Archivos Españoles de Urología
ISSN: 0004-0614
urologia@arch-espanoles-de-urologia.es
Editorial Iniestares S.A.
España

Parada, David; Peña, Karla; Moreira, Otto

SARCOMATOID CHROMOPHOBE RENAL CELL CARCINOMA. A CASE REPORT AND REVIEW OF THE LITERATURE.

Archivos Españoles de Urología, vol. 59, núm. 2, marzo, 2006, pp. 209-214
Editorial Iniestares S.A.
Madrid, España

Arch. Esp. Urol., 59, 2 (209-214), 2006

SARCOMATOID CHROMOPHOBE RENAL CELL CARCINOMA. A CASE REPORT AND REVIEW OF THE LITERATURE.

David Parada[1], Karla Peña[1] y Otto Moreira[2].

Service of Pathology[1], Vargas Hospital. José María Vargas School of Medicine. Central University of Venezuela. Caracas. Venezuela.
Service of Urology[2], Vargas Hospital. Caracas. Venezuela.

Summary.- *OBJECTIVES: We report herein the clinical, histological, and immunohistochemical features of a case of sarcomatoid chromophobe renal cell carcinoma.*

METHODS/RESULTS: A 59-year-old woman referred a two-month history of constant right flank pain, and hematuria. A right radical nephrectomy was performed. Gross pathologic examination showed a tumor located in the lower part of the kidney with two different aspects. Histologically, the tumor was composed of two intermixed distinct morphologic components: a chromophobe renal cell carcinoma and a high-grade spindle cell sarcoma.

CONCLUSION: Our case represent a typical sarcomatoid chromophobe cell carcinoma. This unusual renal cancer has the potential to behave aggressively and to metastasize.

Keywords: *Kidney. Sarcomatoid Carcinoma. Chromophobe carcinoma. Immunohistochemestry*

Resumen.- *OBJETIVO: Describir los hallazgos clínicos, histológicos e inmunohistoquímicos en un caso de carcinoma renal cromofobo sarcomatoide.*

MÉTODOS/RESULTADOS: Paciente femenina de 59 años de edad quién refirió historia de dolor constante en flanco derecho y hematuria de dos meses de evolución. Se realizó una nefrectomía radical derecha. El examen macroscópico mostró un tumor localizado en la parte inferior del riñón con dos apariencias. Histológicamente, el tumor estuvo constituído por dos componentes morfológicos distintos entremezclados: carcinoma renal cromófobo y sacoma fusiforme de alto grado.

CONCLUSIÓN: Nuestro caso representa un típico carcinoma cromófobo sarcomatoide. Este cáncer renal infrecuente tiene el potencial de conducta agresiva y de metastizar.

Palabras clave: *Riñón. Carcinoma sarcomatoide. Carcinoma cromófobo. Inmunohistoquímiaca.*

INTRODUCTION

Chromophobe renal cell carcinoma is a rare variant of renal carcinoma, with distinct histochemical, ultraestructural, and genetic characteristics (1,2). They are relatively uncommon accounting for 5 % of renal neoplasm (3). This subtype of kidney cancer has been considered to show a better prognosis than conventional renal clear cell carcinoma. On the other hand, foci of high-grade spindle cells, often reminiscent of a malignant fibrous histiocytoma (sarcomatoid component), can occur in all histologic subtypes of renal cell carcinoma (RCC) and its presence is associated with poor prognosis, with a median survival following diagnosis of less than 1 year reported in most studies (4-12).

Correspondence to:
David Parada D, MD, MSc, PhD.
Service of Pathology.
Vargas Hospital.
San Francisquito a Monte Carmelo
Esquina El Recodo, San José
Apdo. 1010, Caracas. (Venezuela)
parada@cantv.net

Acepted for publication: May 12 th, 2005

In this report we present a rare case of sarcomatoid chromophobe renal cell carcinoma showing an aggressive behavior. The histologic, histochemical and immunohistochemical features are presented as well as a review of the literature.

