M. Naroienejad MD[1].
R. Salouti MD[2].

Renal Cell Carcinoma in Transplanted Kidney

Immunosuppressive drugs are prescribed routinely to kidney transplant recipients to prevent rejection. These medications are associated wi th an increased risk of secondary malignancies, including renal cell carcinoma in the transplanted kidney itself.
We present a case of renal cell carcinoma in a transplanted kidney.

Keywords: renal transplantation, renal cell carcinoma, malignancy, immunosuppressive drugs

Introduction:

Renal transplantation is used with increasing frequency worldwide as an effective treatment for end-stage renal disease. Several immunosuppressive drugs are prescribed routinely to kidney recipients to prevent transplant rejection. It is well known that immunosuppressive medications are associated with an increased risk of secondary malignancies. [1, 2]

It is generally estimated that in approximately six percent of organ transplant recipients, a kind of neoplasm will develop. There are some reports in the literature about the occurrence of renal cell carcinoma in transplanted kidneys. [3-6] The majority of renal cell carcinomas occur in the native kidney; in the transplanted kidney, however, they represent only 4.6% of cancers in organ transplant recipients and 10% of all cancers in kidney grafts. Less than 50 cases of renal cell carcinomas have been reported in the transplanted kidney. [3]

The cause of the increased incidence of malignancy in immunosuppressed patients may be the viral transformation of host cells, chronic antigenic stimulation, administration of carcinogenic medications, or impaired immunosurveillance. [7] The accurance of lymphoid malignancies is clearly increased but not visceral tumors. Anogenital carcinomas are a special problem in transplant recipients in whom the incidence is twice the normal. [8]

The carcinomas may occur one to 15 years after transplantation and range from carcinoma in situ to metastatic disease.

Case Pesentation

A 34-year-old man was referred to our imaging center for sonography of a transplanted kidney. The patient had a history of end-stage renal disease due to chronic glomerulonephritis associated with streptococcal pharyngitis, and had undergone two renal transplantations. The first transplantation was 8 years prior to admission that was rejected after a month, and the second was 7 years prior to admission. After the second transplantation, the patient had annual follow–ups, so it was his 7th follow-up when we visited him. The patient did not look ill. He did not report fever, nausea and vomiting, or weight loss. On his recent

1. Assistant professor, Department of Radiology, Hasheminejad hospital, Iran University of medical sciences, Tehran, Iran.
2. Department of Radiology, Hasheminejad hospital, Iran University of medical sciences, Tehran, Iran.

Corresponding Author:
Mino Naroienejad
Address: Hasheminejad hospital, Valinejad alley, Valiasr St., Tehran, Iran.
PO Box: 1969714713
Tel: 0098-21 88797761-5
Fax: 0098-21 88796539
E-mail: minoonar@yahoo.com

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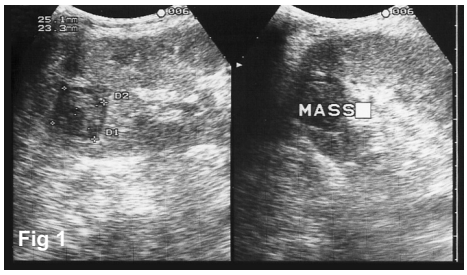
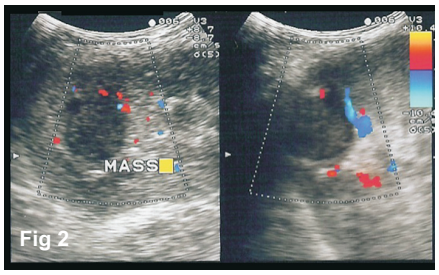




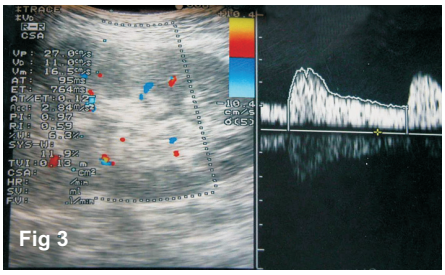


Fig 1. A 25×23 mm Hypoechoic lesion on sonography

Fig 2. The mass was hypovascular on color Doppler sonography

Fig 3. A low- resistance pattern of intera renal arthery

laboratory report, we noticed hematuria (RBC=10), proteinuria (pr=3+), and a rise of serum creatinine to 3.2 mg/dL and BUN to 31 mg/dL. Other lab data were in the normal limits.

On ultrasound examination, the transplanted kidney had normal size and echogenicity, however a well-defined round mass with mixed echogenicity, 25 mm × 25 mm in diameter, was seen in the upper pole cortex of the transplanted kidney (Figure 1).

