ORIGINAL ARTICLE

Histomorphological Spectrum of Renal Tumours In Nephrectomy Specimens

Aishvarya Jandial, Subhash Bhardwaj

Abstract

Introduction: The kidneys are affected by various tumors amongst which, majority of renal neoplasms are reported as malignant, with renal cell carcinoma and wilms tumor being the most commonly diagnosed entities. **Material and Methods:** The study comprises of 65 patients who were diagnosed as having renal tumors and were registered in the department of Pathology from 1st July 2018 to 30th September 2021. The demographic and clinicopathological data was collected and analysed carefully. **Results:** Of the 65 renal tumors studied, 6(9.23%) were reported as benign and 59 (90.77%) were reported as malignant tumors, with Renal Cell Carcinoma and Wilms tumor being the most common ones. In our study, clear cell variant of renal cell carcinoma was the most common variant reported in 39 cases (60%). Majority of cases were reported in 51-60 years age group (25 cases, 38.5%) with mean age for RCC being 53 years and for wilms tumor being 2 years. **Conclusion:** A wide array of renal tumors are encountered day to day on the histopathology of nephrectomy specimens, many of which may be misdiagnosed clinically, so it is very important that each and every nephrectomy specimen be subjected to a meticulous and detailed histopathological examination for a clinico-pathological correlation to ensure proper post operative management.

Key Words

Benign, Malignant, Renal Cell Carcinoma (RCC), Wilms Tumor, Tumor

Introduction

The disorders of renal system account for a high degree of morbidity and mortality owing to the complex structure of kidneys. Kidneys are vital organs responsible for various functions like excretion, maintenance of acid base balance and salt and water metabolism. Nephrectomy is being done for various benign and malignant lesions of the kidney. [1] The benign entities requiring nephrectomy include all the conditions in which the kidneys are irreversibly damaged like those resulting from chronic infections, obstruction, calculi or severe traumatic injury. For various malignant conditions like renal cell carcinoma, wilms tumour, nephrectomy many a times serves as a curable option. [2] The kidneys are affected by various tumors amongst which, majority of renal neoplasms are reported as malignant, with renal cell carcinoma and wilms tumor being the most commonly diagnosed entities . [3] The spectrum of renal tumours consists of a diverse variety of neoplastic lesions which have patterns that are quite distinct for children and adults. A wide array of both benign and malignant neoplasms arise from different components of the renal parenchyma, like from the tubular epithelium.1-4 Accurate diagnosis of most renal tumours is not possible without proper histopathologic evaluation.

Post Graduate Department of Pathology, Government Medical College, Jammu.
Correspondence to: Dr. Aishvarya Jandial, House No. 58, Sector 1A, Channi Himmat colony, Jammu, Jammu & Kashmir, India.

Manuscript Received: 09.09.2021; **Revision Accepted**: 06.12.2021;
Published Online First: 10 Jan, 2023
Open Access at: https://journal.jkscience.org

Cite this article as: Jandial A, Bhardwaj S. Histomorphological Spectrum of Renal Tumours In Nephrectomy Specimens JK Science 2023;25(1):35-38

The treatment of various renal tumours require either radical or partial nephrectomy. [4] A detailed and meticulous histopathologic examination of nephrectomy specimens is really important to accurately diagnose the histologic type of tumour and to carefully look for histopathological prognostic determinants i.e. tumour size, histologic subtype, nuclear grade, and stage in cases of malignant renal neoplasms. [5]

Material and Methods

The present study was carried out in the Department of Pathology, Government Medical College, Jammu over a period of three years 1st July 2018 to 30th September 2021. Retrospective analysis of all the 65 nephrectomy specimens received in the department was done. All the relevant data including the demographic profile of the patients, gross features of the specimen, clinical presentation of the pateint, radiological investigations and histomorphological findings were analysed carefully, followed by the review of Hematoxylin & Eosin stained slides.

Inclusion criteria- All the surgically excised renal specimens diagnosed as renal tumours.

Exclusion Criteria- All the renal lesions other than renal tumours.

