**Supplemental Material**

**Immunosuppression protocol**

Mycophenolate mofetil (MMF) 1 g/day (0.5 g/day for patients aged ≥65 years) was started 4 weeks before transplantation. All patients with titers <1:512 received a single dose of rituximab (150 mg/m2) 2 weeks before transplantation. Patients with titers ≥1:512 and those with rebound titers received rituximab (150 mg/m2) 2 weeks before and on the day of transplantation. A calcineurin inhibitor (tacrolimus or cyclosporine initiated 3 days prior to transplantation), MMF or everolimus, steroids, and basiliximab were used for post-transplant immunosuppression.

**Conditions for SePE**

Apheresis was performed using a KM-9000 (Sanyo Electronic Industries Co., Ltd. Okayama, Japan) or TR55X (Toray Medical Co., Ltd. Tokyo, Japan) or ACH-Σ (Plasauto Σ in overseas models) (Asahikasei Medical Co., Ltd. Tokyo, Japan) blood purification system. SePE was performed using the Evacure Plus EC-4A10 (Kawasumi Laboratories Inc., Tokyo, Japan; sieving coefficients: albumin; 0.61, IgG; 0.44, fibrinogen; 0) as the plasma separator. During SePE, blood flow was maintained at 100 ml/min with a plasma separation rate of 30 ml/min, and unfractionated heparin or nafamostat mesilate was used as the anticoagulant. Plasma volume (PV) was calculated as: PV= (BW/13) x (100-Ht)/100, where BW and Ht indicate body weight (kg) and hematocrit (%), respectively. The target processed PV was set at 2 PV. In tandem HD and SePE, SePE was performed in parallel with the HD circuit, with a blood flow rate of 100 mL/min into the SePE circuit. To prevent a decrease in blood pressure due to the difference in colloid osmotic pressure between the plasma and substitution fluid, a Crit-Line monitor was connected to the blood circuit, and the intravascular blood volume was monitored.

**Measurement of clinical data**

Isoagglutinin titers were measured by a tube centrifugation test, anti-A/B IgM titers were determined using the saline agglutination technique, and IgG titers were evaluated using an indirect Coombs’ test. Changes in isoagglutinin titers and serum IgG, IgM, fibrinogen and factor XIII levels were examined, in addition to any adverse effects.