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Pathology

SPECTRUM OF HISTOMORPHOLOGICAL PATTERNS IN ADULT RENAL TUMORS - AN EXPERIENCE IN TERTIARY CARE HOSPITAL IN WESTERN MAHARASHTRA

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ABSTRACT Renal tumors, both benign and malignant exhibit as a wide, diverse spectrum of neoplastic lesions both in adults and in children. Renal cell carcinoma is the commonest malignancy in adults accounting for 65-70% of all renal tumors and 2% of all cancers. This study was conducted in eleven adult patients with renal tumors managed surgically by nephrectomies received in the department of pathology, K J Somaiya medical college, from the year 2011-2017. The aim was to determine the demographical and histopathological features in adult renal tumors.

Conclusion: Histomorphological spectrum of adult renal tumors in our study is similar to the previously reported literature. Malignant tumors (80%) outnumber the benign tumors (20%). Clear cell carcinoma, a subtype of renal cell carcinoma is the commonest tumor in adult and it tends to be diagnosed at an advanced stage.

KEYWORDS : Renal cell carcinoma, adult, angiomyolipoma, kidney.

INTRODUCTION:

Most renal tumors are epithelial in origin and are predominantly malignant. Renal cell carcinoma is the commonest adult kidney tumor occurring in the age group of 50 to 60 years. The male to female ratio is 2:1. The incidence of bilateral tumors is 1%.[1] The clinical triad of symptoms namely hematuria (59%), flank pain (41%), abdominal mass (45%) occur in 9% of patients. Rarely, systemic and paraneoplastic syndromes manifest in these patients. Radiological investigations like CT /MRI are done in suspected cases of renal tumors. Core biopsy provides adequate diagnostic material in 80% of such cases. Surgical candidates undergo partial nephrectomy. 30% present with metastatic disease and 40% develop recurrence in treated patients for localised tumor.[2]

AIMS AND OBJECTIVES:

1. To study the demographic features and relative frequencies in adult renal tumors.
2. To observe and analyse the variation in the histopathological patterns of renal tumors for adequate post- operative management.

MATERIALS AND METHODS:

This tertiary care hospital based study was conducted in the Department of Pathology, K. J. Somaiya Medical College, Mumbai over a period of seven years (2011 to 2017). Out of all nephrectomy specimens (30) received during this period, eleven patients of renal tumors managed surgically were assessed. Clinical data was collected from the departmental records and analysed.

RESULTS:

Renal cell carcinoma was the commonest malignant renal tumor in adults while angiomyolipoma was the benign tumor. The mean age prevalent for malignant tumor was 45 years in males while in female it was 38 years. The incidence of involvement of right kidney was more than the left kidney. Histologically, clear cell carcinoma was the predominant type followed by two cases of papillary carcinoma, a case of chromophobe cell carcinoma and pelvic urothelial carcinoma. Two cases of benign tumor were reported. One was multiple and seen in young female patient. The other one was associated with colonic mucinous carcinoma, a rare association of the tumor, rarely described in the literature.

DISCUSSION:

Neoplasms of the kidney are classified into benign and malignant and are based on histological, genetic and immunohistochemical features. Epithelial tumors compromise 58% of all renal tumors and 87% are malignant renal neoplasms.[2,3] Renal cell carcinoma is the commonest primary malignant tumor in adults worldwide and constitutes 2-3% of all visceral malignancy. It is seen more in men than in females and occurs in the fifth to seventh decade of life.

In our study, we analysed the demographic features, the histologic type and spectrum of renal tumors in adult nephrectomy specimens. The maximum tumors were seen in the males in the age group of 38 to 79 years (Table 1), similar to the study of Mamta et al.[3] The mean age group was slightly younger than other studies but was similar to Fauzia et al.[4] Majority of the patients had symptoms of pain in abdomen, hematuria and palpable abdominal mass. We received seven radical nephrectomy and four partial nephrectomy specimens in our pathology department which were thoroughly examined grossly. CAP guidelines were followed for histological examination and staging.

Table 1: Demographical features in eleven renal tumors in the present study.

