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Histopathological Evaluation of Renal Tumours - A Two - Year Experience in a Tertiary Care Hospital

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Abstract: ***Objectives: Study the histopathological spectrum of renal tumours in resected nephrectomy specimens at a tertiary care hospital and to analyse the age as well as sex distribution. Materials and methods: total 54 resected nephrectomy specimens were analysed received in the department of pathology, B J Medical College, Ahmedabad over a two - year period i. e., from May 2019 to August 2021. The clinical details (including age, sex, clinical diagnosis along with radiological details) and gross morphology along with microscopic details were recorded. After gross examination, the tissue was subjected to routine paraffin embedding. A minimum of four sections were taken from the tumour. Sections were cut at 3 - 4 microns on microtome and stained with Haematoxylin and eosin stain (H&E) IHC was not done. The results were tabulated. Results: Out of the total 54 renal specimens, 61.11 % of cases were non - neoplastic and 38.88 % were neoplastic. Out of the neoplastic lesions, 4.76 % were benign and 95.23% were malignant. Most of the patients were in 3rd - 5th decade of life with male to female ratio of 1.62: 1. Histopathologically, RCC - clear cell type was the most common subtype in adults and Wilms tumour in children. Conclusion: RCC is the commonest malignant tumour and clear cell RCC is the most common subtype in adults. Wilms tumour was the most common childhood tumour.***

Keywords: Renal tumours, renal cell carcinoma, clear cell renal cell carcinoma, Wilms tumour, nephrectomy

1. Introduction

Primary renal tumours comprise of a wide spectrum of neoplastic lesions of the kidney with patterns which are relatively distinct among children and adults[1 - 4]. Primary renal tumours may be benign or malignant. A wide variety of both benign and malignant renal tumours may arise from different components of the renal parenchyma but mostly arises from tubular epithelium.99 per cent of renal neoplasms are malignant with renal cell carcinoma and Wilms' tumour being the most common[5]. Gold standard of most renal tumours has been nephrectomy i.e., Resection of the kidney which can be either radical or partial nephrectomy. For the proper diagnosis and management of the lesion, accurate histopathological examination of the removed surgical specimen is necessary[6 - 8] The objective of this study was to assess the patterns and the morphology of lesions in nephrectomy specimens in a tertiary care hospital.

2. Materials and Methods

The study was conducted in the department of pathology, B J Medical College, Ahmedabad, Gujarat from May 2019 to August 2021. For this study, all specimens of nephrectomy received in the histopathology section of the department of pathology were included. The specimens were fixed in 10% neutral buffered formalin. After fixation the specimen were measured, weighed and then cut in sagittal section. The capsule was stripped and pelvis, calyces and ureter were fully opened. Gross photographs of the specimen were taken to represent various tumour types. A detailed gross examination of the nephrectomy specimens was carried with respect to the following features: weight and dimensions of the specimen, capsule, external surface, cortex, medulla, pelvis, ureter, renal artery and vein. The presence, number, size and appearance of lymph nodes were noted. After gross examination, the tissue was subjected to routine paraffin embedding. A minimum of four sections were taken from the tumour. Sections were cut at 3 - 4 microns on microtome and stained with Haematoxylin and eosin stain (H&E). All the cases of renal tumours were included. The findings were analysed.

3. Results

An analysis of 54 cases of renal lesions over a period of 2 years is made. The following observations are made.21 cases (38.88%) of the nephrectomy specimens showed neoplasm. Of the 21 tumours studied 20 were malignant and only 1 tumour was found to be benign. Mean age for renal cell carcinoma in our study was 59 years. For wilms tumour it was 4 years. Male to female ratio was 0.92: 1. The most common clinical presentation of our patients was flank pain followed by haematuria, abdominal pain and recurrent UTI. Renal tumours were more common on left side of kidney with the upper pole involved in majority of cases. All cases of our present study are sporadic. No associated congenital anomalies are noted in the present study. Histological typing of tumours is depicted in Table 1. RCC - clear cell type is seen in majority of adults. Wilms' tumour is the most

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common encountered neoplasm in children. Lymphovascular and capsular invasion was seen in 42% cases. Perirenal fat invasion was found in 23.8% cases. Lymph node dissection was performed in only 5 cases. Lymph node histology did not reveal any evidence of metastasis.

4. Discussion

Renal tumours comprise a heterogenous group of neoplasms. Kidneys are affected by a variety of tumours.99 per cent of renal neoplasms are malignant; Renal cell carcinoma and Wilms' tumour being the most common[5]. RCC accounts for approximately 2 per cent of adult malignancies and 80 to 85 per cent of malignant kidney tumours[9]. Our current study is in concordance with the study done by RN das et al[10] in which there is male predominance was seen. In the study done by Guruprasad et al[11], female predominance was seen.

It would be expected that renal tumours arising in young adults likely are more symptomatic and potentially aggressive, therefore requiring aggressive radical treatment. On the other hand, because of the widespread use of imaging in elderly people, an increasing number of tumours are being discovered with potentially indolent behaviour.

