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Case Report

Renal angiomyoadenomatous tumour

Renal anjiyomiyoadenomatöz tümör

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ABSTRACT

Renal angiomyoadenomatous tumour is a newly described rare neoplasm. This tumour is characterised microscopically by admixture of three components- epithelial cells arranged in tubules and nests, angiomyomatous stroma and capillary sized interconnecting vascular channels in close association with the epithelial cell clusters. Microscopically it has wide range of differential diagnoses which include mixed epithelial and stromal tumour of kidney, angiomyolipoma and clear cell renal cell carcinoma with angiomyolipomatous/angiomyoadenomatous areas. Renal angiomyoadenomatous tumour should be differentiated from these tumours. Till now, only 10 cases have been reported in English medical literature. Here, we are reporting a case of renal angiomyoadenomatous tumour in a 29 year- old female patient who presented with hematuria and low backache and describing its main features so as to differentiate this entity from other renal tumours. To the best of our knowledge, this is the first case to be reported from India.

Keywords: Labrynthine vascular channels; rare renal tumour; renal angiomyoadenomatous tumour.

ÖZ

Renal anjiyomiyoadenomatöz tümör yeni tanımlanmış nadir bir neoplazidir. Bu tümör mikroskopik olarak tübüller ve yuvalanmalar şeklinde düzenlenmiş epitel hücreleri, anjiyomatöz stroma ve kılcal damar büyüklüğünde birbirleriyle bağlantılı, epitel hücre kümeleriyle yakından ilişkili damarsal kanallar gibi üç bileşenin karışımıdır. Mikroskopik olarak böbreğin mikst epitelyal ve stromal tümörü, anjiyomiyolipom ve anjiyomiyolipomatöz/anjiyoadenomatöz alanları olan berrak hücreli böbrek karsinom gibi geniş bir ayırıcı tanı spektrumuna sahiptir. Renal anjiyomiyoadenomatöz tümör bu tümörlerden ayırt edilmelidir. Şimdiye kadar İngilizce tıp literatüründe yalnızca 10 olgu bildirilmiştir. Burada hematüri ve sırt ağrısıyla gelmiş 29 yaşındaki renal anjiyomiyoadenomatöz tümör olgusunu bildirmekte ve bu tümörü diğer böbrek tümörlerinden farklılaştıran ana özellikleri tanımlamaktayız. Bilgilerimize göre ilk kez Hindistan'dan böyle bir olgu bildirilmektedir.

Anahtar Kelimeler: Labirent şeklinde damarsal kanallar; nadir böbrek tümörü; renal anjiyomiyoadenomatöz tümör.

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Introduction

Advances in diagnostic pathology with the implementation of molecular study, have helped to add many new tumour entities into the current classification of renal tumours.[1] Renal angiomyoadenomatous tumour (RAT) is a newly described renal neoplasm which has not yet included in this classification. The first case of RAT was reported in 2000 by Michael et al.[2] in a 93- year- old male patient. Five more cases were reported in 2009 by Michael et al.[3] from the renal tumour consultation files of the authors. It is a rare neoplasm with only 10 cases reported in the English medical literature so far. It has distinct histopathological features with clear epithelial cell component, prominent smooth muscle stroma and interconnecting vascular channels in intimate association with the epithelial components.[3] It presents clinically as a renal mass and is seen as a well marginated solid, contrast material - enhanced renal tumor in imaging studies.[4] We are reporting our case of renal angiomyoadenomatous tumour to be added to the database of these tumours.

Case presentation

A 29-year-old female patient presented with complaints of low backache and hematuria persisting for 3 months. Her renal function tests were within normal limits. Contrast- enhanced computed tomography (CT) showed a well defined enhancing mass lesion with central nonenhancing area measuring 4.8 x 4.2 cm in the lower pole of right kidney (Figure 1). Radical nephrectomy was done with a clinical diagnosis of renal cell carcinoma (RCC).

