ABO-Incompatible Renal Allograft in a Patient with Multiple Myeloma

Abstract

Kidney impairment is common in multiple myeloma (MM), often progressing to end-stage kidney disease (ESKD). Although kidney transplantation was traditionally contraindicated, advances in chemotherapy and transplant management have made it a viable option for select MM cases with sustained hematological remission. A 55-year-old female with MM and ESKD achieved complete remission following six months of cyclophosphamide, bortezomib, and dexamethasone (CyBorD) therapy and continued on maintenance bortezomib. She declinined autologous stem cell transplantation, and underwent an ABO-incompatible renal transplant from her spouse. At 12 months post-transplant, graft function remained stable with no MM relapse.

Keywords: *ABO incompatible transplant, CyBorD, ESKD, Kidney transplant, Multiple myeloma*

Introduction

Renal impairment, a common multiple myeloma (MM) complication, affects ~25–50% of patients, frequently progressing to end-stage kidney disease (ESKD).[1] Historically, MM patients were deemed unsuitable for kidney transplantation (KTx) because of concerns regarding overall prognosis, relapse risk, and increased susceptibility to infections. Advances in chemotherapy, immunosuppressive regimens, and transplant management have allowed select patients with sustained hematological control to benefit from them. We report the first ABO-incompatible renal allograft in an Indian patient with MM achieving complete remission using a cyclophosphamide, bortezomib, and dexamethasone (CyBorD) regimen without undergoing autologous stem cell transplantation (ASCT).

Case Report

A 55-year-old female presented in June 2022 with fatigue, abdominal pain, vomiting, oliguria, and dyspnea. Laboratory investigations revealed severe anemia (hemoglobin 7 g/dL), hypercalcemia (12.4 mg/dL), and elevated creatinine (10 mg/dL). The renal biopsy demonstrated k-restricted cast nephropathy with early light chain deposition. Subsequent bone marrow aspiration and biopsy showed hypercellular marrow with 43% CD138-positive plasma cells; fluorescence in situ hybridization was negative for common cytogenetic abnormalities.

The patient was initiated on a six-month CyBorD course, achieving complete hematological remission, confirmed by a 1.54 serum-free light chain (SFLC) κ-λ ratio. She then continued bortezomib maintenance therapy every 15 days, with regular two-monthly assessments of the SFLC ratio. The patient declined ASCT, though recommended to consolidate remission. A thorough multidisciplinary evaluation revealed her as a KTx candidate. Before transplantation, a repeat whole-body PET scan revealed no metabolically active disease; repeat bone marrow flow cytometry demonstrated normal findings. She (B blood group) underwent ABO incompatible transplant with her husband with A blood group (Baseline anti A titer IgG - 1:64, IgM - 1:64).

The patient received rituximab and underwent five sessions of plasmapheresis for desensitization. Induction immunosuppression was done using anti-T-lymphocyte globulin (total dose-3 mg/kg). Postoperative recovery was uneventful, with immediate graft function; the patient's creatinine reached 0.60 mg/dL. At three months post-transplant, she experienced a graft pyelonephritis episode, which was successfully managed with an intravenous antibiotic course. At the latest 12 month follow-up post-transplant, her graft function was stable with 1.2 mg/dL creatinine and no clinical or laboratory evidence of an MM relapse. She remains on bortezomib maintenance therapy, with SFLC analyses performed every two months.

Discussion

Renal transplantation in MM patients is challenging due to the dual graft rejection and disease relapse risks. Most cases described in the literature involve patients undergoing ASCT before KTx.[2-9] Our case is noteworthy because the patient achieved complete remission solely with CyBorD therapy and maintained it on bortezomib. Since there are no clear guidelines, and experience of KTx in MM is limited to case reports, a multidisciplinary team was put together to decide on the beat course of action.

KTx in MM lacks standardized guidelines and is primarily documented through case reports. Herrmann *et al.*[10] reported five AL amyloidosis patients who underwent successful transplantation after achieving complete remission without ASCT, while Lum *et al.*[11] described two MM patients in partial remission who received transplants on bortezomib maintenance. These experiences suggest that kidney transplantation—whether preceded by ASCT or not—can yield favorable short-term outcomes with at least partial remission.

Although immunosuppression may raise relapse risks, Herrmann *et al*.[10] reported recurrent AL amyloidosis in only three patients, suggesting a low risk in those achieving complete hematologic response. Other studies indicate

that transplantation in MM patients with sustained responses can yield outcomes comparable to non-MM recipients.[12–14] However, bortezomib-based maintenance may still heighten relapse risk, emphasizing the need for careful patient selection, multidisciplinary approach, and thorough pre-transplant assessment of remission status, immunological risk, and overall fitness.

Another concern is conditioning agents and immunosuppression exacerbating renal injury or triggering recurrence, necessitating a balance between preventing rejection and avoiding plasma cell reactivation. Recent data suggest that vigilant monitoring and judicious maintenance therapy use help mitigate these risks.[15–18]

The decision to proceed with an ABO-incompatible transplant was supported by the successful application of desensitization protocols, which have shown promising outcomes in high-immunologic-risk settings. Although the patient experienced a serious infectious complication (pyelonephritis) early in the post-transplant course, it was promptly managed, and long-term graft function was preserved. Longer-term follow-up is warranted to monitor for potential MM and chronic graft outcomes.

This case underscores the KTx to offer improved quality of life and survival benefit's potential over long-term dialysis in carefully selected patients with MM. It also reinforces the need for ongoing research to refine transplant protocols, optimize immunosuppression, and establish standardized criteria for transplant eligibility in this complex patient population.

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