On Duplex Doppler ultrasound, there were multiple vessels running around the mass but there was no evidence of visible vessels within the mass itself, despite the low sensitivity setting of the ultrasound machine. Thus, the mass was assumed to be hypovascular (Figure 2).

On Doppler spectral analysis, the blood flow of segmental and interlobar arteries of the transplanted kidney showed a normal low resistance pattern with the resistive index equal to 0.59 (Figure 3).

The ultrasound device was a Hitachi EUB 525 (Japan) with a 3.5 MHz convex transducer.

The patient was referred for a CT scan of the transplanted kidney (without contrast since the serum creatinine level was high). The CT scan apparatus was Neusoft (China) spiral dual-row detector. On CT scan examination there was no evidence of any mass lesion or bulging in the renal contour due to the small size of the tumor and not using the contrast media; so an MRI study was indicated.

On MRI, the mass was well-marginated and low signal intensity on both T1- and T2 weighted images. The MRI apparatus was a General Electric, Sigma, 1.5 Tesla (USA) (Figure 4).

Renal biopsy under the guide of ultrasound was performed. Fine needle aspiration biopsy was taken with a 16-guage needle. The pathologic examination of the sample revealed renal cell carcinoma. The patient underwent surgery. During the operation, the surgeons were not able to detect the tumor by inspection or palpation; therefore the tumor was localized with ultrasonographic guidance and was excised with safe margins (Figures 5 and 6).

Microscopic examination of the pathology sections revealed neoplastic tissue consisting of cells arranged in sheets, cell-lined trabecular and papillary structures, and round to oval nuclei and small to medium-sized clear to eosinophilic cytoplasms associated with areas of hemorrhage, all consistent with renal cell carcinoma (RCC). A small rim of normal appearing renal tissue was noted in the tumor's periphery (Figure 7).

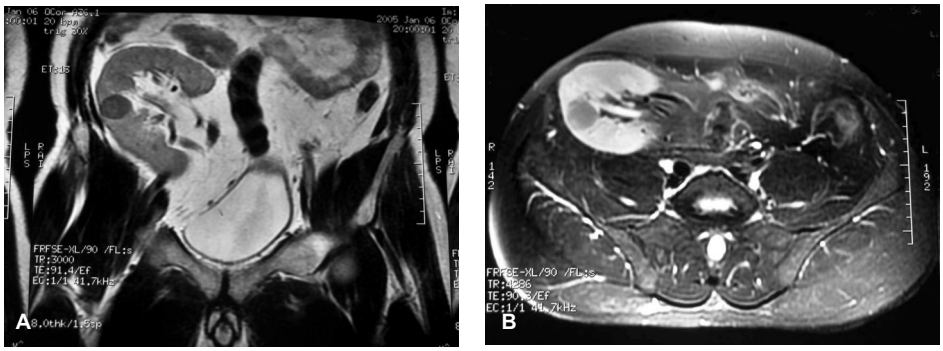
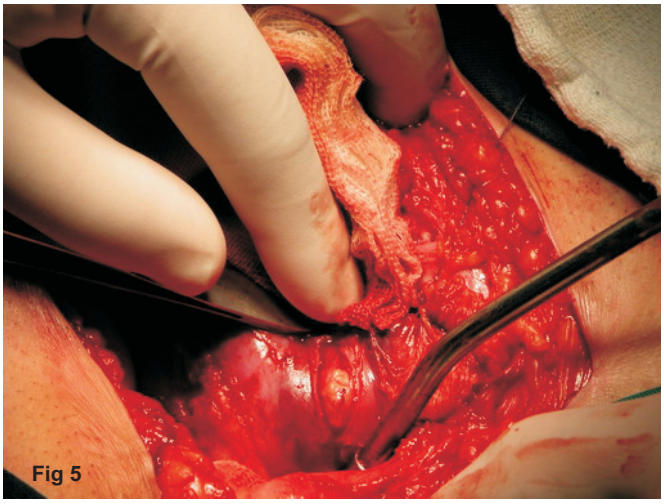


