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ACHILLES HEEL OF CO-MORBID CONDITIONS IN THE USE OF CADAVERIC PAEDIATRIC KIDNEYS IN TRANSPLANTS - ALLOGRAFT RHABDOID TUMOUR - A DONOR DERIVED HAZARD?

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Summary

Transplantation improves the quality of life, but not without risks. Malignancy after transplantation is one among the important causes of mortality. The usage of immunosuppression enhances the risk of developing cancer in transplant recipients. In addition to this, these patients are at a risk of developing donor derived or donor transmitted cancers. Although these malignancies are uncommon, they have worse outcome and higher mortality rates. These cancers either can be transmitted at the time of transplantation or develop over a period from donor's tissue after transplantation. We present a case of an adult recipient who developed malignant rhabdoid tumour after successful dual en bloc paediatric kidney transplant.

Key words: rhabdoid tumour, renal transplant, en bloc, donor derived cancer, peadiatric transplant

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INTRODUCTION

The frequency of malignancy after transplantation is one among the major causes of mortality [1]. The use of immunosuppressants, which is the main stay after transplantation, amplifies the incidence of de novo cancer in addition to that of donor derived cancers [2]. Most commonly occurring malignancies after transplant are, Kaposi's sarcoma, skin cancers, post transplant proliferative disease(PTLD), lung, prostrate, hepato cellular and kidney cancers [3]. Donor transmitted or donor derived cancers reported in the literature are few and malignant rhabdoid tumour (MRT) incidence in the allograft is very rare. It is a rare aggressive tumour, found most commonly in children. We report the outcome of allograft of an adult renal transplant recipient who developed MRT.

CASE DESCRIPTION

A 14-month-old female child (one of the twins) was declared brain dead due to cavernous venus sinus thrombosis secondary to severe dehydration. Before donation, the donor's abdominal sonography was normal. Patient was hemodynamically stable. Both the kidneys were retrieved en-bloc. Paired

kidneys were transplanted into a 56-year-old female recipient with end stage renal disease who was on hemodialysis for 7 years. Allografts were flipped from right to left, the left kidney was placed in right paracolic gutter, and the right was placed in true pelvis with hilum resting on psoas muscle. Allograft vena cava anastomosed end to side to the recipient's external iliac vein, aorta anastomosed to external iliac artery. Patient was on standard triple drug immunosuppression. After initial dialysis recipient attained a nadir creatinine of 1.2 mg/dL after 3 weeks post transplant. Graft function was better and the follow-up serum creatinine level at one year was 0.87 mg/dl. After one year, patient complained severe abdominal pain. Computerized tomography (CT) abdomen-pelvis showed a mass like tumour in the medial kidney with no cortico- medullary differentiation. Right kidney (Fig. 1) had a rupture, and ill-defined hemorrhagic areas. Nephrectomy was performed, histopathological review showed partial loss of cortico-medullary differentiation. The renal parenchyma showed infantile glomeruli. Foci showed infiltrate of atypical cells arranged in sheet like pattern. The cells have irregular nuclei, conspicuous nucleoli with moderate rim of eosinophilic cytoplasm. Few cells showed rhabdoid morphology (Fig. 2A-B). Immunohistochemistry (FIG. 2C-D) revealed malignant rhabdoid tumour with loss of INI-1 expression in the neoplastic cells, and high (55%) Ki-67 proliferation index.

Radical nephrectomy was performed. PET-scan revealed metabolically active large lobulated mass in the right parailiac region extending into pelvis. The overall imaging features were suggestive of metastatic nodal disease. Omentectomy procedure was performed where all the pelvic lymphnodes, tissue within the pelvis, meso-rectal deposits were removed. Chemotherapy was initiated, but the patient could not survive post-operative sepsis.

