of other workers. [5,8]

This study included both benign and malignant renal tumors. Amongst the malignant tumors, RCC was the most common as has been reported in various series throughout the world.[2,4,8,9] It is worth mentioning that we did not encounter any case of bilateral RCC which is documented in literature.[10] It must be noted that, RCC is a heterogeneous group of malignant tumor with various histopathological features. The Prognosis of the disease is impacted with different subtypes of the RCC and grading system.[7] In our study, conventional clear cell RCC was the commonest followed by chromophobe (CRCC) and papillary RCC. Chromophobe RCC is less aggressive and carries best prognosis in the group of RCCs. Microscopic finding of which showed tumor cells having distinct cell borders, and central round to oval nuclei with perinuclear halo as observed in our cases is well documented in other series.[4,11] Gross and microscopic features of papillary RCC and sarcomatoid RCC and two cases of transitional cell carcinoma compared well, as described by different authors and WHO criteria. [1,6,11]

We had a case of Wilms tumor (Nephroblstoma) in a two year old girl which on microscopic examination revealed classic triphasic pattern. [6]

In the group of benign tumors,we had one case of angiomyolipoma (AML). This case was presented with acute abdomen with radiological evidence of renal mass. Pathological examination showed gross and microscopic evidence of hemorrhages in the AML hence fitted in Wunderlich's syndrome. The case has been reported in the institutional journal. [12]

This study gives an insight into various indications for nephrectomies in tertiary care hospitals in semi urban population in Indian scenario.

References:

1. Novick AC, Streem SB, Surgery of the kidney,Walsh PC, RetikAB,StameyTA,Vaughan ED Campbell's Urology Vol-3 6th ed. WB Saunders;p2428-2435.
2 Aiman A, Singh K, Yasir M. Histopathological spectrum of lesions in nephrectomy specimens: A five-year experience in a tertiary care hospital. J SciSoc 2013;40:148-54.
3 Alpers CE , Chang A. :The Kidney. In Kumar V, Abbas A , Aster JC, editors. Robbins and Cotran Pathologic Basis of Disease 8th ed. Philadelphia : WB Saunders;2009 p905-70
4 Datta B, Giri A, Halder B. Histopathological evaluation of surgically treated adult renal tumors: Report from a tertiary care center in India. Indian J Cancer 2016; 53:124-6.
5 Datta B, Moitra T, Chaudhury DN, Halder B. Analysis of 88 nephrectomies in a rural tertiary care center of India. Saudi J Kidney Dis Transpl . 2012 ; Jul 13];23:409-13.
6. Eble J N, Sauter G, Epstein JI, Sesterhenn IA, editors. Pathology & Genetics of Tumors of the Urinary System and Male Genital Organs. Lyon: IARC Press; 2004.
7. Fuhrman SA, Lasky LC, Limas C. Prognostic significance of morphologic parameters in renal cell carcinoma. Am J Surg Pathol 1982; 6:655 63.
8. Mahesh kumar U, Yelikar BR, Girija Patil, Mahesh H Karigoudar, Pankaj pande ,Patil SB. Spectrum of Histopathological lesions in Nephrectomy specimens – A two year study in a tertiary care hospital ;International journal of research in pharmaceutical and biomedical sciences; 2012: vol 3(4) 1787-90.
9. Shaila, Nityananda BS, Arasi T. Spectrum of lesions in Nephrectomy specimens in tertiary care hospital. J of Evolution of Med and Dent Sci. 2015 ; 4(73) : 12714-25.
10. Anand M, Deshmukh S D, Gulati H K, Devasthali D A. Bilateral renal cell carcinoma presenting as fracture tibia. Indian J Cancer 2012;49:316-7.
11. Muglia VF, Prando A. Renal cell carcinoma: histological classification and correlation with imaging findings. Radiol Bras. 2015; 48 (3) : 166 – 174.
12. Rajor D, Dash N, Gadekar J, Mutha S,Akhtar M : Wuderlich's Syndrome – Spontaneous rupture of a giant renal angiomyolipoma. VIMS Health Science Journal 2016;3.