Case Report

Co-occcurence of Two Different Subtypes of Renal Cell Carcinoma in A Unilateral Healthy Kidney

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ABSTRACT

Renal cell carcinoma (RCC) is a malignant neoplasm of renal tubular origin of adult age group which presents as a mass in a kidney with abdominal pain and hematuria. There are various subtypes of RCC, each having distinct morphological features, prognosis and response to targeted therapy. Development of two RCC of different subtypes in the same kidney is rare because each RCC arises from a particular genetic abnormality. here we discuss two different RCC subtypes in a healthy kidney, one showing features of Papillary RCC and other showing mixed features with papillae formation and clear cells.

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Introduction

Renal cell carcinoma is the commonest malignant epithelial tumor of the kidney. It is a tumor of adult population with peak in the sixth and seventh decades though some recently described entities like translocation associated RCC are common in children. Male predominance is seen. There are different histopathological types of RCC having different morphological, immunohistochemical and cytogenetic features and variable prognosis. RCC presents as a single mass in the kidney, though some RCC like papillary RCC may be multifocal [1]. Simultaneous occurrence of two different types of RCC in the kidney is rare and there are only few case reports and that too either in diseased kidney or with genetic predisposition. Here we describe two different subtypes of RCC in a single healthy kidney.

Case Report

A 50 year male patient presented to our hospital with mass in the abdomen. CT scan showed a mass in the left kidney measuring 13x10.5x9 cm. Radical nephrectomy was done and sent to the pathology department of IMS, BHU.

Gross Findings: The radical nephrectomy specimen was measured 13x10.5x9 cm. Part of the ureter was identified on the medial aspect of specimen and measured 3cm in length. The capsule of the specimen was intact. On sectioning, a tumor was found in the upper pole of the kidney measuring 12x8x8 cm. On cut, the tumor was variegated in appearance with yellow, hemorrhagic and grayish white areas. No cystic areas were seen. The part of ureter, perinephric fat, gerota fascia and renal sinus were found free of tumor grossly. A separate tumor was seen in the lower pole separate from the main tumor and measured 2.2x2cm. Cut surface was solid grayish white. No hemorrhagic and necrotic areas were identified in the lower pole tumor. (Figure 1). Part of normal parenchyma was also identified in between the two tumors.

Microscopic Examination: Histopathological examination of the main (larger) tumor showed predominantly clear cell in acinar pattern and focal areas of papillary pattern. The acinar pattern showed nests of tumor cells separated by thin fibrovascular septae (Figure 2). The papillary pattern showed papillae lined by cells with abundant clear cytoplasm along with thin fibrovascular core. (Figure 3). Nuclei were basally placed and were of high nuclear grade. Few psammoma bodies and hyalinized areas were also seen. No subnuclear vacuolation, stromal metaplasia, foamy macrophages or hemosiderin in the epithelial cells were seen. IHC showed few CK positive cells (Figure 4).

The second tumor at the lower pole of kidney showed a papillary tumor with many foamy macrophages within the fibro vascular cores (Figure 5,6). The papillae were lined by single layer of cells with scant basophilic cytoplasm. Based on these findings it was reported as papillary RCC type I. CK7 was strongly positive (Fig7).

On follow up at 6 months, patient was symptom free.

