

HISTOPATHOLOGICAL SPECTRUM OF NEOPLASTIC LESIONS OF KIDNEY- A THREE YEARS STUDY

Dr Saket Sarswat¹, Dr. Vimlesh², Dr. D.P. Soni³

¹ Resident Doctor, Department of Pathology, Sardar Patel Medical College, Bikaner

² Medical Officer (Pathology), Government Hospital, Sridungargarh, Bikaner

³ Professor, Department of Pathology, Sardar Patel Medical College, Bikaner

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Corresponding author: Dr Saket Sarswat

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Abstract

Background: Kidney can be involved in various pathological process. Both benign & malignant tumors can occur in the kidney. They arise from different components of renal parenchyma, notably tubular epithelium.¹ 99 percent of renal neoplasms are malignant, with renal cell carcinoma and wilm's tumor being the most common². Men have higher incidence than women (approximately 1.6:1) and vast majority are diagnosed after 65 years of age.

Material and methods: Prospective and retrospective study from January 2017 to December 2019 in the Department of Pathology.

Results: The study comprised of 67 cases of neoplastic conditions, out of which 63 cases are malignant and only 4 cases were recorded as benign.

Conclusion: Malignant tumors far more common than benign lesions. In adults and older individuals, renal cell carcinoma was most common while among paediatric age group, wilms tumor was most common. Benign tumors were uncommon.

Keywords: Kidney, renal cell carcinoma, wilms tumor

Introduction:

Kidney is one of the most important organ of the body. Various congenital, inflammatory and neoplastic conditions can involve the kidney.

Neoplastic lesions are further categorised according to the origin. Mostly arise from tubular epithelium which includes papillary adenoma, oncocytoma and renal cell carcinoma. Other categories are metanephric tumors, nephroblastic tumors, mesenchymal tumors, mixed mesenchymal and stromal tumors, tumor arising from renal pelvis, hematolymphoid tumors and metastasis.

Incidence of benign tumors is very less as compare to malignant lesions. Epithelial tumors are the most common comprising about 58% of all renal tumors & 87% of all malignant renal neoplasms. Renal cell carcinoma forms main bulk of malignant tumors.

Wilms tumor, though ranked fifth in frequency among childhood solid tumors, is the most common childhood abdominal malignancy. It is seen primarily in infants, 50% of the cases before the age of 3 years and 90% before the age of 6 years. Bilateral involvement being 5-10% of cases.

Many times, the tumors are asymptomatic and may be found as an incidental finding on radiological studies. Common clinical presentations include pain, palpable mass and haematuria. Other constitutional symptoms are fever, weakness, weight loss & malaise.³

The best tools currently available for detecting early state renal malignancy are routine investigations such as IVP, USG, CT and MRI.⁴ The introduction of nephrectomy and other subsequent surgical interventions for renal diseases provided clinical information and histopathological insight that form the basis of current concepts of renal tumors.

Material and Methods:

Study place: Sardar Patel Medical College, Bikaner.

Study duration: January 2017 to December 2019

Study design: Both prospective and retrospective study

Inclusion criteria: All the nephrectomy specimens suspected to have neoplastic lesions.

Exclusion criteria:

Congenital diseases of kidney

Inflammatory lesions

Routine histological procedure was followed and slides were stained with H&E.

Observation and results:

Total of 67 cases were studied in the Department of Pathology, Sardar Patel Medical College, Bikaner from 1st January 2017 to 31st December 2019. Total 67 nephrectomy specimens were received and these were studied in relation to age distribution, histopathological features the results of the study were as follows:

Table 1: Frequency of neoplastic conditions of the kidney in the total nephrectomy specimens

Year	Total no. of nephrectomy specimens	Number of cases in present study	Frequency (%)
2017	40	20	29.8
2018	65	24	35.8
2019	55	23	34.3
Total	160	67	100

In the present study, total number of cases was 67 out of total 160 nephrectomy specimens. Maximum no. of cases (24, 35.8%) were received in 2018.