CASE REPORT

A 59-year-old woman referred a two-month history of constant right flank pain, and hematuria. She had a noncontributory medical history. Her physical examination was unremarkable. A cystoscopy was performed, showing no alterations. An abdominal computerized tomography revealed a non-homogeneous mass, which measured 7 cm, involving the lower pole of the right kidney. The working diagnosis was renal cell carcinoma. She underwent a right radical nephrectomy. The patient died of multiple metastases eight months after the surgical procedure.

Pathological findings

The resected right kidney weighed 188 g. The tumor was located in the lower part of the kidney and measured 6.8 x 3 x 2 cm. On the cut surface the tumor showed a biphasic appearance, with one area yellowish-white in color, and the other area showed homogeneous aspect with hemorrhage, tan in color (Figure 1, A,B). The tumor partly invaded the surrounding adipose tissue. The renal sinus, vascular and ureteral margins of resection were free of tumor. The adrenal gland showed no gross abnormalities.

Histologically, the tumor was composed of two intermixed distinct morphologic components: a chromophobe renal cell carcinoma and a high-grade spindle cell sarcoma. The chromophobe renal cell carcinoma was composed of compact epithelial cells in solid sheets. The cells were of large size with well-defined borders and abundant, finely reticular, translucent cytoplasm (Figure 2 A,B). Characteristic perinuclear halos were also present, giving the cells a koilocytic appearance. The nuclei were centrally located and had irregular outlines with different degrees of hyperchromasia. These tumor cells were strongly positive for Hale´s colloidal iron satin. Admixed with the chromophobe renal cell carcinoma were areas of sarcomatoid component (Figure 2 A,B). The sarcomatoid cells were spindle, multinucleated and epithelioid. Some tumor cells showed deeply eosinophilic cytoplasm without cross-striation. Mitotic figures were frequently observed. The spindle cells were arranged in ill-defined fascicles with occasional storiform pattern. The sarcomatoid component showed an aggressive, dissecting growth pattern with invasion into the perirenal adipose tissue.

Immunohistochemical studies showed cytokeratin AE1/AE3, cytokeratin 7, epithelial membrane antigen and CD117 reactivity in chromophobe cells carcinoma, (Figures 2, C, D, E, F). The sarcomatoid component demonstrated vimentin and focally cytokeratin 7 reactivity. The sarcomatoid cells failed to stain for cytokeratin AE1/AE3, cytokeratin 20, epithelial membrane antigen, S-100 protein, alpha smooth muscle actin, Anti-Myo D1 and CD34. For specific immunohistochemical details see Table I.

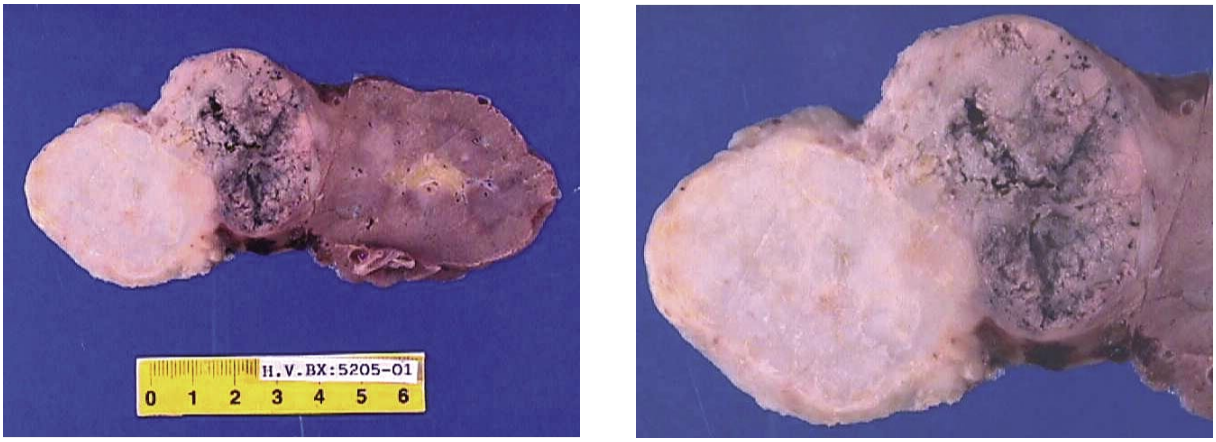

FIGURE 1A y B (Detail), Macroscopic finding showing tumor with biphasic appearance, with one area yellowish-white in color, and the other area showed homogeneous aspect with hemorrhage, tan in color.