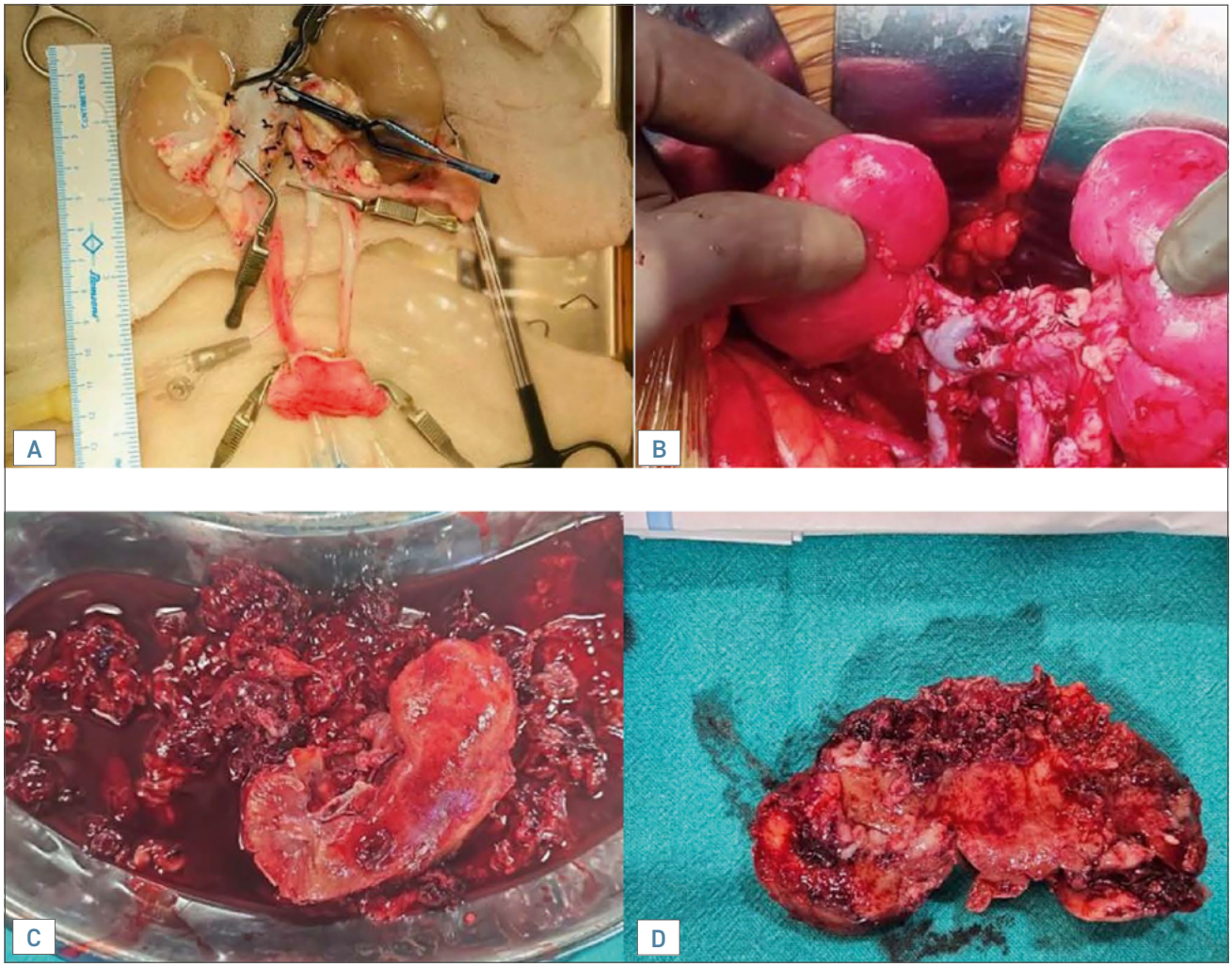

Figure 1. Showing. **A**) dual en bloc kidneys retrieved along with a cuff of bladder; **B**) both kidneys placed in right iliac fossa on either side of psoas muscle; **C,D**) graft nephrectomy along with ruptured hemorrhagic tissue.