Table 2: Distribution of various neoplastic conditions of the kidney

S.N.	Name of disease	Number of cases	Frequency (%)
1	Oncocytoma	1	1.49
2	Angiomyolipoma	1	1.49
3	Mesoblastic nephroma	2	2.98
4	Clear cell carcinoma	37	55.22
5	Papillary renal cell carcinoma	10	14.92
6	Collecting duct carcinoma	2	2.98
7	Transitional cell carcinoma	9	13.43
8	Wilms tumor	4	5.97
9	Round cell tumor	1	1.49
10	Total	67	100

Most common neoplastic lesion was clear cell carcinoma comprising of 37 cases (55.22%) followed by Papillary cell RCC (10 cases, 14.92%). Malignant tumors were more common than benign tumors.

Table 3: Distribution of cases according to side/laterality

S.N.	Side/Laterality	Number	Frequency (%)
1	Left	30	44.78
2	Right	37	55.22
3	Total	67	100

Table no. 4 shows distribution of cases according to side or laterality. Left side kidney was involved in 30 (44.78%) cases while right side kidney was involved in 37 (55.22%) of cases.

Table 4: Distribution of neoplastic cases of kidney according to gross characteristics

S.N.	Gross features	Number of cases	Frequency (%)
1	Solid	22	32.8
2	Cystic	24	35.8
3	Variegated	21	31.3
4	Total	67	100

Given table shows gross characteristics of renal neoplastic conditions. In this study, 24 cases (35.8%) were cystic, 22 cases (32.8%) were solid and 21 cases (31.3%) were having variegated cut surface.

Table 5: Sex wise distribution of different neoplastic conditions of kidney in the present study

S.N.	Name of lesion	Male	Frequency (%)	Female	Frequency (%)
1	Oncocytoma	1	2.3	0	-
2	Angiomyolipoma	0	-	1	4.2
3	Mesoblastic nephroma	1	2.3	1	4.2
4	Clear cell RCC	24	55.8	13	54.2
5	Papillary RCC	8	18.6	2	8.3
6	Collecting duct RCC	0	-	2	8.3
7	Transitional cell carcinoma	6	13.9	3	12.5
8	Wilms tumor	2	4.6	2	8.3
9	Round cell tumor	1	2.3	0	-
10	Total	43	100	24	100

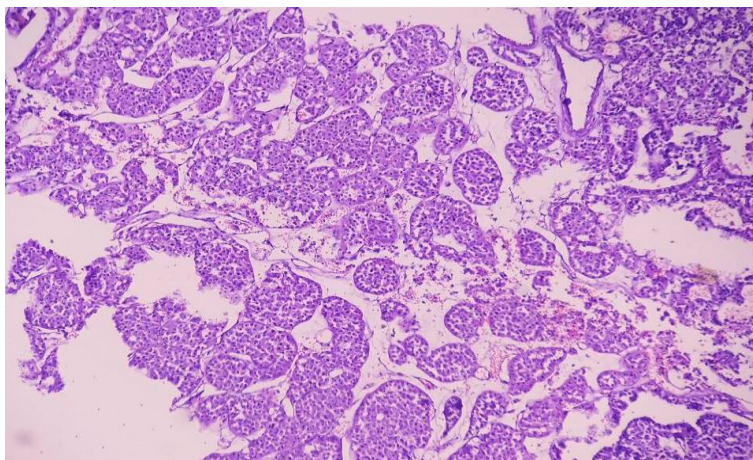
Given table shows that clear cell carcinoma was the most common lesion in both male and female. Overall, oncocytoma, clear cell RCC, papillary RCC, TCC and round cell tumor were more common in males while angiomyolipoma and collecting duct RCC were more common in females. Mesoblastic nephroma and wilms tumor equally affected both sexes.