Our study was prospective in nature and highlights the histopathological spectrum of renal tumours, their age distribution and the pathological prognostic grading for renal tumours in our setup. Histologically, clear cell renal cell carcinoma was most common. In wilms' tumour, the most common histologic pattern was triphasic with mixture of blastemal, epithelial and mesenchymal tissue.

Grossly in our study majority of the cases involved left kidney and the upper pole. This was similar to the observations made by TA Badmus et al (2008) [12]who found majority of cases involving left kidney.

Histologically, Wilms tumour (28.57%) was most common followed by renal cell carcinoma - clear cell type (23.8%), RCC - unclassified (14.28%), RCC - papillary type (9.52%), RCC - chromophobe type (4.76%). There was one case each of cystic RCC, angiomyolipoma, malignant rhabdoid tumour and a case of well differentiated squamous cell carcinoma. The observation made by Mohammad Rafique (2007) [13] was that majority of malignant neoplasms of the kidney (90%) were Renal cell carcinoma. Also V Popat et al (2010) [14] in their study found that (70%) malignant lesions were accounted for by renal cell carcinoma.

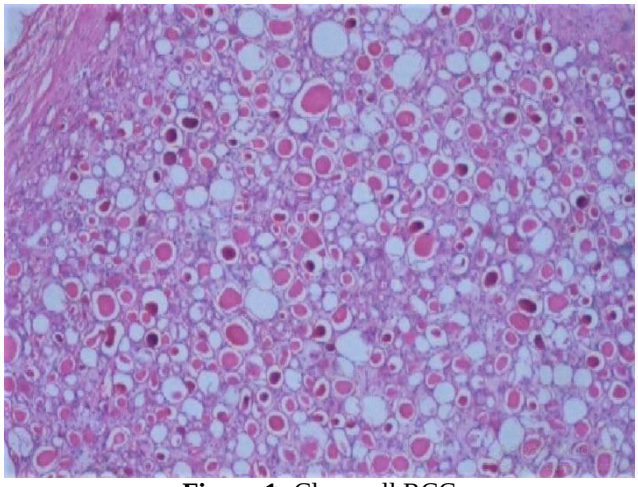

Figure 1: Clear cell RCC

In the 8th edition of AJCC, tumour limited to the kidney and measuring >7 cm is classified as pT2, but likelihood of extrarenal extension, especially renal sinus invasion, increases with tumour size, so that true pT2 RCC is very rare[15, 16]. Similarly we observed pT2 RCC much less often (2 cases) than pT1 and pT3 tumours. In our study, RCC clear cell type with rhabdoid differentiation was T2bNxMx and ISUP grade 3. Size of the tumour was 12.5x8x5.5 cm3. It had a variegated appearance with necrotic areas. LVI and CI was present but renal sinus and perirenal fat involvement was not found. Sarcomatoid features were not identified. Papillary RCC with oncocytic features had TNM stage T2aN1Mx AJCC stage group 3. The tumour measured 10x5.5x6.5 cm3 with variegated partly solid partly cystic appearance. Areas of haemorrhage and necrosis were also identified. LVI and CI was present along with perirenal fat involvement. Renal sinus involvement was not seen. A lymph node labelled as para - aortic lymph node was received separate from the nephrectomy specimen measuring 4.4x4.1x3.2 cm3. The section from lymph node showed complete effacement of lymph node architecture by tumour tissue with only one or two residual follicles.

Of the 6 cases of Wilms tumour in our study, majority cases (5) showed favourable histology and no anaplastic nuclear features.1 case of WT showed the presence of diffusely anaplastic features. This particular tumour was received in a ruptured state (intraoperative rupture) and on microscopy sections showed tumour infiltrating into renal parenchyma with many areas of haemorrhage and extensive coagulative necrosis with tumour cells arranged diffusely. Tumour also showed brisk mitotic activity. There was evidence of vascular invasion and infiltration into perirenal fatty tissue. In the study done by Ram Narayan Das et al showed 2.5% of cases with anaplasia[10].

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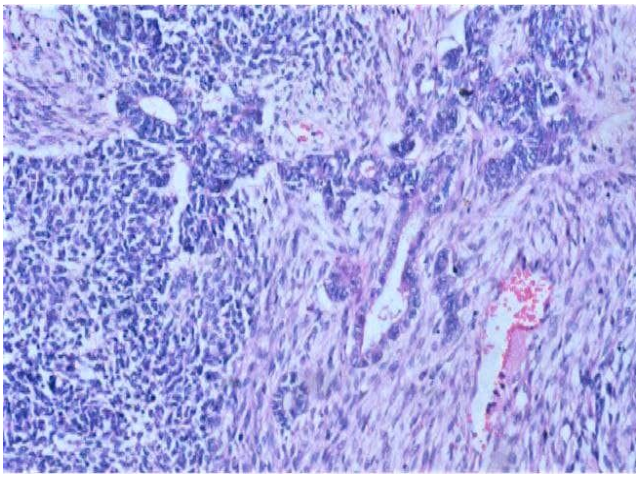


Figure 2: Wilms tumour

The incidence of renal squamous cell carcinomas among malignant renal tumours is in the range of 0.5 - 0.8%, as reported by Li et al[17]and Blacher et al[18] in the present study, one case of well differentiated squamous cell carcinoma was seen in a 35 - year - old man.

