Supplementary Materials

Table S1 Donor and recipient clinical characteristics by microthrombi grade

Characteristics	Focal group (*n*=15)	Diffuse group (*n*=18)	*P*
Donors			
Gender, male (%)	66.7	72.2	1.000
Age, years (SD)	43.5(15.8)	49.2(14.8)	0.294
BMI, kg/m^2(SD)	23.3(3.5)	23.7(3.8)	0.727
Death from brain trauma (%)	73.3	83.3	0.674
CIT, hours (SD)	8.9(3.8)	8.4(2.8)	0.647
Warm ischemia, minutes (SD)	11.6(6.7)	14.8(5.9)	0.155
Recipients			
Age, years (SD)	44.9(13.2)	45.8(10.1)	0.823
Gender, male (%)	46.7	66.7	0.304
BMI kg/m^2(SD)	21.3(1.9)	20.9(2.7)	0.639
Primary disease			0.375
Chronic nephritis (%)	73.3	88.9	
Others (%)	26.7	11.1	
Dialysis (HD/PD)	9/6	7/11	0.227
HLA mismatch (SD)	3.4(1.2)	3.4(1.6)	0.982
Induction therapy			0.300
ATG (%)	53.3	72.2	
Basiliximab (%)	46.7	27.8	
Anticoagulation post-transplantation, n (%)	2(11.1)	0(0)	0.489
Maintain immunosuppression	100	94.4	1.000
Fk506+MMF+pred (%)			

SD, Standard Deviation; BMI, Body Mass Index; CIT, Cold Ischemia Time; HD, Hemodialysis; PD, Peritoneal Dialysis; HLA, Human Leukocyte Antigen; ATG, Anti-thymocyte globulin; FK506, tacrolimus; MMF, Mycophenolate mofetil; Pred, prednisone.

Table S2 Donor and recipient clinical characteristics by plasma therapy status

Characteristics	Plasma therapy (*n*=9)	No-plasma therapy (*n*=11)	*P*
Donors			
Gender, male (%)	77.8	90.9	0.566
Age, years (SD)	49.4(19.0)	44.0(14.2)	0.472
BMI, kg/m^2(SD)	23.6(3.2)	23.7(3.9)	0.98
Death from brain trauma (%)	77.8	81.8	1.000
CIT, hours (SD)	7.1(2.0)	7.8(3.3)	0.604
Warm ischemia, minutes (SD)	14.7(2.9)	14.1(5.5)	0.780
Recipients			
Age, years (SD)	41.2(12.0)	49.6(10.3)	0.109
Gender, male (%)	55.6	72.7	0.642
BMI, kg/m^2(SD)	19.8(2.4)	21.3(2.1)	0.138
Preoperative PLT 10^9/L(SD)	252(112)	193(49)	0.134
Preoperative Hb, g/L(SD)	115(12)	110(11)	0.457
intraoperative blood loss, ml (SD)	100(0.0)	105(35.0)	0.703
Intraoperative blood transfusion (%)	0	0	-
PLT 3 hours after operation ,10^9/L(SD)	181(68)	132(45)	0.067
Hb 3 hours after operation, g/L(SD)	101(17)	99(10)	0.602
RBC transfusion after operation (n)	5	0	0.008
Anticoagulation after operation, n (%)	2(25.0)	0	0.164
Renal hematoma after operation, n (%)	3(33.3)	1(9.1)	0.285
DGF, n (%)	8(88.9)	2(18.2)	0.005
HLA mismatch (SD)	4.2(1.2)	3.1(1.1)	0.045
Induction therapy			0.038
ATG, n (%)	9(100)	6(54.5)	
Basiliximab, n (%)	0	5(45.5)	

SD, Standard Deviation; BMI, Body Mass Index; CIT, Cold Ischemia Time; PLT, Platelet; Hb, Hemoglobin; RBC, Red Blood Cell; DGF, Delayed Graft Function; HLA, Human Leukocyte Antigen; ATG, Anti-thymocyte globulin.

