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Case Report

Kidney Transplantation for Kidney Failure Due to Multiple Myeloma: Case Reports

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Transplantation centers have historically considered a history of multiple myeloma as a contraindication to kidney transplantation due to high recurrence rates and poor transplant survival. However, there have been significant advances in the treatment of multiple myeloma, with improved patient survival, which may allow for successful kidney transplantation in these patients. We report on 4 patients who underwent kidney transplantation at our institution between 2009 and 2015 after having achieved a very good partial response or better with chemotherapy and autologous stem cell transplantation. All 4 patients received kidneys from living donors; 2 underwent induction therapy with basiliximab, and 2, with thymoglobulin. One patient had progression of myeloma, which responded well to therapy. All had functioning transplants at 1 year after kidney transplantation. No patients experienced a rejection episode or infections with BK polyomavirus or cytomegalovirus, with follow-up ranging from 16 to 58 months after kidney transplantation. Our experience suggests that kidney transplantation is feasible in a subset of patients with multiple myeloma. Future studies are necessary to compare outcomes in these patients with other high-risk patients undergoing kidney transplantation.

INDEX WORDS: Kidney transplantation; multiple myeloma; autologous stem cell transplantation (ASCT); outcomes; end-stage renal disease (ESRD); kidney failure; renal replacement therapy (RRT); RRT modality; hematologic malignancy; light chain deposition disease (LCDD); bortezomib; remission; case report.

Multiple myeloma is a plasma cell dyscrasia that accounts for 1% of malignant diseases and 10% to 13% of all hematologic malignancies.[1,2] Decreased kidney function is a common complication seen in almost 50% of patients with multiple myeloma, with 2% to 12% of cases progressing to kidney failure.[2,3] Kidney disease related to multiple myeloma is associated with a marked increase in morbidity and mortality.[2]

In a retrospective study of US Renal Data System data, Abbott et al[4] reported that among 375,152 patients initiated on dialysis therapy from 1992 to 1997, a total of 3,298 (0.88%) had multiple myeloma. Patients with multiple myeloma had a 2-year all-cause mortality rate of 58% versus 31% in all other dialysis patients and a 2.5 times higher relative risk for death. Survival rates remained low with conventional therapies for multiple myeloma due to poor response rates, early relapse, and poor long-term disease control.

In the last decade, there have been major advances in the treatment of multiple myeloma. The integration of antimyeloma agents such as thalidomide, lenalidomide, and bortezomib into induction regimens has markedly increased the rate of response.[1,5] Current practice guidelines support the use of a bortezomib-containing multiagent induction regimen followed by melphalan and autologous stem cell transplantation in eligible patients to optimize tumor reduction and long-term disease control.[1,6,7] In addition, single-agent maintenance therapy after autologous stem cell transplantation with lenalidomide, bortezomib, or thalidomide has shown promise in prolonging progression-free survival.[1,8-10]

We report our experience with 4 patients with multiple myeloma who successfully underwent kidney transplantation after achieving at least a very good partial response.

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Patients' demographics, clinical characteristics, and multiple myeloma treatment data are shown in Table 1. Pre– and post–kidney transplantation characteristics are shown in Table S1. Outcomes including serum creatinine (Scr) level, estimated glomerular filtration rate (eGFR) as calculated using the CKD-EPI (Chronic Kidney Disease Epidemiology Collaboration) equation,[11] proteinuria, serum free light chains, infections, and kidney biopsy results are shown in Table 2.

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Table 1. Demographics, Clinical Characteristics, and Multiple Myeloma Treatment Course