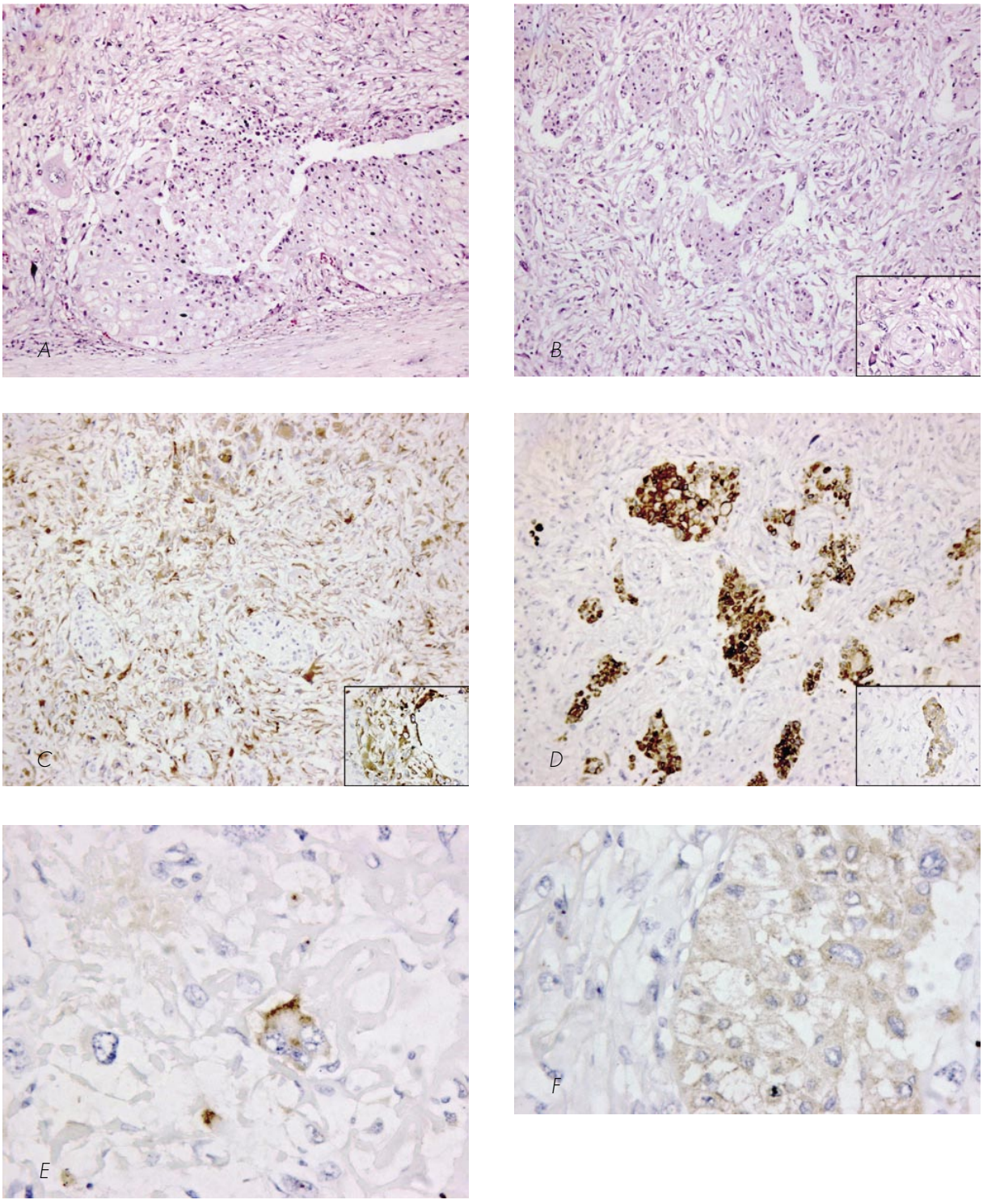

FIGURE 2. Microscopic and immunohistochemical findings. A, Histologically, the tumor was composed of chromophobe renal cell carcinoma and a high-grade spindle cell sarcoma. The chromophobe renal cell carcinoma was composed of compact epithelial cells in a solid sheets (H-E 100x). B, Sarcomatoid cells intermixed with chromophobe cell carcinoma (Detail) (H-E 100x, 400x). C, Sarcomatoid cells with intense positivity for vimentin (DAB 100x, 400x) D, Cytokeratin 7 with reactivity in chromophobe cell carcinoma (DAB 100x, 400x). E, Cytokeratin 7 showing focal inmunoreactivity in pleomorphic cell (DAB 400x). F, Citoplasmatic reactivity for CD117 (C-Kit) in neoplastic cells (DAB 400x).

TABLE I. ANTIBODIES USED FOR INMUNOHISTOCHEMICAL STUDIES.

Antigen	Clone	Source	Dilution	Pretreatment
CK AE1/AE3	AE1/AE3	Dako,Glostrup,Denmark	1:50	Steamer
CK 7	OV-TL 12/30	Dako,Glostrup,Denmark	1:50	Steamer
CK 20	Ks 20.8	Dako,Glostrup,Denmark	1:50	Steamer
EMA	E29	Dako,Glostrup,Denmark	1:100	Steamer
SMA	1A4	Dako,Glostrup,Denmark	1:100	None
Desmin	DE-R-11	Dako,Glostrup,Denmark	Prediluted	Steamer
Anti-Myo D1	5.8 A	Dako,Glostrup,Denmark	1:50	Steamer
S100	Polyclonal	Dako,Glostrup,Denmark	1:200	Steamer
CD34	QBEnd10	Dako,Glostrup,Denmark	1:50	Steamer
Vimentin	V9	Dako,Glostrup,Denmark	1:100	Steamer
CD117	Polyclonal	Dako,Glostrup,Denmark	1:200	Steamer

DISCUSSION

Sarcomatoid transformation in chromophobe renal cell carcinoma is extremely rare, with only, to our knowledge, sixteen similar cases reported in the English literature (Table II). We reviewed these together with our case. There was an apparent female preponderance. Of the sixteen cases, five occurred in men and eleven in women (M:F=1:2,2). The age of the patients