Results

*Demographic profile:*The present study includes 65 cases of renal tumors reported in the department of Pathology at Government Medical College, Jammu. Of the total 65 renal tumors studied, 59 (90.77%) were reported as malignant and 6 (9.23%) were reported as benign tumors. Majority of cases were reported within 51-60 years age group (25 cases, 38.5%) followed by 61-70 age group (12 cases, 18.5%). Mean age for renal cell carcinoma in our study was 53 years while that for Wilms tumor was 2 years. *Table 1* shows the age wise distribution of renal tumors in our study. A higher numbers of renal tumors were seen in males (69.2%) as compared to females with male to female ratio of 2.25:1.

Clinicopathological profile

The most common clinical presentation in our patients was flank pain in 30 cases, followed by haematuria, fever, lump abdomen, burning micturition and vomiting. Renal tumors were seen to be more common on the left side with upper pole of kidney most commonly involved in majority of cases. Grossly, 58 cases (89.2%) of renal tumors showed variegated appearance (*Fig1*). *Table 3* depicts histopathological spectrum of renal tumors observed in our study. Wilms tumor was reported as the most common childhood tumor and renal cell carcinoma as the most common tumor in adults. The RCC- clear cell variant (39 cases, 60%) was the most common subtype of RCC observed, which was followed by papillary variant (7 cases, 10.8 %) and chromophobe variant (2 cases, 3.1 %). The majority of renal cell carcinomas i.e. 53.8% showed Grade 2 nuclear features as per Fuhrmans nuclear grading. Renal vein invasion was seen in 9.2% of cases. Majority of the renal tumors were in range of 4-7 cm in size.

Discussion

Histopathology is considered as a significant and essential tool to evaluate the spectrum of renal tumors. Renal tumors comprise of heterogeneous group of neoplasms which can be distinguished on the basis of histology. [6] Classification of renal cell carcinoma is important as far as the treatment and prognosis part is concerned and also for the better understanding of histogenesis. The kidneys can be affected by variety of tumours, majority of which are malignant; of which Renal Cell Carcinoma and Wilms tumor are most common. [7] RCC is the most common primary malignancy of kidney (85%) all over the world and constitutes about 2-3% of all visceral malignancies in adults. [8] Our study highlights the histopathological spectrum of renal tumors and their respective age distribution. A meticulous and detailed histopathologic examination of the nephrectomy specimens is vital for the accurate diagnosis, classification, prognostication and post operative management. [9]

In our study, males were the predominantly affected population with a male: female ratio of 2.25:1. This finding was similar to the study conducted by Latif F *et al* [10]. Majority of patients presented with flank pain (30 cases, 46.1%) and hematuria (12 cases, 18.4%) which was similar to clinical presentation of patients in a study conducted by Jagtap SV *et al* [11]. The majority of patients who presented with tumors were in the age group of 51-60 years (25 cases, 38.5%) followed by 61-70 years (12 cases, 18.5%). This finding was similar to study carried out by Bashir N *et al* [12] who also concluded that renal tumors were most common in 51-60 years age group.

Histopathological disagnosis: Grossly in our study majority of the cases involved left kidney (55.3%) and right kidney was involved in 46.1%. This was similar to

Table I. Frequency of renal tumors with respect to age

Age (in years)	No. of cases	Percentage (%)
0-10	6	9.2
11-20	0	0
21-30	3	4.6
31-40	7	10.7
41-50	8	12.4
51-60	25	38.5
61-70	12	18.5
>70	4	6.1
total	65	100

Table 3. ClinicalPresentations of Renal Tumors

Clinical features	No. of patients (%)
Flank pain	30 (46.2%)
Hematuria	12(18.4%)
Fever	10(15.4%)
Lump abdomen	7 (10.7%)
Burning micturition	4(6.2%)
Vomiting	2 (3.1%)

