Extensive Sarcomatoid Transformation in a Chromophobe Renal Cell Carcinoma

Shanthala P. R.[1], Shreesha Kandige[2]

[1]Assistant professor, [2]Professor

Department of Pathology, Yenepoya Medical College, Mangalore-575 018, Karnataka, India

Abstract

Sarcomatoid transformation in renal cell carcinoma occurs rarely, at an incidence of 5 %. We report an interesting case of extensivesarcomatoid transformation occurring in 70 year old female patient. Microscopically, the renal tumor was composed of high grade neoplastic spindle cells creating a diagnostic dilemma of differentiation from primary sarcomas of kidney. Extensive sampling of the tumor mass revealed small foci of epithelial carcinomatous elements of chromophobe renal cell carcinoma, rest of the tumor had undergone a sarcomatoid transformation.

Key words : Sarcomatoid transformation, chromophobe renal cell carcinoma

Introduction

Chromophobe renal cell carcinoma is an uncommon type of renal cell carcinoma constituting about 4-5% all renal cell carcinomas (RCCs) [1]. The incidence of sarcomatoid transformation in chromophobe type is about 9% [2.3]. Sarcomatoid transformation is a pattern of dedifferentiation found in all types of RCC, hence it is not viewed as a type of its own, but is rather a progression to high grade carcinoma of the type from which it arose. This transformation is characterized morphologically by presence of pleomorphic spindle cells,with ultrastructural or immunohistochemical evidence of epithelial and mesenchymal differentiation. Occasionally, sarcomatoid elements overgrow the antecedent carcinoma to the extent that it cannot be recognized, such tumors are placed under renal cell carcinoma unclassified category of World Health Organization(WHO) classification [4,5].We report here a rare case of extensive sarcomatoid transformation occurring in chromophobe RCC.

Case report

A 70 year old female, diabetic and hypertensive was admitted with history of loin pain and mass per abdomen of 2 months duration. Ultrasonography of abdomen reported a large heterogeneous mass in the left kidney with areas of cystic degeneration, necrosis and foci of calcification suggestive of RCC kidney. CT abdomen confirmed the findings of ultrasonography. Patient underwent left radicalnephrectomy.

Grossly, left kidney was enlarged, renal capsule was breeched in areas, cut surface of the kidney showed a large circumscribed tumor mass measuring 19x13x10cm, with a variegated appearance. Solid grey white areas,areas of hemorrhage, necrosis and cystic changes were seen (Figure 1). Renal vein invasion with a thrombus of size 4.5x1.5x1cm was observed.

Microscopically, the tumor was predominantly composed of pleomorphic spindle shaped cells arranged in diffuse sheets, fascicles, and whorl pattern. Bizarre tumor giant cells, many typical and atypical mitotic figures were seen. Large areas of hemorrhage, necrosis and perivascular hyaline change, foci of osseous metaplasia were observed. The tumor had invaded the capsule and renal vein. Further extensive sampling of the tumor revealed few small foci of chromophobe renal cell carcinoma with polygonal cells having raisinoid nuclei, characteristic perinuclear halo, fine reticular cytoplasm with prominent cell membranes were seen (Figure2). Morphologic diagnosis of sarcomatoid change in chromophobe RCC was made. On immunohistochemistry, the sarcomatoid elements showed focal cytokeratin positivity and diffuse positivity for vimentin.The chromophobe carcinomatous component showed diffuse positivity for cytokeratin and were vimentin negative (Figure 3).