On gross examination, the nephrectomy specimen showed a well circumscribed 3 x 3 x 2 cm growth in the lower pole of the right kidney located closer to the anterior surface. Cut section of the growth was grey-white with brownish foci (Figure 2). Rest of the kidney was apparently normal with corticomedullary differentiation. Microscopic examination showed a circumscribed neoplasm composed of intermixing of epithelial, smooth muscle, and vascular components (Figure 3a). Epithelial components were arranged in tubules and nests of cells with moderate

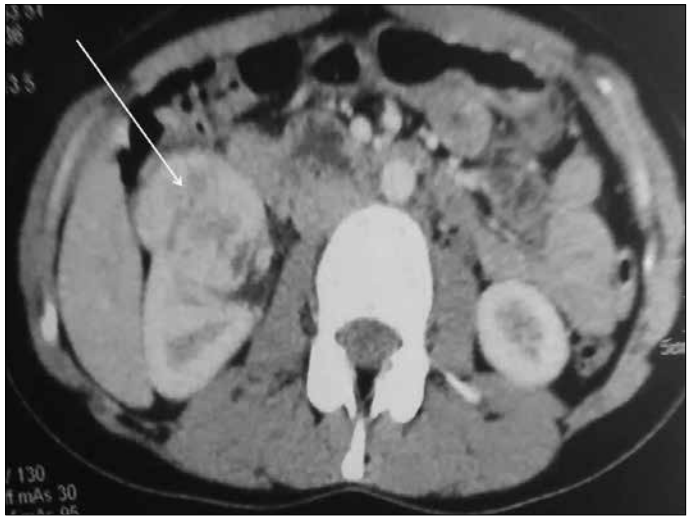

Figure 1. Abdominal computed tomography showing tumor in the right kidney (arrow)

Figure 2. Cut section of kidney showing circumscribed tumour with grey- white and brownish areas

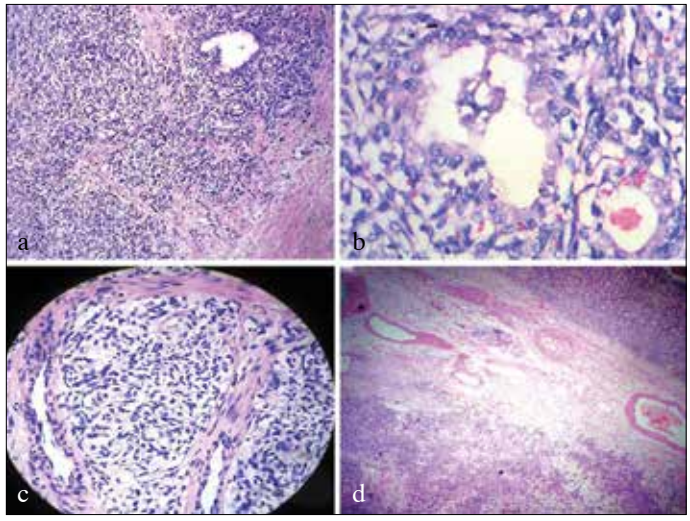

Figure 3. a-d. The three components of the tumour-epithelial, smooth muscle and vascular (H&E x 40) (a). Epithelial component arranged in glandular/tubular pattern with basally located bland nuclei and intimately surrounded by thin vascular channels (H&E x 400) (b). Epithelial tissue surrounded by smooth muscle bundles (H&E x 400). (c) Thick fibrovascular capsule separating tumour (left) from normal renal tissue (right) (H&E x 400) (d)