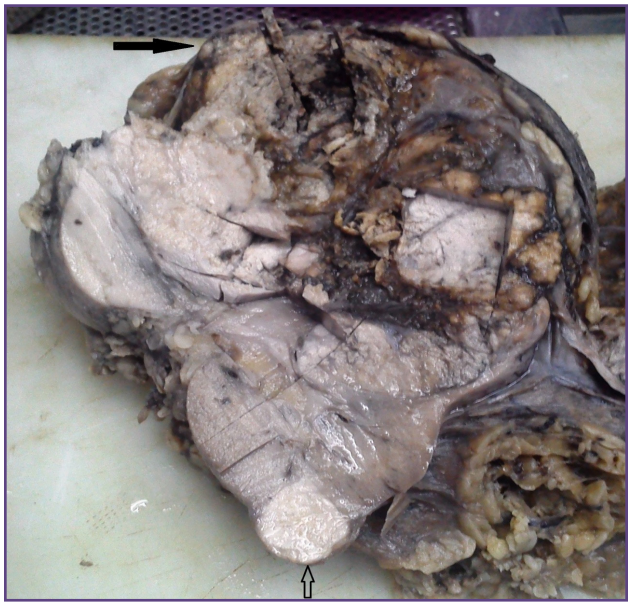

Fig 1 : Gross specimen: Radical nephrectomy specimen shows two distinct tumors - black shaded arrow shows larger dominant tumor at the upper pole & Open arrow shows smaller tumor at the lower pole of kidney.

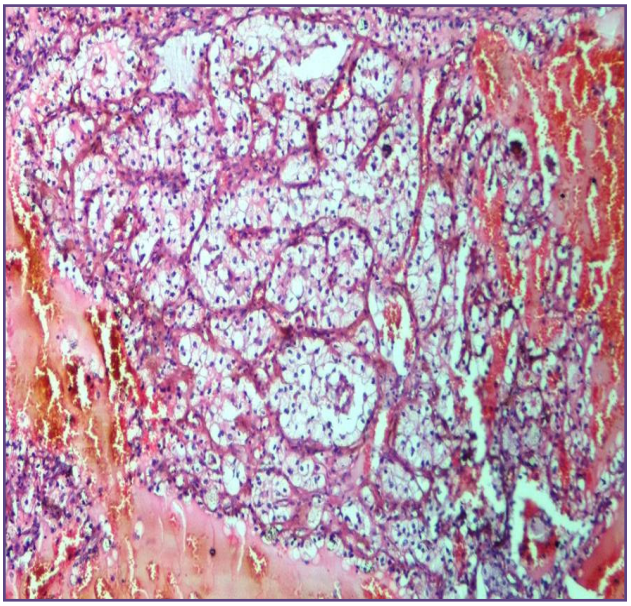

Fig. 2: Dominant tumor shows acinar pattern – nests of tumor cells(clear cells) separated by fibrovascular septa. (H&E , 10x10).

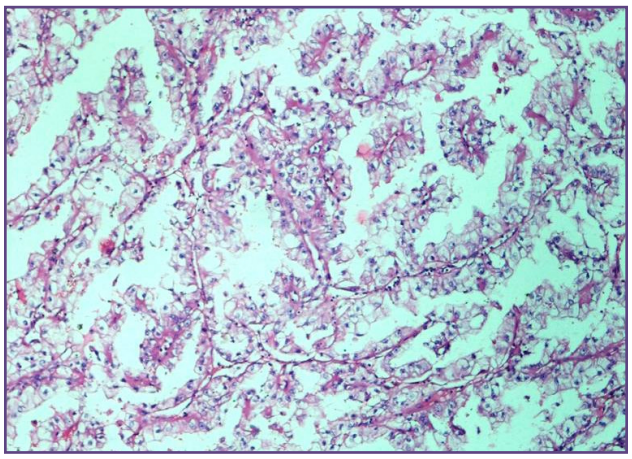

Fig. 3: Dominant tumor shows papillary pattern – long papillae lined by polygonal clear cells with a thin fibrovascular core.(H&E, 10x10).