Sr. no	AGE	SEX	SITE	SIZE OF TUMOR
1	60	M	Right -lower pole	4.5x3.5 cm
2	48	M	Right -lower pole	4.0x 4.0 cm
3	47	M	Left – upper pole	20 x12cm
4	69	M	Left – upper pole	8.0x 8.0cm
5	70	M	Right -upper pole	17 x 12cm
6	20	F	Left - upper pole	4.0x 3.0cm
7	77	M	Left – upper pole	3.0x 2.0cm
8	38	M	Right –lower pole	8.0x6.0cm
9	60	F	Left - upper pole	6.0x 5.0cm
10	37	F	Right - lower pole	12x7.0cm
11	60	F	Right – mid pole	6.9x 4.3cm

In the present study, nine cases were malignant (81.8%) and two cases were benign (18.2%) (Table 2). Renal clear cell carcinoma was the commonest malignant tumor (45.45%) and angiomyolipoma (18.18%), the benign tumor. The study was similar to Nusrat et al[5] and Vinay et al.[6] The mean age of presentation was 53.27 years. The tumors were commonly seen in the upper pole of the right kidney and in male patients.

Table 2 : Age wise distribution of renal tumors in the present study.

AGE	BENIGN (18.2%)	MALIGNANT(81.8%)
17- 37 yrs	2	-
38-58 yrs	-	3
59- 79 yrs	-	6

Majority of them presented with pain in abdomen and hematuria. CT scan / MRI were done to confirm the mass in the kidney. Grossly, the average size was 8.5 cm, both in benign and malignant tumors. However, large size of the tumor was seen in malignant cases. Predominantly, the upper pole of the right kidney was involved more than the lower one. One of the tumor was located in the mid portion of the kidney (Table 1). Histopathological evaluation revealed five clear cell carcinomas (45.45%), two papillary carcinomas (18.18%) a case of chromophobe carcinoma (9.09%) and two angiomyolipomas

(18.18%) (Table 3). This was similar to the study of nephrectomies done by Dr. Hephzibah Rani and Agarwal et al.[7,8] The Furhman nuclear grade for clear cell carcinoma grade 2 which was similar to Ngairangbam et al[9] (Fig 1A, 1B). The tumors were in stage II disease. Two cases of papillary carcinoma, a variant of renal cell carcinoma, were also observed in our study. These tumors had a low nuclear grade on histology. They also have a unique histomorphology and immunohistochemistry and a favourable clinical outcome hence diagnosis is very crucial. Previously, they were considered as low grade clear cell carcinoma.[10]

Table 3: Histological types and frequency of renal tumors in the present study.

Type of renal tumor	Histologic type	No	percentage
Benign	Angiomyolipoma	2	18.18%
Malignant	Clear cell carcinoma	5	45.45%
	Papillary carcinoma	2	18.18%
	Chromophobe cell carcinoma	1	9.09%
	Transitional cell carcinoma	1	9.09%

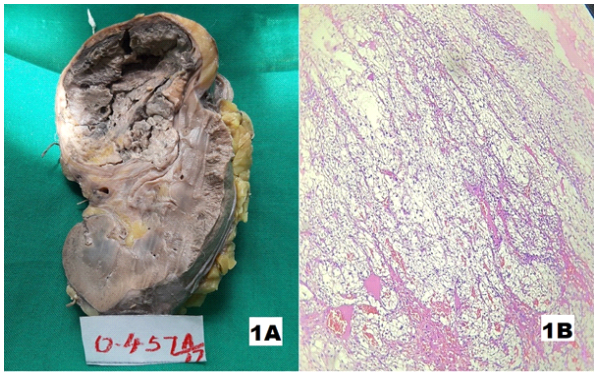

Fig 1A - Gross of renal cell carcinoma- Relatively circumscribed tumor with variegated appearance.
1B - Microscopy of Renal cell carcinoma – Clear cell type

Chromophobe cell carcinoma is a rare tumor with different histochemical, ultrastructural and genetic features.[11] It represents 5% of renal cell carcinoma. We report a case of chromophobe cell carcinoma in a 56 years male who presented with mass and pain in the abdomen. Grossly the tumor was solitary, circumscribed, grey tan with areas of necrosis (Fig 2A). The histology revealed classical variant of tumor, composed of well-defined cells with wrinkled nuclei and perinuclear halo. Areas of nuclear atypia, mitosis and sarcomatoid features were also noted (Fig 2B). Sarcomatoid differentiation is seen in 9% of cases and has poor prognosis. Hence, extensive sampling is mandatory to look for these features. The other variants include oncocytoma-like and a mixed type.