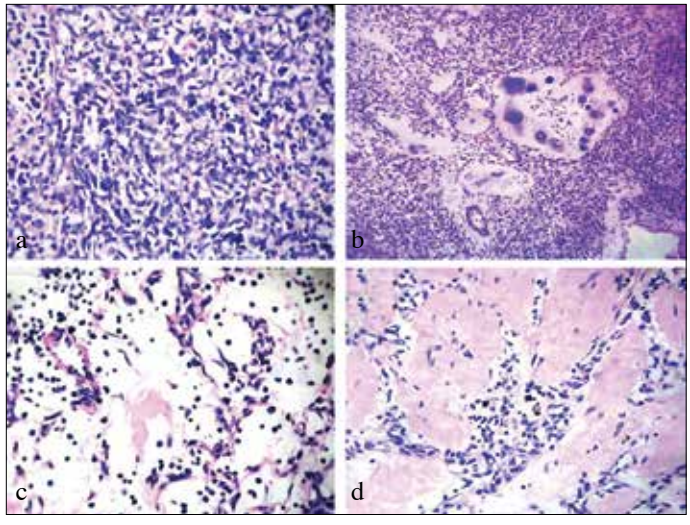

Figure 4. a-d. High power view of thin anastomosing vascular channels surrounded by pericyte-like cells (H&E x 400) (a). Metaplastic stromal cartilage/bone (H&E x 400) (b). Edematous/Hyalinized areas with inflammatory cells (H&E x 400) (c, d)

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amount of pale eosinophilic to clear cytoplasm with blister like apical snouts and basally located round to oval vesicular nucleus (Figure 3b). A few tubules were cystically dilated. No mitosis or nuclear pleomorphism was noted. Smooth muscle cells were arranged in bundles within (Figure 3c) and also in the periphery of the tumour forming a pseudocapsule (Figure 3d). The vascular component was seen as thin walled small capillary channels lined with plump endothelial cells arranged in an interconnecting labyrinthine pattern and surrounded by pericyte-like cells (Figure 4a). Many thick walled vessels were also seen within the tumour with prominent smooth muscle wall. Focally, stroma showed cartilaginous/osseous metaplasia (Figure 4b). Focal areas of edema and hyalinisation (Figure 4c, d) with scattered inflammatory cells composed of plasma cells, lymphocytes and hemosiderin laden macrophages were also noted. Necrosis was absent.The renal pelvis, renal vessels, sinus and perirenal fat were not involved.

Immunohistochemical (IHC) analyses were performed to further delineate the cellular components (Figure 5). Pancytokeratin (Pan CK) & CK 7 were positive in epithelial component. SMA was positive in smooth muscle cells. CD 34 positivity in stromal vessels highlighted the delicate stromal capillary channels.Vimentin and CD 10 were only focally positive in epithelial cells. HMB45, Melan A, CD117, AMACR, ER& PR were negative. Ki 67 showed low proliferation index. Morphology and IHC staining pattern of the present case was similar to the previously reported cases of renal angiomyoadenomatous tumour.

Discussion

Renal angiomyoadenomatous tumour is a rare neoplasm. Histologically, it is different from usual renal neoplasms included in the present WHO classification of renal tumours like clear cell RCC, papillary RCC, and chromophobe RCC etc. On gross examination, RAT was seen as a well circumscribed mass. In