Address for correspondence

Dr. Shreesha Kandige, Professor, Department of Pathology, Yenepoya Medical College, Deralakatte, Mangalore - 575018, Karnataka, India. **Email :** drshreesha@gmail.com

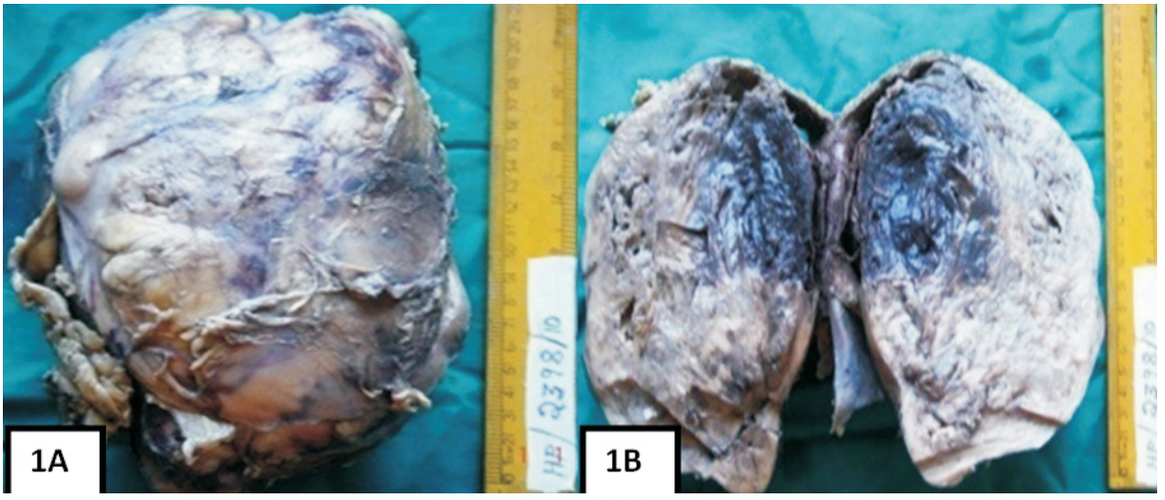

Figure 1. (A) Gross photograph of the enlarged kidney (B) Cut surface of the kidney shows a large circumscribed grey white tumor with areas of hemorrhage and necrosis.