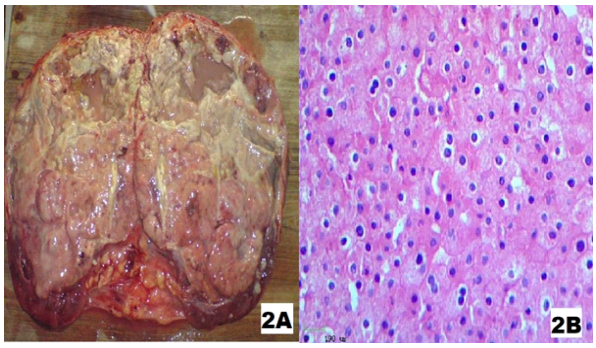

Fig 2A - Gross of chromophobe cell carcinoma – Well circumscribed tumor, light brown colored
2B - Microscopy of Chromophobe cell carcinoma, eosinophilic type with prominent perinuclear halo

Renal cell carcinoma has been currently classified by WHO into various subtypes. However, clear cell carcinoma (70%), papillary carcinomas (10-15%) and chromophobe cell carcinomas (4-6%) represents more than 90% of all RCCs.[12] The classification is significant as it has theurapeutic and prognostic implications. Preoperative radiological diagnosis is of utmost importance for staging of tumors and also to follow up patients in cases of poor surgical conditions. Newer treatment options such as cryo- and radiofrequecncy- ablation, targeted molecular therapy and active surveillance require accurate preoperative diagnosis.[13] This has improved the prognosis for patients with metastatic disease. Nephron sparing excision and radical nephrectomies are conducted according to the size of the tumor.

Perez-Montiel et al[14] study stated that, unlike urothelial carcinomas of the bladder, primary urothelial carcinoma of pelvis are predominantly high grade and present in advanced stage. Unusual features include micropapillary areas, sarcomatoid carcinoma, squamous cell carcinoma, clear cell, glandular differentiation, signet ring or plasmacytoid cells, tubular extension into the pelvis. These tumors generally occur in adults and account for 7% of all primary renal tumors. Predisposing factors include analgesic abuse, thorotrast exposure, cyclophosphamide therapy. Incidence increases with congenital abnormalities. Hematuria is the commonest symptom. Intravenous- and retrograde- pyelography are the accurate means of diagnosis. Generally, they are soft grey white masses involving the entire pelvis or may extend into the ureter and thus can be differentiated from RCC. Invasion of the renal vein and into the IVC has also been reported. Occasionally, it is associated with RCC. Treatment depends on the stage of disease. In multicentric disease and co-existent dysplasia, radical nephrectomy is the choice of surgery. Our patient presented at the age of 60 years with painless hematuria. Radiologically, a renal complex cyst with Bonaisk score of 4/5 was reported. Based on the CT findings the patient was treated by right nephrectomy. Grossly, a bulge was seen in the pelvic region. Cut surface revealed dilated pelvis with grey white tumor occupying the pelvis and extending into the upper pole of the kidney (Fig 3A). Microscopically, the tumor had features of high grade transitional cell carcinoma with stage II disease, as the tumor deposit was seen in adjacent renal parenchyma (Fig 3B&3C). They resemble tumors of urinary bladder and also share common risk factors. Generally, the upper urinary tract tumors are multiple and 2-10% are bilateral as well. Radical surgery which consists of nephro-ureterectomy and excision of a cuff of bladder around ureteric orifices is the standard treatment. Renal cell carcinoma, with synchronous ipsilateral transitional cell carcinoma of the pelvis as reported by Atilgan et al[15] was treated by nephro-ureterectomy with bladder cuff removal.