	Case 1	Case 2	Case 3	Case 4
Age at MM diagnosis, y	52	50	50	47
Sex	Male	Male	Male	Male
Ethnicity/race	Hispanic	White	White	Other
SFLC at diagnosis, mg/L	NA	κ: 1,900; λ: 1.2	κ: 2,870; λ: 9.3	κ: 59,000; λ: 9
Bone marrow biopsy	20% plasma cells; IgA κ myeloma	90% plasma cells; IgG κ myeloma	30% plasma cells; IgG κ myeloma	90% plasma cells; IgA κ myeloma
Renal involvement at presentation	Yes	Yes	Yes	Yes
Native kidney biopsy	LCDD with features suggestive of cryoglobulinemic GN	ND	LCDD	ND
MM treatment course pre-KTx	Plasmapheresis; thalidomide/Dex; vincristine/Doxil/Dex; CP mobilization; melphalan conditioning, then ASCT	Bortezomib/Dex; high-cutoff dialysis; lenalidomide/doxorubicin/CP/Dex; CP mobilization; melphalan conditioning, then tandem ASCT; bortezomib maintenance	Bortezomib/Dex/lenalidomide; melphalan conditioning, then ASCT; lenalidomide, then bortezomib maintenance	Bortezomib/Dex/lenalidomide; CP mobilization; melphalan conditioning, then ASCT; lenalidomide maintenance
MM treatment course post-KTx	None	Bortezomib maintenance; switched back to lenalidomide/Dex due to progression, then carfilzomid/CP/Dex, then pomalidomide/CP/Dex	Bortezomib maintenance	None
Hematologic response[a] pre-KTx	CR	VGPR	CR	CR
Hematologic response[a] post-KTx	CR	SD	CR	CR
Time from remission to KTx, mo	66	20	32	53
Comorbid conditions	HTN, HLD, CAD, PVD, gout	HTN, nephrolithiasis	Gout	HTN, HLD, GERD

Abbreviations and definitions: ASCT, autologous stem cell transplantation; CAD, coronary artery disease; CP, cyclophosphamide; CR, complete remission (negative immunofixation on serum and urine, <5% plasma cells in bone marrow); Dex, dexamethasone; GERD, gastroesophageal reflux disease; GN, glomerulonephritis; HLD, hyperlipidemia; HTN, hypertension; KTx, kidney transplantation; LCDD, light chain deposition disease; MM, multiple myeloma; NA, none available; ND, not done; PVD, peripheral vascular disease; SD, stable disease (not meeting criteria for CR, VGPR, partial response, or progressive disease); SFLC, serum free light chain; VGPR, very good partial response (serum and urine M protein detectable by immunofixation but not by electrophoresis or ≥90% reduction in serum M protein plus urine protein level <100 mg/24 h).

[a]Response was assessed using the International Myeloma Working Group uniform response criteria for multiple myeloma adapted from Durie et al.[17] The pre-KTx response is hematologic status right before transplantation, and post-KTx is the most recent status obtained up to May 1, 2016.

Case 1

A 52-year-old man presented with anemia, Scr level of 2.5 mg/dL, proteinuria with protein excretion of 18.8 g/24 h, and a paraprotein spike on serum protein electrophoresis (SPEP). Bone marrow biopsy showed 20% plasma cells and kidney biopsy revealed light chain deposition disease (LCDD). He was treated with plasmapheresis, thalidomide, and dexamethasone, followed by vincristine, doxorubicin, and dexamethasone for 4 cycles. He achieved a complete remission 6 months later, which was followed by autologous stem cell transplantation. He underwent kidney transplantation 66 months later. He was maintained on tacrolimus, mycophenolic acid, and prednisone. A protocol transplant biopsy 6 months after kidney transplantation showed no signs of rejection. He remains in remission from multiple myeloma, off all multiple myeloma therapy, with stable transplant function 58 months after kidney transplantation, with Scr level of 1.1 mg/dL (eGFR, 73 mL/min/1.73 m^2).

Case 2

A 50-year-old man presented with shortness of breath, rib pain, pancytopenia, and Scr level of 1.0 mg/dL. SPEP showed a paraprotein spike and bone marrow biopsy confirmed multiple myeloma. He was started on treatment with bortezomib plus dexamethasone in addition to intensive hemodialysis with a Gambro high-cutoff filter to reduce serum free light chain levels. Despite these measures, the patient progressed to kidney failure. He was started on treatment with Doxil, cyclophosphamide, lenalidomide, and dexamethasone. He achieved a very good partial response after tandem autologous stem cell transplantation and remained on bortezomib and dexamethasone treatment for 20 months, at which time he underwent kidney transplantation from a blood group type ABO-incompatible donor (donor A Rh+ and recipient O Rh+). The University of California, San Francisco ABO-incompatible protocol was initiated, and antithymocyte globulin was used for induction therapy. He was discharged to