Table 6: Age group wise distribution of different neoplastic conditions in the present study

Age group (years)→ Name of lesion(↓)	<10	11-20	21-30	31-40	41-50	51-60	61-70	>70
Oncocytoma	-	1	-	-	-	-	-	-
Angiomyolipoma	-	-	-	-	-	-	-	1
Mesoblastic nephroma	1	1	-	-	-	-	-	-
Clear cell RCC	-	-	2	2	7	15	7	4
Papillary RCC	-	1	-	-	2	2	3	2
Collecting duct RCC	-	-	-	-	1	1	-	-
Transitional cell carcinoma	-	-	-	-	-	1	5	3
Wilms tumor	3	-	1	-	-	-	-	-
Round cell tumor	-	-	-	-	-	-	1	-
Total	4	3	3	2	10	19	16	10
Frequency (%)	5.97	4.48	4.48	2.98	14.93	28.36	23.88	14.93

Maximum number of cases (19, 28.36%) were found in the age group of 51-60 years.

In the paediatric age group, wilms tumor comprised of most of the cases (3 cases out of 4) while on the other extreme of age, RCC comprised of maximum number of cases (6 cases out of 10).

**Image 1: Oncocytoma showing solid nests in loose connective tissue stroma (H&E, 4x)**

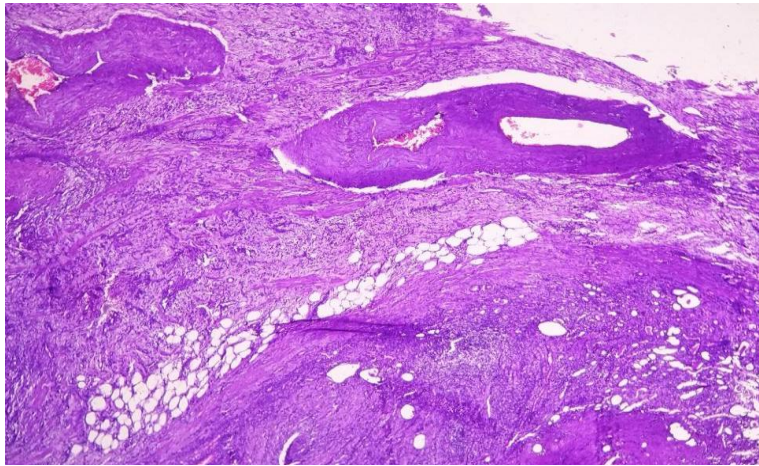


Image 2: Angiomyolipoma showing thick walled blood vessels, adipose tissue and smooth muscles (H&E, 4x)

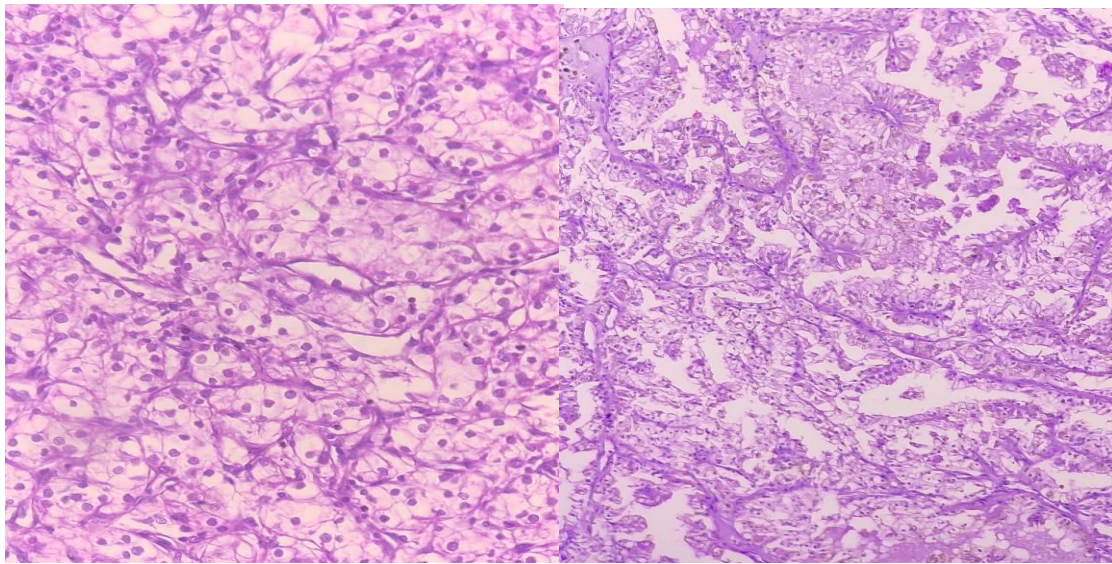


Image 3: Clear cell RCC showing cells with clear to pale eosinophilic granular cytoplasm & chicken wire vascular network (H&E, 4x). Papillary type RCC showing papillary architecture & foamy macrophages in the core of papillae (H&E, 10x)