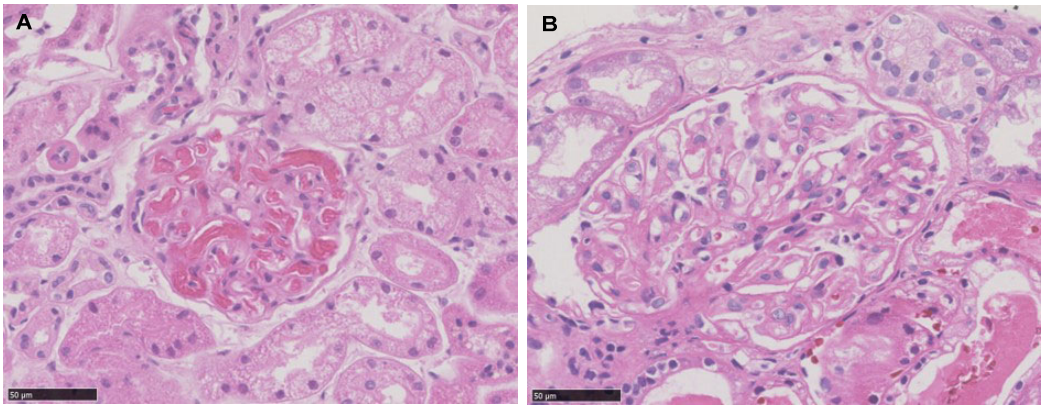

Fig. S1 Renal biopsy. The donor was a 52-year-old male with traumatic brain injury and the recipient was a 56-year-old female patient. (A) DCD donor kidney biopsy after reperfusion on Jan.23,2020: multiple thrombi in glomerular capillaries. (B) Renal transplant biopsy after operation on February 5, 2020: swelling and proliferation of glomerular endothelium, formation of false double track sign, stenosis of capillary lumen. (H&E staining, scale bar A: 50 μm, B: 50 μm).