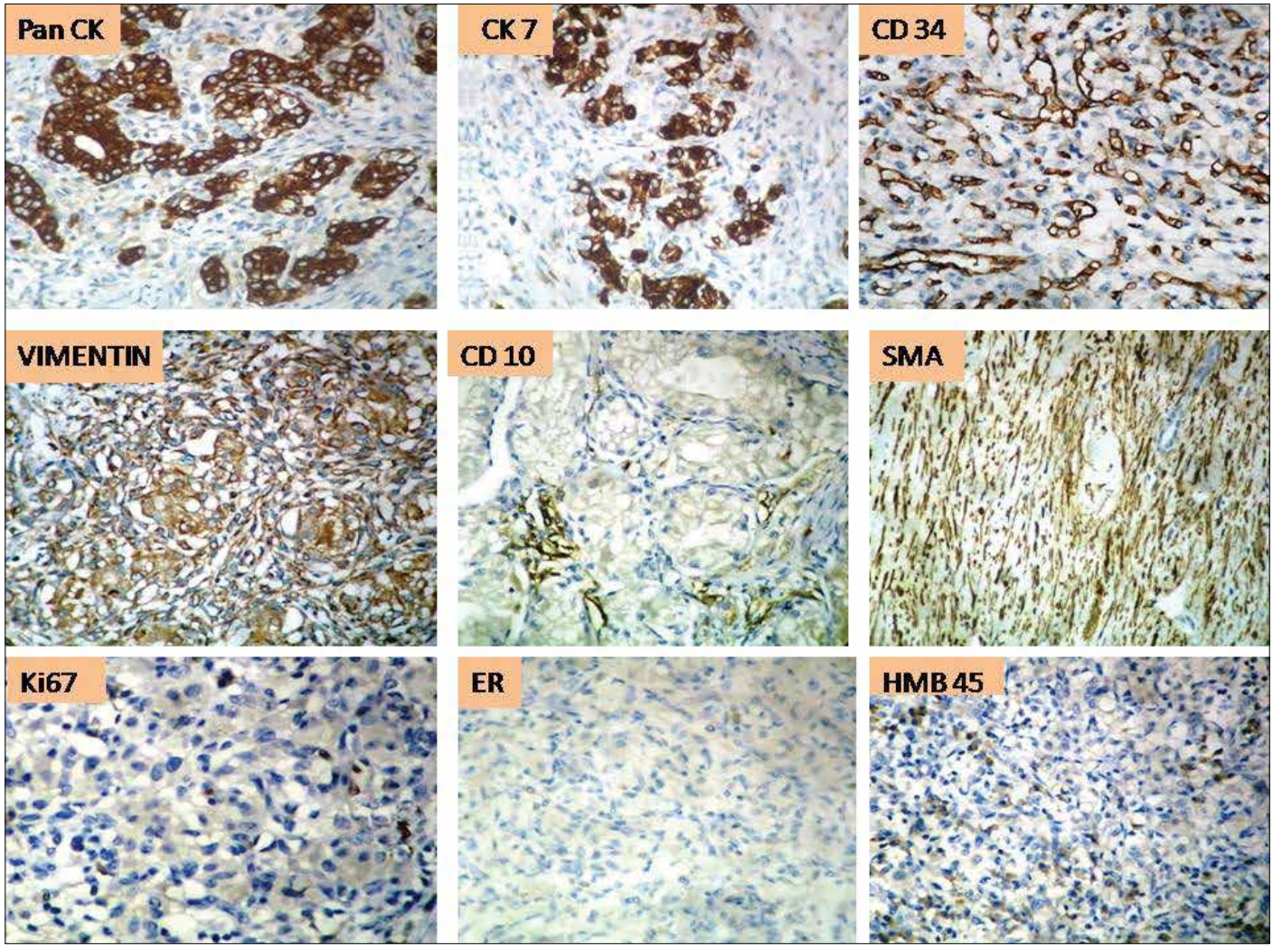

Figure 5. IHC PANEL. Pan CK & CK7 positive in epithelial cells. CD34- Positive in vascular channels. Vimentin & CD10- Focally positive. SMA: Positive in smooth muscle bundles. Ki67- Low proliferative index. ER & HMB 45- Negative

the case series of Michael et al.[3] the longest diameter of the tumor ranged from 2.3 to 8.5 cm with a median diameter of 4.1 cm. In the present case, the longest diameter of the tumor was 3 cm and cut section showed a circumscribed tumour with grey-brown appearance. According to previous reports, the epithelial component of RAT is arranged in tubules and nests of clear cells seen dispersed within a smooth muscle stroma which may also form a pseudocapsule around the tumour. Epithelial nest and tubules are also surrounded by capillary sized vessels. In the present case also, epithelial component was arranged in both tubules and nests of clear cells. Michael et al.[3] found that Pancytokeratin (Pan CK) and CK 7 were positive for epithelial components of RAT. CD 10 may be negative or show focal weak positivity. In the present case, epithelial component showed PanCK & CK 7 positivity. Vimentin, and CD 10 showed only focal positivity for the epithelial component. The immunostaining pattern of this tumour was almost identical with papillary renal cell carcinoma and some authors propose that both are similar entities.