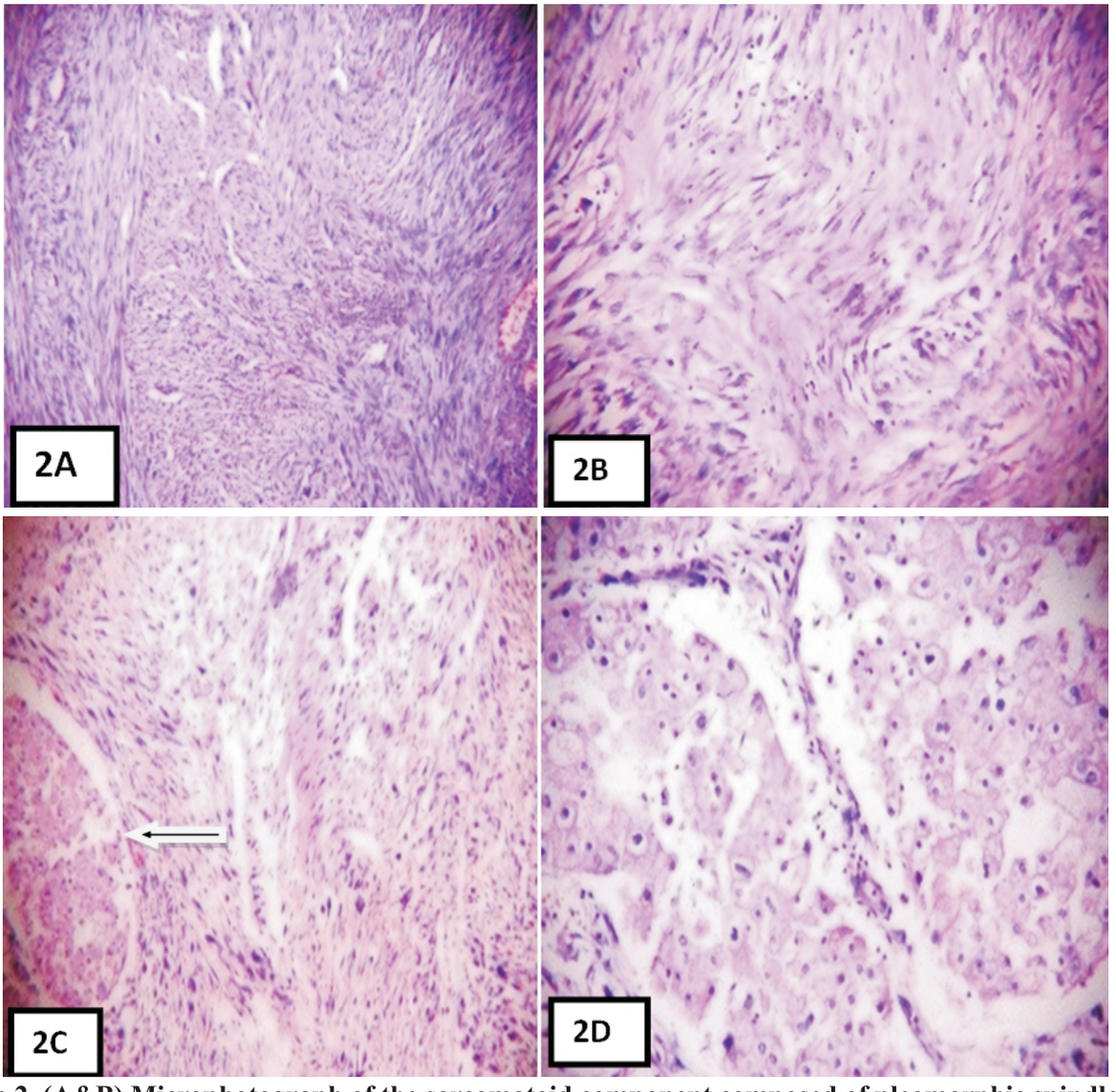

Figure 2. (A&B) Microphotograph of the sarcomatoid component composed of pleomorphic spindle cells. (C&D) Foci of chromophobe renal cell carcinoma composed of group of polygonal cells having raisinoid nuclei, perinuclear halo and prominent cell membranes. (H&E X10, X40).