ranged from 49 to 77 years (average: 60.31). In the largest series reported to date, of six cases of sarcomatoid renal cell carcinoma with foci of chromophobe renal cell carcinoma (CRCC), Akthar et al (5) found, similar relation between sex and the average age was 56.83. Probably, these findings suggest a presentation age older than conventional chromophobe renal cell carcinoma and appear that sarcomatoid chromophobe RCCs are more frequent in female patients. In regard to clinical symptoms, most patients had noted flank pain and hematuria. These clinical symptoms are similar to the other renal cell carcinomas.

Macroscopically, twelve carcinomas were located in the right kidney (75%) and four were located in the left side (25%). The tumor size ranged between 3 and 18 cm (average 9.97). Similar findings have been reported in CRCCs, although average size tumor was major in sarcomatoid chromophobe RCCs compared with the classical form (21). The lesion were widespread. In the sixteen patients, twelve have local spread (73.33%) and five cases showed distant metastases (33.33%). By contrast, in a recent analysis of 61 cases of chromophobe renal cell carcinoma Peryomaure et al. (21) found that the most common pathologic stage tumor was T1 in 65.6% of cases, and T2 in 31.1% patients. It is suggested that sarcomatoid chormophobe RRC is a more aggressive neoplasm compared with classic chromophobe carcinoma. Similar findings were obtained in the study by Cheville et al. (4). They demonstrated a very poor prognosis in the sarcomatoid chromophobe cell carcinoma compared with classic chromophobe cell carcinoma. Additionally, some reports indicate that sarcomatoid change is more common among patients with chromophobe cell carcinoma (5,22).