The amount of leiomyomatous stroma in RAT is highly variable. It may range from 10% to 70% of the whole tumor mass.[3] In our case, smooth muscle cells were seen as interrupted bundles forming a pseudocapsule separating neoplasm from adjacent normal kidney and within the tumour around the epithelial cell groups.

Renal angiomyoadenomatous tumour has a peculiar vascular pattern. Epithelial, and vascular components are intermingled in such a way that a fine labyrinth of capillaries will rim the epithelial component [4]which is seen more clearly in immunostaining for endothelial cells (CD 31 or CD 34).[2-4] Such a vascular pattern with capillary- sized vessels were seen in this case which were highlighted by CD 34 immunostaining. This labyrinthine capillary network in close contact with the epithelial component is a characteristic feature described in RAT. In the case series study by Michael et al.[3] no such capillary network was observed in ten randomly selected cases of clear cell renal carcinoma and one case of clear cell renal carcinoma associated with leiomyomatous stroma.

Other mixed renal tumors include mixed epithelial stromal tumour of kidney (MESTK), angiomyolipoma and RCC with angiomyolipomatous/angiomyoadenomatous component. These neoplasms should be differentiated from RAT. MESTK is usually seen in middle aged, perimenopausal women which can explain its relation with estrogen.[5] It arises from the central part of kidney as an expansile growth with both cystic and solid areas.[1] MESTK is a dimorphic tumour with tubules and cysts of epithelial component embedded within a spindle cell stroma resembling ovarian stroma.[6,7] Our case did not have ovarian type stroma. Numerous vascular channels in the stroma also refuted the diagnosis of MESTK. In case of MESTK, spindle cell stroma is ER and PR positive.[8] ER and PR were negative in stroma of our case.

Angiomyolipoma (AML) is one of the commonest mesenchymal neoplasm of kidney having an association with tuberous sclerosis. Our patient did not have features of tuberous sclerosis. AML is characterized by variable proportion of adipocytes, spindled, epithelioid smooth muscle cells, and thick walled blood vessels. [9] It is well demarcated from kidney but not encapsulated. Its cut surface may have a yellowish appearance resembling clear cell RCC or assume a grey- white color similar to leiomyoma depending on the predominance of the components in the tumour. [1] RAT has no adipocyte component. Epithelial component seen as tubules and nests in RATare not observed in AML. AML can show entrapped tubules near the periphery of the tumour but not deep inside the tumour. Moreover, AML belonging to the PECOMA group is positive for melanocytic immune markers. [10] HMB 45 and Melan A, staining performed in our case were negative ruling out a lipid- poor variant of AML.

Rare cases of clear cell RCCs (CCRCC) with RAT -like areas have been reported. In these cases, areas of CCRCC will be clearly evident with a minor component of RAT-like area.[11] Immunohistochemical feature of RAT may overlap with clear cell papillary RCC (CCPRCC). But morphologically CCPRCC will be having prominent papillary architecture with thick cellular core and the large, voluminous clear cells lining the papillary structures so that the cells of one papilla may touch the cells of adjacent papilla. In RAT, papillary structures are absent and the clear cell component is less prominent.[12]

Genetics of RAT is different from other renal tumours. It does not show any mutations like von Hippel-Lindau gene mutation, gain of chromosome 7,17, loss of chromosome Y etc usually seen in other renal neoplasms.[3] Fluorescence in situ hybridization studies in four cases by Kuroda et al.[13] have revealed that monosomy of chromosomes 1, 11, and 16 is a constant finding in RAT cases that can be considered to be diagnostic. Course of this tumour was benign in all previously reported cases. Surgical resection is said to be curative. Recurrence or death due to neoplasm has not been yet reported.[14] But, long term follow up of more cases are needed to assess the exact biological behaviour of this lesion.

In conclusion, RAT is a rare renal neoplasm with a distinct morphological pattern and molecular alteration. Extensive search of English medical literature showed only 10 reported cases. To the best of our knowledge, this is the first case to be reported from India. Though all reported cases had a benign course during short-term follow-up periods, more studies are required to know the true nature and behaviour of this tumour.

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