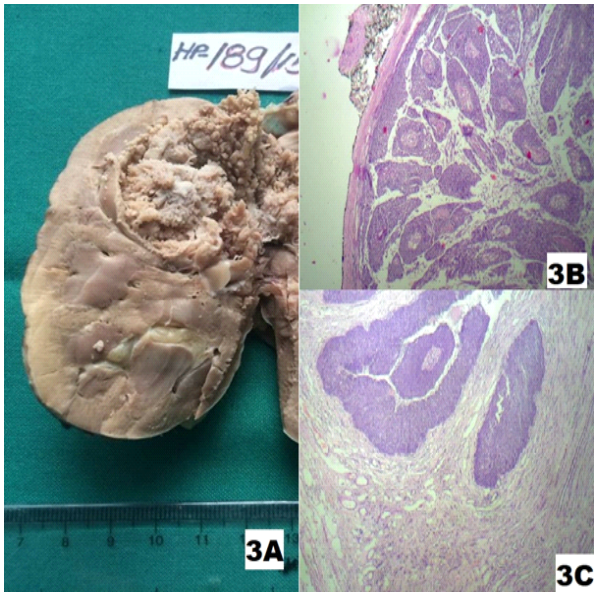

Fig 3A - Gross of urothelial carcinoma of pelvis: The tumor is seen filling the dilated pelvis and has granular surface.
3B - Microscopy showing high grade urothelial carcinoma of renal pelvis

Benign tumors in adults are classified into renal cell tumors, metanephric tumors, mesenchymal tumors and mixed epithelial and mesenchymal tumors. Surabhi et al [16] in the review observed that overlapping features of benign and malignant tumors requires histologic evaluation to establish definitive diagnosis and facilitate proper patient management. Many authors noted that malignant tumors (80%) outnumber benign tumors (20%) and is similar to our

study.[5,7,8] Angiomyolipomas are the most frequent benign tumors in females and incidence ranges from 0.2 – 0.6%.[17] In imaging studies, detection of adipose tissue is the fundamental criteria of diagnosis and is critical to prevent unnecessary nephrectomies and preserve renal function. Few may lack this feature and cause difficulties in the differentiation from renal cell carcinoma. Jacob et al [18] reported a case of massive sporadic renal angiomyolipoma treated by partial nephrectomy. In our study, we report two angiomyolipomas with unusual features. One of the tumors had synchronous mucinous carcinoma of colon along with angiomyolipoma (Fig 4A, B &C). The other patient had two tumors in the ipsilateral kidney which is generally associated with tuberous sclerosis. However, we could not follow up the patient in our institution.

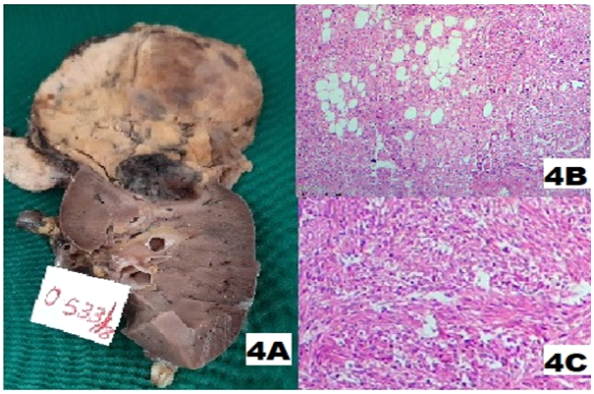

Fig 4A - Gross of Angiomyolipoma showing predominantly yellow areas and foci of haemorrhage.
4B & C - Microscopy of Angiomyolipoma composed of lipid rich and myoid cells admixed with blood vessels.

Mamta et al, Aiman et al in their study on nephrectomy specimens observed the incidence of malignant tumors to be 90% and benign 10%.[19,20] The present study provides an insight into the histopathological spectrum of adult renal tumors in our tertiary care hospital and it correlates with other studies.[3-16] The mean age was 53.27 years with M:F ratio of 2:1. In our study, the right kidney was more involved than the left one. The mean size of the tumor was 8.5 cms. Renal cell carcinoma was the commonest malignant tumor and angiomyolipoma was the commonest benign tumor. Treatment depends on the size, type and stage of disease.

CONCLUSION:

A meticulous and systematic pathological approach plays a crucial role in determining the histologic type and the prognostic indicators of adult renal tumors which is needed for complete post-operative treatment protocol.

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