Table 5. Fuhrman nuclear grading of RCC

Fuhrmans nuclear grade	No. of cases	percentage
Grade 1	10	15.4 %
Grade 2	35	53.8 %
Grade 3	14	21.6 %
Grade 4	6	9.2 %

observations made by Aiman A *et al* [13] and Bashir N et al in their respective who also concluded that majority of cases showed involvement of left kidney. In our study upper pole was involved by 36 cases (55.4%), 16 cases (24.6%) involved lower pole and 13 cases (20.0%) involved whole kidney. This was comparable to a study carried out by Popat V *et al* [14] who also observed that majority of cases of renal tumors involved the upper pole of kidney. In our study, in majority of cases the tumor size was in the range of 4-7cm, which was similar to observations made by Bashir N *et al* [12]who also observed that majority of tumors ranged between 4-7 cm. Majority of cases (58 cases, 89.2%) of renal tumors showed variegated appearance. On cut section, congenital mesoblastic nephroma, renal sarcoma were grey white, while oncocytoma was grey brown on cut section. The case of squamous cell carcinoma showed necrotic growth. Wilms tumor presented as large, solitary, spherical mass which was sharply demarcated from the renal parenchyma. These findings were similar to studies conducted by Mehra M *et al* [15]

Microscopically: In the present study out of 65 cases a total of 59 cases (90.77%) were reported as malignant

Table 2. Gender wise distribution of renal tumors

Gender	No. of cases	Percentage (%)
Male	45	69.2
Female	20	30.8
	65	100

Table4. Distribution of renal tumors according to histopathological diagnosis

Tumor	Cases (%)
BENIGN	6 (9.23%)
Wilm's tumor	9 (13.8%)
Angiomyolipoma	2 (13.8%)
Congenital mesoblastic nephroma	2 (3.1%)
Oncocytoma	2 (3.1%)
MALIGNANT	59 (90.77%)
RCC (clear cell variant)	39 (60%)
RCC (papillary variant)	7 (10.8%)
RCC (chromophobe variant)	2 (3.1%)
Wilms Tumor	9(13.8%)
Renal sarcoma	1 (1.5%)
Squamous cell Carcinoma	1 (1.5%)
total	65(100%)

while the benign tumors comprised of 6 cases (9.23%). The majority of malignant tumors comprised of renal cell carcinoma (48 cases, 73.8%). Histologically, RCC- clear cell variant was most common 39 cases (60.0%) (Figure 3) followed by Wilms tumor 9 cases (13.8%) followed by RCC- Papillary type 7 cases (10.8%) and angiomyolipoma, congenital mesoblastic nephroma, RCC-chromophobe type and oncocytoma accounting for 2 cases each (3.1%) followed by renal sarcoma and squamous cell carcinoma accounting for 1 case each (1.5%). This was comparable to observations made by Latif F *et al* [10] and Chandanwale SS [16] who also observed that renal cell carcinoma comprised of majority of malignant tumors of kidney constituting , 87.2% and 97% respectively. Also Popat VC *et al* [14] in their study similarly reported that renal cell carcinoma accounted for majority (70%) of malignant tumors. Microscopically, the clear cell variant of RCC was the predominant subtype observed, involving 39 cases followed by papillary variant 7cases and chromophobe type in 2 cases. The RCC- clear cell variant showed compact sheets and nests of cells with clear cytoplasm, along with network of arborizing small and thin walled vessels. RCC- papillary variant consisted of papillae or tubulopapillary architecture with fibrovascular cores with few foamy macrophages, psammoma bodies and hemosiderin present in many cases. RCC- chromophobe variant showed confluent solid growth present in the

form of nests, sheets and alveoli comprising of pale cells with irregular and angulated nuclei with coarse chromatin. These findings were similar to observations by Bashir N et al in their study.

Fuhrman nuclear grading revealed that 35 (53.8%) cases showed Grade 2 nuclear features and 14 (21.6%) cases depicted Grade 3 nuclear features. This is similar to the study conducted by Popat VC *et al* [14] who also observed that majority of cases of RCC showed Grades 2 and 3 nuclear features. Majority of RCC cases in our study showed grade II nuclear features which is an important prognostic indicator. Wilms tumor consisted of blastemal, epithelial and stromal components in variable proportion. Despite new technical advancements in the field of imaging, the confirmatory diagnosis of renal neoplasms is still based on histopathological examination which eventually will prove to be helpful in further patient management. [17]