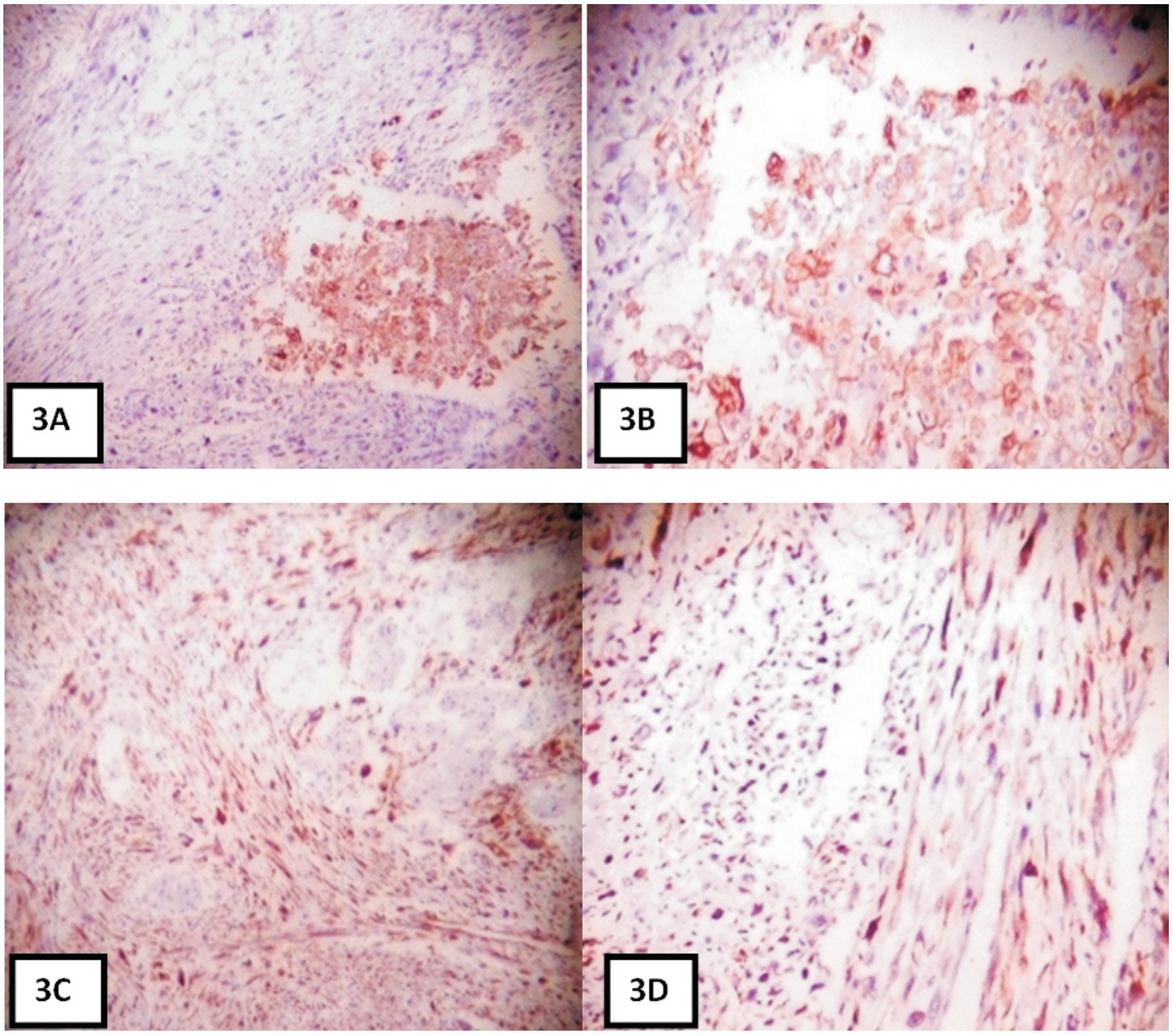

Figure 3. (A&B) Diffuse cytokeratin positivity is seen in chromophobe carcinomatous elements and sarcomatoid spindle cells are focally positive. (C&D) The chromophobe carcinomatous elements are vimentin negative and sarcomatoid spindle cells show diffuse vimentin positivity.(IHC, X10, X40).

Discussion

Chromophobe RCCs with sarcomatoid transformation have been observed to occur mostly at 6th decade of life orlater, withan higher incidence in females [6]. These findings seem to be concordant in the present case. The sizes of these tumors have been variable. Macroscopically, the chromophobe RCCs are solitary circumscribed tumors with homogenous light brown cut surface. The sarcomatoid change in these tumors appear as solid, firm, grey white fleshy to fibrous areas [2].

Microscopically, the carcinomatous and sarcomatoid components are seen in variable proportion. The sarcomatoid components usually have pleomorphic spindle cells arranged in malignant fibrous histiocytoma like or fibrosarcoma like pattern, but heterologous differentiation patterns like that of osteosarcomatous, chondrosarcomatous rabdo myosarcomatous and liposarcomatous are also described [7]. When there is extensive sarcomatoid transformation, the usual sampling of tumor mass may at times would lead to missing out of the carcinomatous elements, where in the tumor morphology may mimic primary sarcomas of the kidney .

On immunohistochemical studies, chromophobe RCC demonstrate pancytokeratin, cytokeratin 7, epithelial membrane antigen and parvalbumin positivity [4]. It is also reported that these tumors are

positive for CD 117 (c-kit) [6,8]. These tumors are vimentin negative. The sarcomatoid components usually express mesenchymal marker vimentin diffusely,but cytokeratin is expressed focally or may be absent.In our case we have used immunohistochemical markers, cytokeratin and vimentin.