The coexistence of both histopathologic neoplasias, chromophobe cell carcinoma and sarcomatoid carcinoma, may be due to either dedifferentiation of the more differentiated chromophobe cell tumor or to the collision of two synchronous tumors. Actually, the dedifferentiation theory seems more accepted based on the evolution of renal carcinoma into a spindle cell morphology. This sarcomatoid change probably is the result of extensive chromosomal rearrangement, leading to an identical spindle morphology. Recently, an oncogene, KIT, has been shown to be involved specifically in the development of CRCC (23). Our findings confirmed the expression of KIT in classical CRCC carcinoma and probably support the hypothesis that KIT protein could be involve in the origin of CRCC. Additionally, in our case we could show no reactivity for CD117 in to the sarcomatoid component and this

TABLE II. PREVIOUSLY REPORTED SARCOMATOID CHROMOPHOBE RENAL CELL CARCINOMA.

Study	No. of patients	Age / Sex	Location in kidney (size, cm)	Local spread	Distant metastases	Diagnostic term use
Akhtar et al, 1997 (5)	6	57/F 56/M	Right(in 3) Left(in 3) (11.0)	Yes (in 3 pts)	Yes	Sarcomatoid renal cell carcinoma with chromophobe carcinoma
Gomez-Roman et al, 1997 (13)	1	61/M	Right lower (11.2)	Yes	No	Sarcomatoid chromopobe carcinoma
Hirowaka et al, 1998 (14)	1	57/F	Right upper (12.0)	-	No	Sarcomatoid renal cell carcinoma with chromophobe carcinoma
Kuroda et al, 1998 (15)	1	49F	Right upper (3.0)	Yes	No	Chromophobe renal cell carcinoma with sarcomatoid foci
Mai et al, 1999 (16)	1	65/M	Right lower (10.0)	Yes	No	Sarcomatous transformation of chromophobe renal cell carcinoma
Nagashima et al, 2000 (17)	1	72/F	Right lower (9.5)	Yes	No	Chromophobe renal cell carcinoma with sarcomatoid change
Tardio, 2000 (18)	2	77/F 77/F	Left mid (5.5) Right lower (9.5)	Yes (in 1pt)	No (in 2 pts)	Chromophobe renal cell carcinoma with sarcomatoid areas
Cserni et al, 2002 (19)	1	52/F	Right mid and lower (14.5)	Yes	No	Sarcomatoid renal cell carcinoma with foci of chromophobe cell carcinoma
Abrahams et al, 2003 (20)	1	55/M	Right lower (13.5)	Yes	Yes	Chromophobe renal cell carcinoma with sarcomatoid transformation
Current study	1	59/F	Right lower (6.8)	Yes	No	Sarcomatoid chromopobe carcinoma

could be interpreted as wide chromosomal change in CRCC producing spindle cell morphology. Finally, the collision theory seems unlikely because the close intermixing of the two patterns in some neoplasm, including the present one, and the rarity of each of the tumors.

In conclusion, our case represents a typical sarcomatoid chromophobe cell carcinoma. These tumors are not frequent and in contrast with the classical form of chromophobe cell carcinoma, the diagnosis carries a worse prognosis, because this unusual renal cancer has the potential to behave aggressively and

to metastasize. Larger studies are needed to elucidate the clinical behavior of sarcomatoid chromophobe cell carcinoma.

REFERENCES AND RECOMENDED READING

(*of special interest, **of outstanding interest)