Conclusion

The present study provides a fair insight into the various histopathological patterns of malignant tumors in nephrectomy specimens in our institution and its correlation with many other studies carried out across the world. A wide array of renal tumors are encountered day to day on the histopathology of nephrectomy specimens, many of which may be misdiagnosed clinically and radiologically; so it is very important that each and every nephrectomy specimen be subjected to a meticulous and detailed histopathological examination for a clinico-pathological correlation to ensure proper post operative management. Since our institution caters, in addition to Jammu province, to adjacent parts of Kashmir and various other neighbouring states, so these results can be safely considered as a reflection of the disease pattern in this particular region of the country.

Financial Support and Sponsorship

Nil.

Conflicts of Interest

There are no conflicts of interest.

References

1. Tai YS, Chiang IN, Huang CY, Tai HC, Pu YS. Effectiveness of different diagnostic tools for upper urinary tract urothelial carcinoma. Urol Sci 2015; 26(1): 57-60
2. Eggener SE, Rubenstein JR, Smith ND. Renal tumors in young adults. J Urol 2004;171:106 - 10
3. Padmanabhan A, Sachdeva P, Gadgil NM. Clinico-pathological study of adult renal tumours. Indian J Pathol Oncol 2016;3:202-11
4. Madhu Kumar R, Meghana P, Vasudev V, Bharathi M. Histopathological spectrum of renal tumors in nephrectomy specimens. Indian J Pathol Oncol 2019;6(1):52-56
5. Bansal M, Jindal A, Gupta S. Histopathological audit of nephrectomy specimens from a single center in North India. East J Med Sci 2020;5(3):57-60
6. Naiding M, Goswami A, Singh S. Histopathological Study of Spectrum of Renal Tumours In A Tertiary Care Centre - A Five Years Retrospective Study. J Sci 2017; 7(6): 240-44
7. Thaker BD, Singh K. A histopathological review of Nephrectomy specimens Received in a Tertiary care hospital-A retrospective study. J Med Sci Clin Res 2017;5(6):23807-810
8. Narang V, Garg B, Walia A, Sood N, Malhotra V. Histomorphological Spectrum of Nephrectomy Specimens-A Tertairy Care Centre Experience. Nat J Lab Med 2016;5(2):51-4
9. Ajmera S, Ajmera R. Histopathological spectrum of lesions in nephrectomies -a five-year study. Int J Health Sci Res 2017;6(7):44-6
10. Latif F, Mubarak M, Kazi JI. Histopathological characteristics of adult renal tumours: a preliminary report. J Pak Med Assoc 2011;61(3):224-28
11. Abraham G P, Cherian T, Mahadevan P, Avinash TS, George D, Manuel E. Detailed study of survival of patients with renal cell carcinoma in India. Indian J Cancer 2016; 53: 572-4
12. Bashir N, Bashir N, Shah P, Bhat N, Salim O, Nuzhat. Histopathological study of renal tumors in resected nephrectomy specimens - an experience from teritary care centre. Natl J Med Res 2015;5(1):26-9
13. Aiman A, Singh K, Yasir M. Histopathological spectrum of lesions in nephrectomy specimens: A five-year experience in a tertiary care hospital. J Sci Soc 2013;40:148-54
14. Popat VC, Kumar MP, Udani D etal:A Study On Culprit Factors Ultimately Demanding Nephrectomy. Internet J Urol 2010; 7(1):173-75
15. Mehra M, Gupta P, Sharma N L. Histopathological Patterns of Renal Tumors Seen in Nephrectomy Specimens: A Three-Year Experience at a Tertiary Care Hospital in Western Part of Rajasthan. Int J Med Res Prof 2016; 2(2): 221-24
16. Chandanwale SS, Naragude P, Singh M, Raj A, Bamanikar S, Buch AC, Shah K. Prevalence of pathological lesions in 161 nephrectomies: An experience from a teaching hospital in urban industrial area of Maharashtra. Indian J Med Spec 2020;11:21-27
17. Rafique M. Nephrectomy: Indications, complications and mortality in 154 consecutive patients. J Pak Med Assoc 2007; 5: 35-8