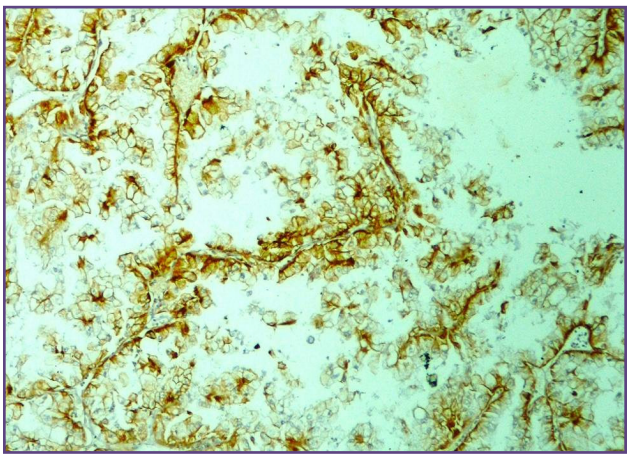

Fig. 4: Immunohistochemistry (IHC), Cytokeratin : Papillary areas of dominant tumor shows membranous cytokeratin positivity (IHC CK, 10x10).

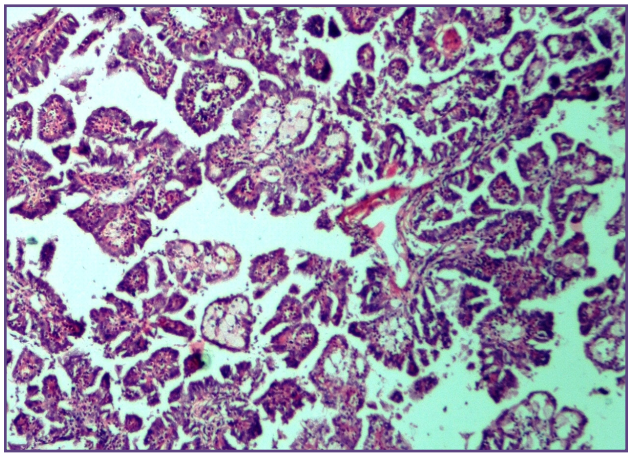

Fig 5 : Smaller tumor : Sections from smaller tumor shows features of Papillary RCC (H&E ,10x10) .

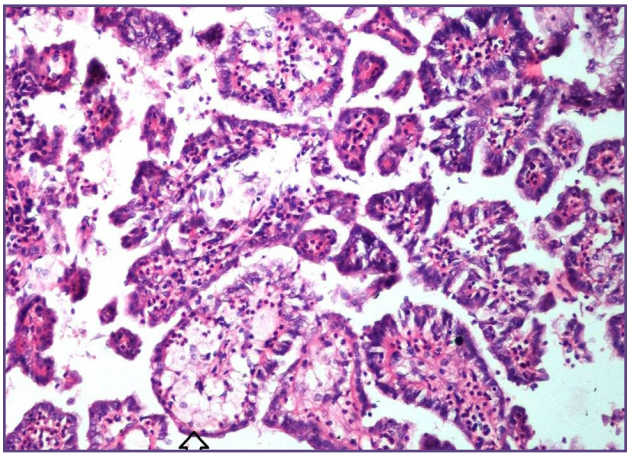

Fig. 6: Smaller tumor : High power view shows papillae with prominent fibrovascular core containing foamy macrophages (arrow) (H&E, 20X).

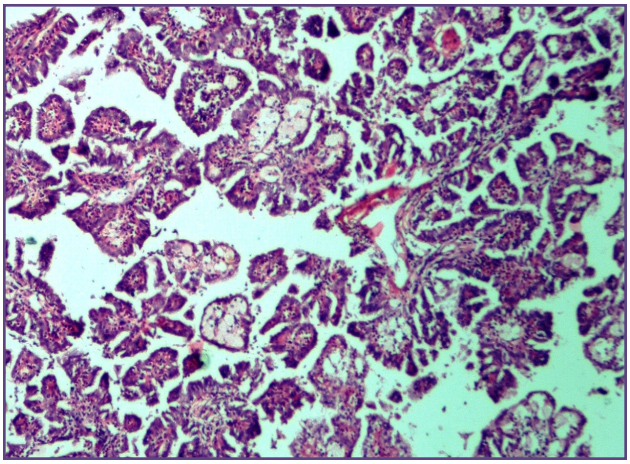

Fig. 7: IHC (CK7) : Smaller tumor shows strong diffuse membranous positivity for CK 7 (IHC,CK7, 10x10).