1. THOENES, W.; STÖRKEL, S.; RUMPELT, H.J: "Human chromophobe cell renal carcinoma". Virchows Arch. B. Pathol. Oncol. Mol. Pathol., 48: 207, 1985.
2. KURODA, N.; TOI, M.; HIROI, M. y cols.: "Review of chromophobe renal cell carcinoma with focus on clinical and pathobiological aspects". Histol. Histopathol., 18: 165, 2003.
3. MURPHY, W.M.; GRIGNON, D.J.; PERLMAN, E.J.: "Renal cell carcinoma, chromophobe cell type". Silverberg SG, Sobin LH, eds. Tumors of the kidney, bladder, and related urinary structures. Washington, DC: American Registry of Pathology, 130, 2004.
4. CHEVILLE, J.C.; LOHSE, C.M.; ZINCKE, H. y cols.: "Sarcomatoid renal cell carcinoma. An examination of underlying histologic subtype and an analysis of associations with patient outcome". Am. J. Surg. Pathol., 28: 435, 2004.
5. AKHTAR, M.; TULBAH, A.; KARDAR, A.H. y cols.: "Sarcomatoid renal cell carcinoma: the chromophobe connection". Am. J. Surg. Pathol., 21: 1188, 1997.
6. BERTONI, F.; FERRI, C.; BACCHINI, P. y cols.: "Sarcomatoid carcinoma of the kidney". J. Urol., 137: 25, 1987.
7. CANGIANO, T.; LIAO, J.; NAITOH, J. y cols.: "Sarcomatoid renal cell carcinoma: biologic behavior, prognosis, and response to combined surgical resection and immunotherapy". J. Clin. Oncol., 17: 523, 1999.
8. DE PERALTA-VENTURINA, M.; MOCH, H.; AMIN, M. y cols.: "Sarcomatoid differentiation in renal cell carcinoma". Am. J. Surg. Pathol., 25: 275, 2001.
9. FARROW, G.M.; HARRISON, E.G.; UTZ, D.C.: "Sarcomas and sarcomatoid and mixed malignant tumors of the kidney in adults. Part III". Cancer, 22: 556, 1968.
10. MIAN, B.M.; BHADKAMKAR, N.; SLATON, J.W. y cols.: "Prognostic factors and survival of patients with sarcomatoid renal cell carcinoma". J. Urol., 167: 65, 2002.
11. RO, J.Y.; AYALA, A.G.; SELLA, A. y cols.: "Sarcomatoid renal cell carcinoma: clinicopathologic. A study of 42 cases". Cancer, 59: 516, 1987.
12. SELLA, A.; LOGOTHETIS, C.J.; RO, J.Y. y cols.: "Sarcomatoid renal cell carcinoma: a treatable entity". Cancer, 60: 1313, 1987.
13. GOMEZ-ROMAN, J.J.; MAYORGA-FERNANDEZ, M.; FERNANDEZ-FERNANDEZ, F.: "Sarcomatoid chromophobe cell renal carcinoma: Immunohistochemical and lectin study in one case". Gen. Diagn. Pathol., 143: 63, 1997.
14. HIROKAWA, M.; SHIMIZU, M.; SAKURAI, T.: "Sarcomatoid renal cell carcinoma with chromophobe cell foci: Report of a case". APMIS., 106: 993, 1998.
15. KURODA, N.; HAYASHI, Y.; ITOH, H.: "A case of chromophobe renal cell carcinoma with sarcomatoid foci and a small daughter lesion". Pathol. Int., 48: 812, 1998.
16. MAI, K.T.; VEINOT, J.P.; COLLINS, J.P.: "Sarcomatous transformation of chromophobe cell renal carcinoma". Histopathology, 34: 557, 1999.
17. NAGASHIMA, Y.; OKUDELA, K.; OSAWA, A. y cols.: "Chromophobe renal cell carcinoma with sarcomatoid change: A case report". Pathol. Res. Pract., 196: 647, 2000.
18. TARDIO, J.C.: "Chromophobe cell renal carcinomas with sarcomatoid areas". Histopathology, 36: 184, 2000.
19. CSERNI, G.; KOVACS, R.B.; TARJAN, M. y cols.: "Sarcomatoid renal cell carcinoma with foci of chromophobe carcinoma". Pathol. Oncol. Res., 8: 142, 2002.
20. ABRAHAMS, N.A.; AYALA, A.G.; CZERNIAK, B.: "Chromophobe renal cell carcinoma with sarcomatoid transformation". Ann. Diagn. Pathol., 7: 296, 2003.
21. PEYROMAURE, M.; MISRAI, V.; THIOUNN, N. y cols.: "Chromophobe renal cell carcinoma. Analysis of 61 cases". Cancer, 100: 1406, 2004.
22. DELAHUNT, B.: "Sarcomatoid renal carcinoma: The final common dedifferentiation pathway of renal epithelial malignancies". Pathology, 31: 185, 1999.
23. YAMAZAKI, K.; SAKAMOTO, M.; OHTA, T. y cols.: "Overexpression of KIT in chromophobe renal cell carcinoma". Oncogene, 13: 847, 2003.