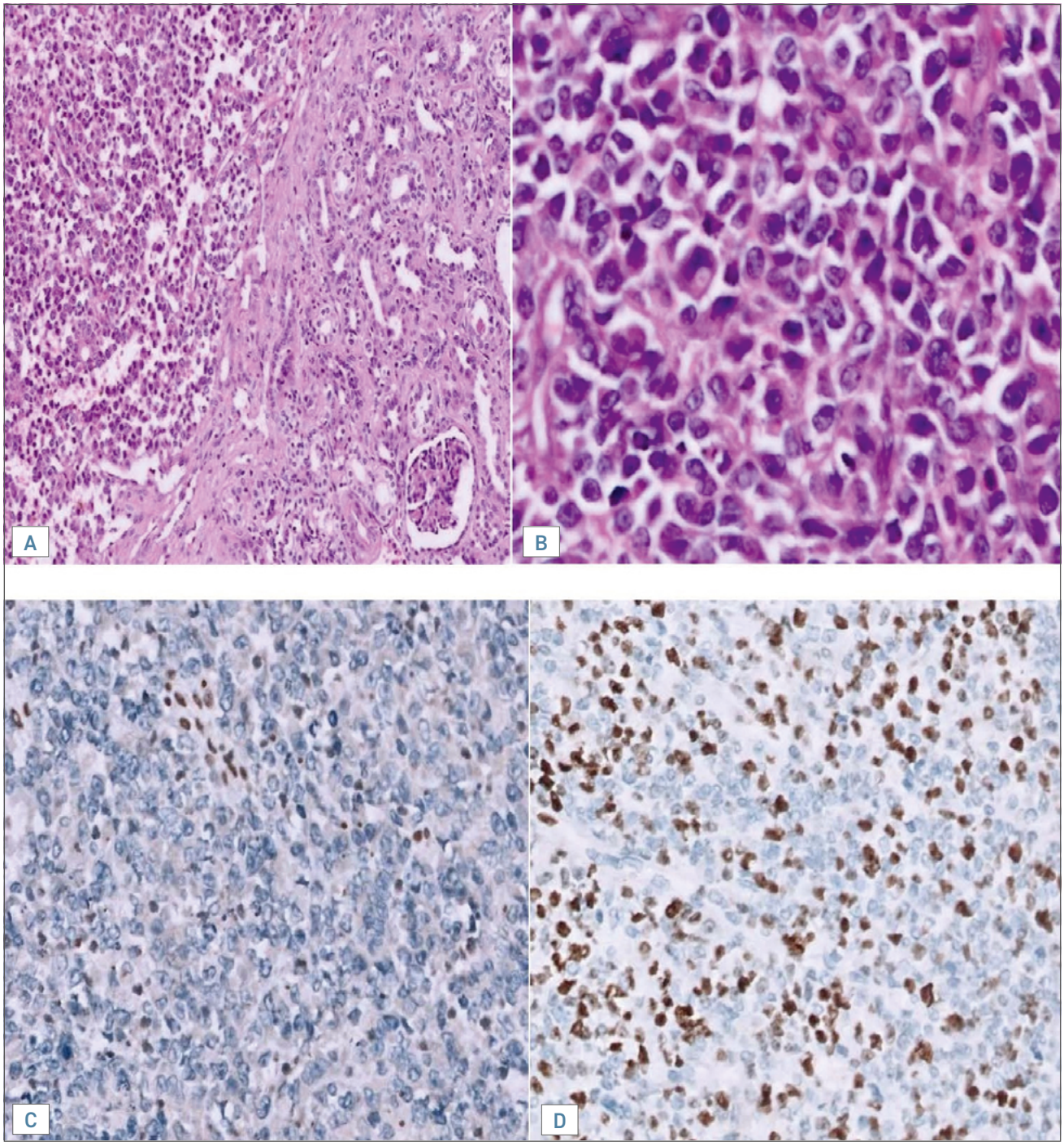

Figure 2. Histopathology and Immuno histochemistry. **A**) tumor with adjacent renal parenchyma (H&E, 5x); **B**) sheets of neoplastic cells with small blue round cells, few with rhabdoid morphology (H&E, 40x); **C**) INI-1 expression lost in tumor cells (20x); **D**) Ki67 index- about 55% (20x).

DISCUSSION

To best of our knowledge, this case of malignant rhabdoid tumour in allograft is the third one reported. In all these three cases, kidneys were received from peadiatric cadaver donors. The risk of cancer development is 2-4 folds higher in transplant recipients compared to general population [4]. Mortality rate due to malignancies

was higher compared to infections in post transplant patients [5]. Gaurav et al. [6] reported renal cell carcinoma, in three adult recipient allografts. Interestingly, all the three recipients developed ESRD due to IGA nephropathy. It was also been stated that the RCC was not pre existing. It has been perceived that the early incidence of malignancy could be due to the presence of preexisting cancer cells in the renal parenchyma. Rhabdoid tumors in allograft reported in the literature were only two. MRT is an aggressive and highly malignant tumour with abysmal outcomes. Xiong et al. [7] reported MRT in an adult female recipient who received dual en bloc kidneys from an infant. MRT developed after 4 months post transplant. They reported that upon FISH and STR analysis that the Y chromosome in the tumour cell was of donor origin and considered MRT might be donor transmitted. In another case, Zhang et al. [8] reported a similar case but both recipient and the donor were children. It was reported that a 12-year-old boy received kidney from 2-year-old cadaveric male donor. Within six months patient developed MRT. They were not sure whether the tumour origin was from the metastatic cell from the donor's CNS tumour or pre existing rhabdoid tumour predisposition syndrome of the recipient. Coincidentally in both these reports, the donors were died due to brain tumours (suspected astrocytoma). We can speculate that in these two cases, it was donor transmitted as around 15% of MRT is associated with atypical teratoid/rhabdoid tumour (AT/RT) of the brain. However, in our case the donor was declared brain dead due to cavernous venous sinus thrombosis secondary to severe dehydration. The radiological studies did not reveal any tumours. We can only speculate that there could be a malignant cell or a minute tumour, which remained unnoticed and later, proliferated in the allograft. We can only perceive that the allograft tumour was donor-derived owing the nature of rhabdoid tumours. It will be very useful to distinguish whether the tumour is donor origin or from *de novo* occurrence in the recipient to reiterate tumor genotype and phylogenesis. Although rhabdoid tumour prevalence in children less than 2 years is about 1-2% and has familial predisposition, we have advised parents to screen the other twin sibling. In conclusion-a careful pre-transplant evaluation for preneoplastic lesions is very crucial as these lesions may develop very rapidly into malignant tumors. We emphasize that these kinds of cases must be reported, to make amendments in cadaveric donor selection, to avoid risks and life-threatening predicaments.

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Conflict of interest statement

The authors declare no conflict of interest.

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Author contributions

UM, PP, GM, SH, DN, PK, SS: conceptualized and edited the manuscript; SK: manuscript preparation.

Ethical consideration

This study was approved by the Krishna Institute of Medical sciences (approval number: IRB/IACUC: KIMS/IEC-BHR/2024/91-07 approved 31/0824).

The research was conducted ethically, with all study procedures being performed in accordance with the requirements of the World Medical Association's Declaration of Helsinki.

Written informed consent was obtained from each participant/patient for study participation and data publication.

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