Discussion

RCC includes different types of tumors arising from the tubular epithelium from the kidney. Usually a single type of RCC develops in a kidney. Simultaneous development of two different RCCs in the same kidney is rare, though association of RCC with benign tumors like oncocytoma and angiomyolipoma has been described[2]. WHO classifies RCC into different types based on characteristic morphological features [3]. Each RCC subtype has specific immunohistochemical and cytogenetic features.

Clear cell RCC is the commonest RCC subtype characterized by acinar or nesting pattern with thin fibrovascular septae and abundant clear cytoplasm. Papillae formation is rare but pseudopapillae may be seen in high grade tumors. Immunohistochemistry shows diffuse membranous positivity for CAIX and CD 10. 3p deletion is detected on cytogenetic evaluation[4].

Papillary RCC is the next common RCC subtype comprising around 10% of RCC and characterized by papillae formation with foamy macrophages within the fibrovascular cores. Cytologically, PRCC is divided into type I PRCC characterized by cells with single layer of nuclei and scant amphophilic cytoplasm and type II PRCC by cells showing nuclear stratification with abundant eosinophilic cytoplasm. Clear cells are rare. IHC shows strong diffuse membranous positivity for CK7. Cytogenetics shows trisomy of chromosomes 7 and 17 and loss of chromosome Y[5].

In the present case, the smaller tumor showed features of PRCC and the dominant tumor showed acinar and papillary pattern with abundant clear cytoplasm, psammoma bodies and high nuclear grade. WHO classifies these tumors under category, Renal cell carcinoma, unclassified.

H Ross et al., described four subtypes for tumors showing both clear cell and papillary pattern as Clear cell RCC, Papillary RCC, Clear cell papillary RCC and Xp11 translocation carcinoma[6]. Clear cell RCC and Papillary RCC may show focal papillae formation and clear cells respectively, but the nuclear grade is low in case of clear cell RCC and foamy macrophages are seen in papillary RCC. Moreover, the characteristic IHC and cytogenetics distinguish these tumors. Clear cell papillary RCC is a recently described entity showing papillae lined by clear cells of low nuclear grade, subnuclear vacuolation and smooth muscle stromal metaplasia[6]. Xp11 translocation carcinoma is characterized by chromosomal translocation involving TFE3 gene on Xp11.2 locus with resultant fusion of TFE3 with multiple partner genes like ASPL, PRCC, NonO, PSF. This results in overexpression of TFE3 which is a member of microphthalmia associated transcription (MITF) family[6,7]. This carcinoma is the commonest RCC subtype in children and associated with prior chemotherapy. It can also develop in adult population and one study found an incidence of 4.2% in adult population[8]. Morphologically it shows papillae and acinar pattern, clear cells, psammoma bodies and hyalinized nodules. Strong nuclear positivity for TFE3 is seen on IHC. In the present case, Xp11 translocation may be one possibility, however, without specific IHC and molecular studies, it cannot be confirmed.

Few reports of concurrent RCCs of different histological types have been described[9,10]. In these reports, the patients had some medical or genetic disease and PRCC was the dominant tumor, whereas, in the present case, the patient was healthy and PRCC was the smaller tumor. Since these cases are rare, the prognosis is uncertain. In the present case, the patient underwent radical nephrectomy and is currently symptom free after a follow up of six months. Synchronous 2 different types of RCC in same kidney should not change the management approach.

Conclusion

In conclusion, we here describe a rare finding of simultaneous occurrence of two different RCCs subtypes in a unilateral healthy kidney. There are very few case reports describing the same. To the best of our knowledge, this is the 13th case of the literature that had these two different subtypes of RCC in the same kidney [11]

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Competing Interests

None Declared

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