Fig 4 (A,B). The hyposignal mass on T1-weighted MRI on T2 weighted Image



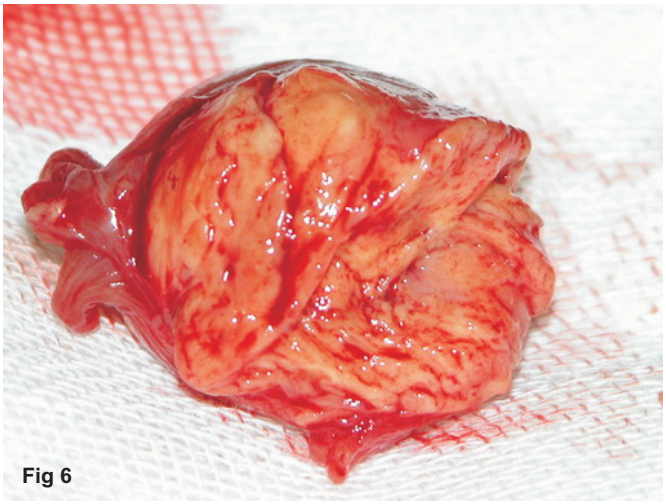


Fig 5. Interoperation view of transplanted kidney

Fig 6. Gross view of the mass after resection

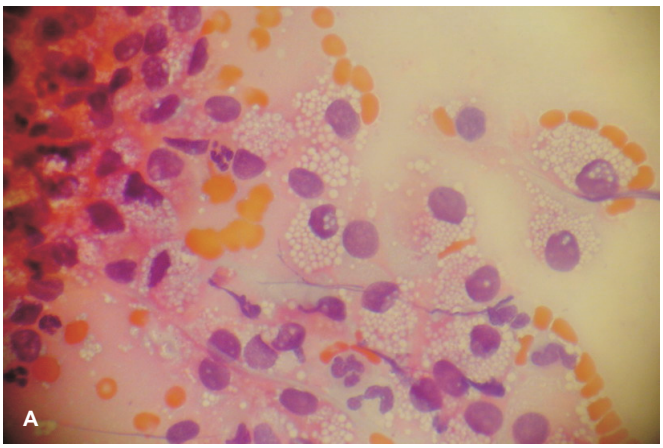
Discussion

Neoplasms develop in approximately six percent of organ transplant recipients. The incidence of lymphoid malignancies, anogenital carcinomas, and skin cancers is clearly increased, but not the visceral tumors.[1, 2] The pattern of malignancy may vary with the immunosuppressive regimen. Compared with patients receiving prednisone and azathioprine therapy, those on cyclosporine experience a higher incidence of lymphoma and Kaposi's sarcoma but a lower incidence of gynecologic neoplasms. [9,10] The increased incidence of malignancy in immunosuppressed patients may be due to viral transformation of host cells, chronic antigenic stimulation, administration of carcinogenic medications, or impaired immunosurveillance. [7]

The malignancy in our patient was of renal cell carcinoma type which is usually rare in transplanted kidneys. The RCC has a wide variety of symptoms (malaise, anorexia, pyrexia) but this patient did not have any of such symptoms. [11] On ultrasound it is usually iso- or hypoe-chogenic as compared to the normal kidneys but most tumors show some heterogeneity as was observed in this patient. [12] On CT scan, RCC is usually isodense or hypodense to normal renal tissue; but we could not detect the lesion on CT that we attribute to not using the contrast media. [13] On MRI, RCC appears as intermediate-intensity signal on T1 weighted sequences, high-intensity signal on STIR, and variable but often intermediate to high intensity on T2 weighted sequences. In this patient it was low-intensity on both of the sequences.[12]

Conclusion

The occurrence of renal cell carcinoma in this patient and other individuals with a transplanted kidney published in the literature emphasizes the importance of annual ultrasonographic surveillance of renal



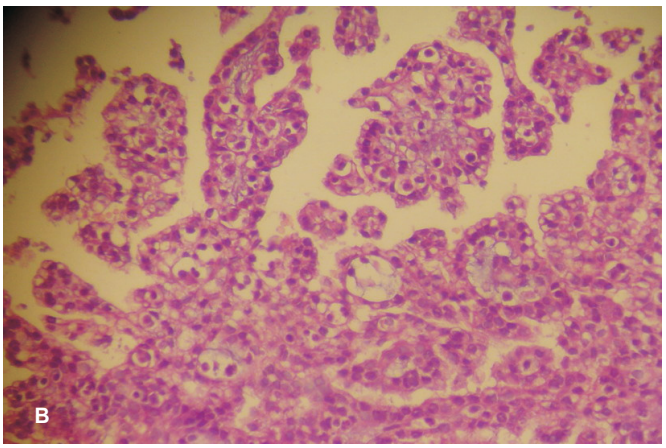


Fig 7 (A,B).Microscopic view of the neoplastic tissue

grafts, especially in the patients on immunosuppressive medications.

Because the risk of tumor formation in other organs cannot be underestimated, a specific policy should be made to evaluate the whole body organs for possible occurrence of neoplasms.

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