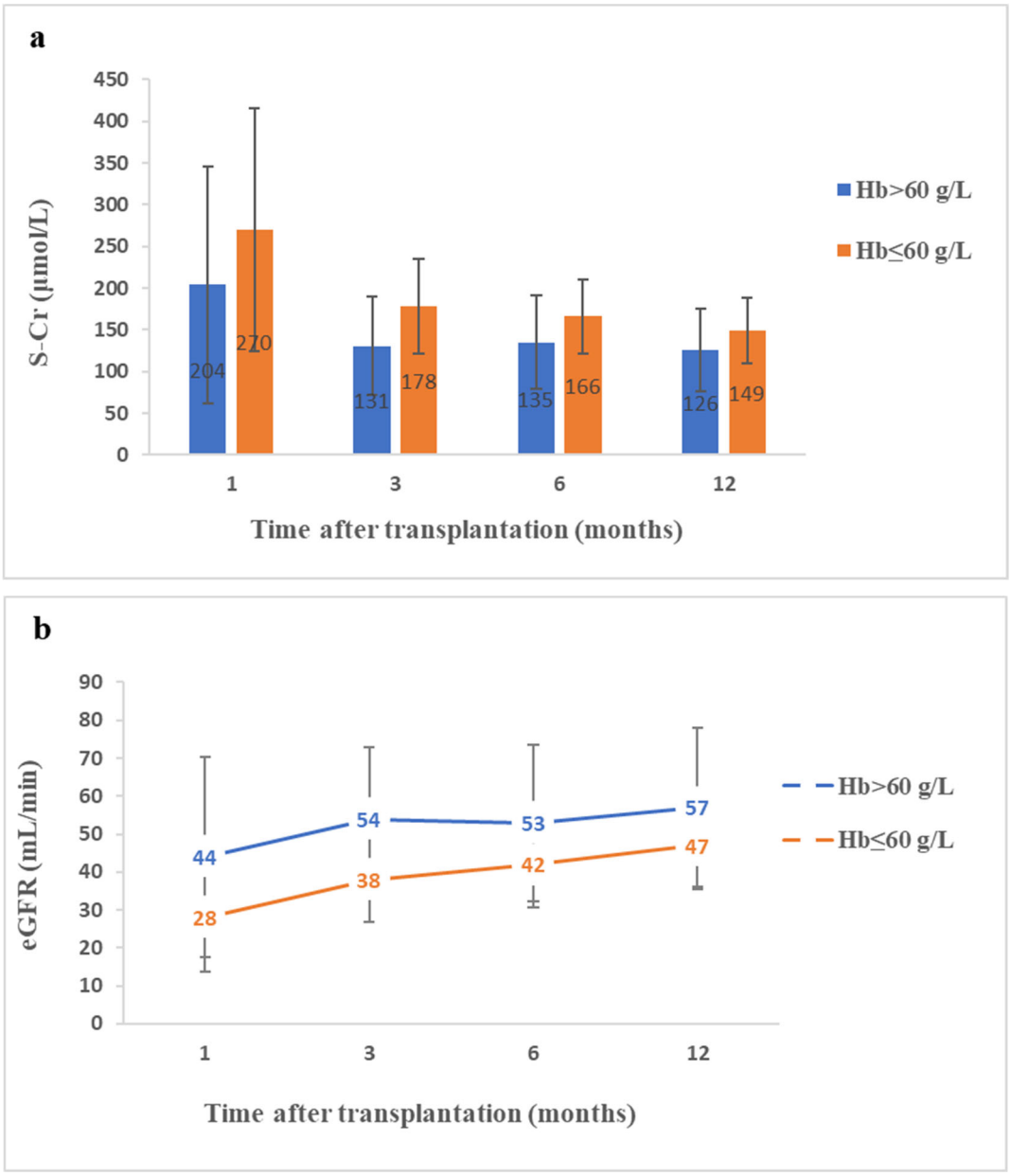

Fig. S2 Kidney allograft function between recipients with Hb≤60 g/L and >60 g/L: (a) Serum creatinine (S-Cr); (b) Estimated glomerular filter rate (eGFR). Hb: hemoglobin. Data are expressed as mean±standard deviation (SD), *n*=20.

Materials and methods

Patient collection and study design

A total of 1735 deceased donor kidney transplants were performed at Kidney Disease Center, the First Affiliated Hospital, College of Medicine, Zhejiang University between January 2013 to October 2020. A total of 33 post-reperfusion kidney biopsies, out of 1528 recipients with post-reperfusion kidney biopsies, exhibited microthrombi in glomerular capillaries. We collected demographics of donors and recipients, as well as laboratory values such as platelet (PLT), hemoglobulin (Hb), schistocytes on peripheral smear, elevated lactate dehydrogenase (LDH), serum creatinine (S-Cr) and estimated glomerular filter rate (eGFR) levels and clinical outcomes such as delayed graft function, rejection, re-biopsy, microthrombi residue, graft and patient survival rate. The follow-up time was 1 year.

Microthrombi were classified as diffuse and focal if at least 50% and <50% of glomeruli had microthrombi, respectively. Based on this, we stratified the recipients into diffuse (n=18) and focal (n=15) groups.

Notably, only a handful of recipients had the tests of schistocytes on peripheral smear after transplantation. Therefore, we mainly identified donor induced recipient thrombotic microangiopathy (dir-TMA) by the recipients' anemia status, thrombocytopenia and elevated LDH based on donor kidney with microthrombi. Consequently, we divided the 33 recipients into dir-TMA (n=20) and non-dir-TMA (n=13) subgroups, based on presence or absence of dir-TMA. Thrombocytopenia was defined as follows: (1) onset within 4 days posttransplant if PLT count was low than $100\times10^9\,L^{-1}$; or (2) a 50% reduction in baseline within 4 days posttransplant when baseline count was lower than $100\times10^9\,L^{-1}$ (Wang et al., 2011). DGF was defined as the need for dialysis within 7 days post-transplantation.

Statistical analysis

The Fisher's exact test was used to compare categorical variables, while a two-sided student's t-test was used for continuous variables. Continuous variables were presented as mean±standard deviation (SD). We also used the CKD-EPI formula to calculate the estimated glomerular filter rate (eGFR). All statistical analyses were performed using SPSS 22.0 software, and values that showed P<0.05 considered statistically significant.

Reference

Wang CJ, Shafique S, Mccullagh J, et al., 2011. Implications of donor disseminated intravascular coagulation on kidney allograft recipients. *Clinical Journal of the American Society of Nephrology*, 6(5):1160-1167.
https://doi.org/10.2215/cjn.07280810