The chromophobe RCCs generally tend to have favorable prognosis compared to other RCCs and the 5-year survival rate is above 83% [1]. Sarcomatoid change in RCC is associated with poor prognosis with a median survival of less than a year. Tumors with such change are seen to behave aggressively with local invasion, invasion of renal vein and distant metastasis. The sarcomatoid transformation in the tumor mass may range from 1-99%. In the present case, the sarcomatoid change constituted nearly about 98 % percent of the tumor, with renal vein and capsular invasion. The presence of sarcomatoid components and their proportion in the tumor is found to be significantly associated with the adverse outcome of the patient, so pathologists need to comment about this in their reports. Other features associated with poor prognosis include tumor size, necrosis and vascular invasion [2,3,5].

Cytogenetic studies of chromophobe RCC show characteristically extensive chromosomal losses (monosomy) of chromosomes 1,2,6,7, 13,17,21 leading to hypodiploid DNA index. Brunelli Metal in their study of sarcomatoid chromophobe RCCs observed that sarcomatoid components demonstrate multiple chromosomes gains (polysomy) of chromosomes 1,2,6,10 and 17. These multiple chromosomal gains may play a role in sarcomatoid transformation of chromophobe RCC [9].

In conclusion, considering the prognostic significance of commenting about the presence or absence of the sarcomatoid elements and their proportion in renal cell carcinomas, we emphasize the importance of extensive sampling of tumor mass and search for carcinomatous elements for proper diagnosis of these highly malignant tumors.

References

1. Gómez Édgar M, Sainz Gerardo G, Sánchez Víctor O, Castro Alberto O, Salcido Francisco G, Ibarra Erik M et al. Sarcomatoidchromophobe renal cell carcinoma: a rare entity. Rev MexUrol 2012;72 :27-30.
2. de Peralta-Venturina M, Moch H, Amin M, Tamboli P, Hailemariam S, Mihatsch Met al. Sarcomatoid differentiation in renal cell carcinoma: a study of 101 cases. Am J SurgPathol 2001;25:275-84.
3. Cheville JC, Lohse CM, Zincke H, Weaver AL, Leibovich BC, Frank I et al. Sarcomatoid renal cell carcinoma: an examination of underlying histologic subtype and an analysis of associations with patient outcome. Am J SurgPathol 2004;28:435-41.
4. Eble JN, Sauter G, Epstein JI, Seterhenn IA (Eds). World Health Organisation Classification of Tumors. Pathology and Genetics of tumors of the Urinary system and Male Genital Organs. Lyon : IARC Press, 2004.
5. Srigley JR, Amin MB, Delahunt B, Campbell SC, Chang A, Grigon DJet al. Protocol for the Examination of Specimens From Patients With Invasive Carcinoma of Renal Tubular Origin. Archives of Pathology & Laboratory Medicine 2010;134: 25-30.
6. David Parada, Karla Peña Otto Moreira. Sarcomatoid chromophobe renal cell carcinoma. A case report and review of the literature. Arch. Esp. Urol 2006; 59 : 209-214
7. Quiroga-Garza G, Khurana H, Shen S, Ayala AG, Ro JY. Sarcomatoidchromophobe renal cell carcinoma with heterologous sarcomatoid elements. A case report and review of the literature. Arch Pathol Lab Med 2009; 133:1857-60.
8. Petit A,Castillo M, Santos M, Mellado B, Alcover JB, Mallofre C. KIT Expression in Chromophobe Renal Cell Carcinoma - Comparative Immunohistochemical Analysis of KIT Expression in Different Renal Cell Neoplasm. Am J SurgPathol 2004;28:676-78.
9. Brunelli M, Gobbo S, Cossu-Rocca P, Cheng L, Hes O, Delahunt B et al.Chromosomal gains in the sarcomatoid transformation of chromophobe renal cell carcinoma.Mod Pathol2007;20:303-9.

Source of funding - Nil
Conflict of interest - None declared