Abstract. Background: Renal carcinosarcoma is a rare tumor with 12 reported cases in the world literature. To our knowledge, carcinosarcoma of a renal allograft has not been reported to date. Case Report: A multifocal urothelial carcinosarcoma of a transplanted kidney in a 49-year-old woman is described. Genomic analysis of the extracted nuclei of all the neoplastic cells showed uniformly XY genotype proving the transplant origin of the tumor. Results: The carcinogenic role of immunosuppressive medications in kidney-transplanted patients is reported in the literature. In this case, immunosuppression may have promoted the carcinosarcoma. Conclusion: Renal transplant patients should be monitored for the development of malignancy in the allograft and elsewhere.

Following renal transplantation, the development of malignancy is three times as likely as in the general population. Diminished immune surveillance is the most likely explanation of the phenomenon. The urinary tract is commonly involved including the native kidneys and the urinary bladder. Approximately 15% of these malignancies arise from the urothelium (1). Twelve cases of carcinosarcomas have been reported (2-5). In all of these cases, the malignancy arose from the urinary tract of the recipient. However, the case reported is of carcinosarcoma arising from the donor allograft.

Case Report

A 49-year-old woman received a renal allograft in February 2001 from a male cadaveric donor. Her immunosuppression regime consisted of Cyclosporin 50 mg once a day. Two years post-transplantation, she presented with painless gross hematuria. Urine cytology revealed atypical cells suspicious for urothelial carcinoma. Ultrasound examination showed papillary tumor in the bladder and pylectasia in the transplanted kidney. She developed oliguria and her serum creatinine started to increase. A percutaneous nephrostomy was inserted and drainage from the nephrostomy was hemorrhagic urine. Cystoscopy revealed multiple bladder tumors extending from the implanted ureteric orifice into the bladder wall (Figure 1). In view of these findings, a graft nephrouretectomy with cystectomy was proposed, followed by maintenance hemodialysis. However, due to iliac vein injury after the graft nephrouretectomy, cystectomy was deferred. On recovery, the patient decided against any further surgery.

Results

Macroscopic examination of the specimen revealed a 4.5-cm, vaguely demarcated, gray-tan fragile neoplastic tissue in the renal pelvis involving the renal parenchyma and the ureter. Microscopic examination of the specimen demonstrated neoplastic proliferation of urothelial cells with dual phenotypic appearance and large areas of necrosis. The majority of the lesion was composed of spindle and scattered epithelioid-like cells. In other sections, the tumor displayed features of a grade 3 urothelial carcinoma with markedly increased mitotic rate (Figure 2A and B). The surgical resected margins were free of tumor tissue. Intratubular spread of malignant cells was noted in the adjacent renal tissue. The neoplastic cells, both the spindle and the epithelioid, disclosed positive immune reaction with cytokeratin (CK) antibody. In addition, in the sarcomatous area, co-
expression of CK and vimentin was noted. Therefore, the diagnosis of carcinosarcoma of the renal pelvis was confirmed.

Two months later, the patient presented with hematuria and a 4-cm subcutaneous mass at the site of previous surgery. She underwent a TUR of the residual bladder tumor and excision of the subcutaneous tumor. Specimens from both origins showed infiltration of the carcinosarcoma (Figure 2C).

FISH (6, 7) analysis of the extracted tumor nuclei from the paraffin block of all the lesions uniformly showed the XY genotype (Figure 2D), proving that the tumor originated from the donor kidney. Other staging examinations such as chest X-ray, abdominal and pelvis CT showed no further metastasis or recurrence.

Due to uremia, only irradiation was recommended. The patient received 40-Gy external beam irradiation to both, the bladder and the skin lesion. Follow-up cystoscopy was clear and the bladder biopsy was negative. The patient remains symptom-free and has no bladder tumor recurrence at 20 months of follow-up.

Discussion

Although carcinosarcoma of the urinary tract is an unusual malignancy, it has been described in association with renal transplantation. In most cases it originates from the recipient’s urinary tract, but it may also arise from the transplant. In our case of an XX genotyped patient, the genomic analysis of the extracted nuclei of all the neoplastic cells showed an XY genotype. This confirms that the tumor originated from the donor kidney. Since the lesion presented more than 2 years
after transplantation, it is unlikely to have been present at the
time of the transplant. Immunosuppression probably
contributed to the propagation and multifocality of the tumor.

**Conclusion**

Recipients of renal transplants should be followed closely
for the development of tumors, and those presenting with
symptoms such as hematuria deserve prompt evaluation.

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