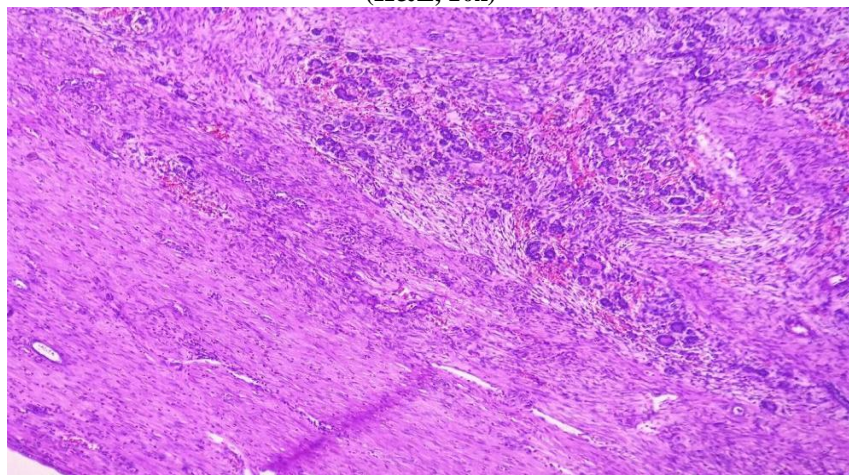


Image 4: Wilm's tumor showing primitive tubules and mesenchymal component (H&E, 4x)

Discussion

The present study was conducted in the Department of Pathology, Sardar Patel Medical College, Bikaner from January 2017 to December 2019. In the present study, 67 cases were included.

Table 7: Comparative incidence of different neoplastic conditions of kidney in various studies.

S.N.	Name of study	Neoplastic
1	Kaustubh singh et al ⁵	16.66%
2	Chaitra B et al ⁶	36.2%
3	Ngairangbam S et al ⁷	14.28%
4	Shaila et al ⁸	24.64%
5	Present study	41.88%

In this study, incidence of neoplastic conditions was 41.88%. These findings were concordant with Kaustubh Singh et al⁵ (16.66%), Chaitra et al⁶ (36.2%), Ngairangbam S et al⁷ (14.28%) and Shaila et al⁸ study (24.64%).

Table 8: Incidence of different benign and malignant conditions in various studies

S.N.	Name of study	Benign	Malignant
1	Victor et al ⁹	13.6%	86.39%
2	Latif et al ¹	6%	94%
3	Seo Young Park et al ¹⁰	7.1%	92.9%
4	Reddy et al ⁴	6.19%	93.8%
5	Gunes Mustafa et al ¹¹	15.7%	84.33%
6	Isah et al ¹²	13.9%	86.1%
7	Present study	5.97%	94.03%

Out of 67 cases, 5.97% cases were benign while 94.03% cases were malignant in nature.

In Latif et al³, Seo Young Park et al¹⁰ and Reddy et al⁴ study, frequency of benign cases was 6%, 7.1% and 6.19% respectively and frequency of malignant cases was 94%, 92.9% and 93.8% respectively. These findings were almost consistent with the present study.

In the studies of Victor et al⁹, Gunes Mustafa et al¹¹ and Isah et al¹², benign cases comprised of 13.6%, 15.7% and 13.9% respectively. In all these three studies, frequency of malignant cases was 86.39%, 84.33% and 86.1% respectively. Although these findings were also comparable with the present study.

Summary and conclusion

Among total 67 cases of neoplastic conditions, 4 cases (5.97%) of benign and 63 cases (94.03%) of malignant diseases were found. Clear cell carcinoma was most common malignant tumor. In paediatric age group, wilms tumor was most common.

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