Cystic RCCs can represent up to 3–14% of all RCCs and comprise a wide category of renal cancers, including multilocular cystic RCCs, unilocular cystic RCCs, RCCs with extensive cystic necrosis, and unilocular cysts with mural tumour nodules[19]. Among these subtypes, multilocular cystic RCC has been shown to be a low - grade neoplasm with an excellent prognosis compared with other subtypes of RCC, both cystic and solid. The 2016 World Health Organization (WHO) classification of kidney tumours recognizes multilocular cystic RCCs as a variant of clear cell RCC. Because cystic RCCs occur infrequently, the natural history, clinical outcomes, optimal treatment strategy, and prognosis for this type of renal malignancy remain controversial.

Lymph node dissection was performed in 5 surgeries for renal tumours. Among them, none showed metastasis. This is in contrast to the study by Magdalena C. et al[20] where 20 surgeries had lymph node dissection with 10 cases showing lymph node metastasis. In current practice lymph node dissection is considered unnecessary in patients with clinically negative lymph nodes[15].

Bonsib et al[21] found that renal sinus invasion is a key invasive pathway, especially for Clear cell RCC. The reason is lack of a fibrous barrier to delineate the renal sinus from the parenchyma, whereas the perinephric fat tissue and renal parenchyma are separated by fibrous capsule. Therefore, theoretically, renal sinus invasion is more likely to occur than perinephric fat infiltration[22]. On the other hand, Kirkali et al[23]reported that the fat tissue was usually invaded through the renal capsule. Our study corresponds with the former - we observed that renal sinus fat was invaded more often than perinephric fat as regards each histologic subtype of renal tumour.

The limitation of our research was an inability to obtain information about clinical outcomes with account of relapse, metastasis and disease free survival and correlate them with histologic features assessed in our study.

5. Conclusion

Majority of renal tumours in our setup comprised of malignant lesions. Wilms tumour was the most common childhood tumour and most common tumour in adults was renal cell carcinoma. The relative incidence of subtypes of renal cell carcinoma is relatively consistent the world over. We demonstrated that tumour size represents one of the most important factors determining biological behaviour of RCC. The likelihood of lymphovascular invasion, fibrous renal capsule/perinephric fat/renal sinus fat and vascular infiltration increased dramatically with increasing tumour size, particularly over 4.5 cm. It should be emphasized that renal sinus and perinephric fat should be carefully investigated, particularly in case of tumours greater than 4 - 5 cm. All these facts should be taken into account during the decision - making process by the urologists and oncologists dealing with renal tumours to optimize the treatment.

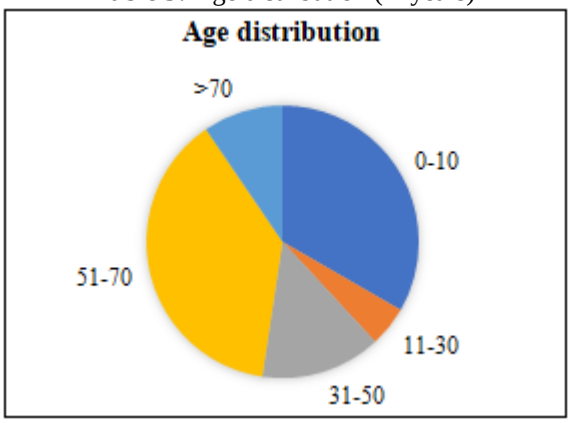
Table 1: Distribution of renal tumours according to histopathological diagnosis

S. NO.	TUMOUR	CASES (n=21)
1	Wilms tumour	6 (28.57%)
2	RCC - clear cell type	5 (23.8%)
3	RCC - unclassified	3 (14.28%)
4	RCC - papillary type	2 (9.52%)
5	RCC - chromophobe	1 (4.76%)
6	Cystic RCC	1 (4.76%)
7	Angiomyolipoma	1 (4.76%)
8	Malignant rhabdoid tumour of kidney	1 (4.76%)
9	Squamous cell carcinoma	1 (4.76%)

Table 2: Gender wise distribution of neoplastic lesions

S. NO.	*Tumour*	*Males*	*Females*
1	RCC - clear cell type	3 (14.28%)	2 (9.52%)
2	Wilms tumour	2 (9.52%)	4 (19.04%)
3	RCC - unclassified	3 (14.28%)	-
4	RCC - papillary	2 (9.52%)	-
5	RCC - chromophobe	1 (4.76%)	
6	Angiomyolipoma	-	1 (4.76%)
7	Squamous cell carcinoma	1 (4.76%)	-
8	Malignant rhabdoid tumour	-	1 (4.76%)
9	Cystic RCC	1 (4.76%)	-

Table 3: Age distribution (in years)



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