**LETTERS TO THE EDITOR**

**Chronic Myeloid Leukemia After Living Donor Liver Transplantation**

A 51-year-old Taiwanese man was a known hepatitis B virus carrier with cirrhosis and bilobar hepatocellular carcinoma (HCC). He underwent four episodes of transcatheter embolization for the HCC. On follow-up, he had HCC recurrences and was advised liver transplantation. He underwent routine pretransplant workup and subsequently underwent right lobe living donor liver transplantation. The perioperative course was uneventful. The immunosuppression used tacrolimus, mycophenolate mofetil, and prednisone. Posttransplant, he underwent 10 cycles of doxorubicin-based chemotherapy due to tumor invasion to the hilar soft tissue and microscopic portal vein tumor thrombosis. He did well postchemotherapy and had no episodes of graft rejection or HCC recurrence.

At 6 months posttransplant, he developed nonspecific leukocytosis. At 13 months posttransplant, his white blood cell count (WBC) was 46.2 $\times 10^3$. At 14 months posttransplant, the leukocytosis increased to 63 $\times 10^3$ (segmenters 49, bands 17, lymphocytes 7.5, monocytes 3.5, eosinophils 1.5, basophils 4, blasts 1, promyeloblast 1, myeloblast 2.5) with no apparent focus of infection (Supplemental Table 1). The C-reactive protein was 3.14. He was advised chromosomal studies and bone marrow biopsy. Leukemia was entertained. Cytogenetic analyses done on Geimsa banded chromosomes from cultured bone marrow cells showed 46, XY, t(9; 22)(q34q11), 100% (Supplemental Fig. 1). A genetic study from peripheral blood sample in the nested polymerase chain reaction assay showed b2a2 BCR-ABL. Bone marrow biopsy revealed hypercellular marrow with myeloid and megakaryocytic hyperplasia, eosinophilia, and basophilia consistent with myeloid leukemia, chronic phase (Supplemental Table 2; Supplemental Fig. 2). Cytoreduction with hydroxyurea was started. Complete hematologic remission (CHR) was reached in 2 months, and continuous CHR thereafter. The WBC count decreased from 95.1 $\times 10^3$ to 4.3 $\times 10^3$ within 7 months treatment with hydroxyurea. Imatinib was started after 9 months of hydroxyurea treatment. Continuous CHR was also noted with imatinib; and genetic study done from peripheral blood samples at 3 months and 6 months after imatinib treatment showed continuous major molecular remission (Supplemental Table 3).

At 40 months posttransplant to present date, the patient is alive with no HCC recurrence, and no episode of graft rejection. He remains on CHR 25 months after the diagnosis of leukemia. His current medications include low-dose tacrolimus, mycophenolate, and imatinib.

Myeloproliferative disorder is a life-threatening condition that can present after the use of immunosuppression in order to prevent rejection in transplantation. However, acute leukemias are rare after solid organ transplantation with an incidence of 0.2–2.5% in reported series (1). There are approximately 13 cases of acute leukemia after solid organ transplant reported in the English medical literature (1–6). Chronic myeloid leukemia (CML) has not been reported after liver transplantation. There were no molecular data of the BCR-ABL at the time of transplantation. However, serial pretransplant hematologic data showed that all hematologic parameters were within acceptable limits. In the early chronic phase of CML, the most common presentation is leukocytosis or thrombocytosis only. Leukocytosis, which was noted for about 6 months before the diagnosis of CML was made, may have been suppressed by doxorubicin (Table 1). Doxorubicin may have suppressed hematopoiesis whereby the patient presented with leukocytosis.

<table>
<thead>
<tr>
<th>TABLE 1. Pretransplant and posttransplant hematologic data</th>
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<tr>
<td><strong>Date</strong></td>
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<tr>
<td>Event</td>
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<tr>
<td>White blood cell count ($\times 10^3$/mm$^3$)</td>
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<td>Hemoglobin (g/dL)</td>
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<td>Hematocrit (%)</td>
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<td>Platelet ($\times 10^3$/mm$^3$)</td>
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<td>Prothrombin time (seconds)</td>
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<td>Partial thromboplastin time (seconds)</td>
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kopenia at that time delaying the diagnosis of CML.

In summary, although rare, leukemia should be considered in any posttransplantation recipient presenting with hematological abnormalities and history of posttransplant chemotherapy.

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Donor Kidneys With Small Renal Cell Cancer or Low-Grade Lower Ureteral Cancer Can Be Transplanted

The shortage of donor organs is a world-wide phenomenon. In Japan deceased organ donation traditionally has not occurred. The great majority of kidneys for transplantation come from living donors. Because of the great shortage of donor organs from living or deceased donors, it is important to use all sources of transplantable kidneys. We report here four cases of successful renal transplantation using kidneys from donors with renal or lower ureteral cancers.

The four donors were patients in other hospitals. Donor patients and their families were informed about the therapeutic options based on the strict standard urological criteria. They all consented on the resection and possible donation if the donor kidneys were medically usable.

One kidney with a clear cell adenocarcinoma, G1>G2, pT2, 3.5 cm in diameter was surgically removed and the tumor was excised on the back table. Lower ureteral cancers were excised from three kidneys. The margins of the remaining ureters were cancer free as determined by frozen section. Histological examination of these three ureters revealed transitional cell carcinoma (TCC), G1>G2, pT1: TCC, G3, pT2: TCC, G2, pT2, respectively. The extirpated organs were perfused with University of Wisconsin solution after removal from the patients and stored after the cancers were excised.

The recipients and their families were fully informed about the possible risk of recurrence of cancer, and they all consented to have transplantation. The donor kidneys were transported to Kure Kyosai Hospital where transplantation was performed.

The operations were done in November of 1997 and in March, July, and September of 2001. The donors’ ages ranged from 62 to 74 years, and the recipients were 42 to 56 years old. One patient had previously had two kidney transplants; the other three had one prior transplant. All received healthy kidneys from related donors, but were on hemodialysis due to rejection at the time of our operation.

After transplantation, all cases developed humoral or cellular rejection reactions of various degrees. The rejections were overcome by plasma exchange, monoclonal antibody (Orthoclone OKT3), and/or steroid pulse therapy.

The recipients were followed up carefully at our outpatient clinic after surgery. All survived for more than 62–109 months without any sign of cancer recurrence. Their creatinine levels were stable (range: 1.5–2.8 mg/dl). All recipients are physically and mentally healthy with gratitude to the unknown donors. One donor was lost to follow up. The other three are alive and cancer free.

In the literature, we found reports about patients who received renal transplants after resection of localized cancer from the donors’ kidneys (1, 2). A study was done on cancer transmission by cardiopulmonary grafts from cancer-carrying donors (3). Kidney transplantation using kidneys with lower ureteric cancers have not previously been reported. Our letter suggests that 1) the kidneys with small renal cancer and low-grade lower ureteral cancer may be used for transplantation, 2) the chronic shortage of donor kidneys may be alleviated by widespread application of our approach.

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REFERENCES


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