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Successful cadaveric kidney transplantation in an extended-hours hemodialysis patient with long-term hemodialysis vintage for 297 months

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ABSTRACT

The patient was a 41-year-old male who had been maintained on extended-hours hemodialysis for 297 months. Despite of long-term hemodialysis vintage, he had no vascular calcification and ectopic calcification. His kidney graft did not experience rejection or other complications 18 months after the cadaveric kidney transplant. Previous reports indicated that graft survival of extended-hours hemodialysis patients did not differ from conventional hemodialysis. However, the dialysis periods in these reports were much shorter than our case. Therefore, extended-hours hemodialysis in long-term dialysis patients may improve renal transplant outcomes in the countries where the waiting time for kidney transplant is long.

Introduction

Extending hemodialysis hours has been reported to improve the survival rate of dialysis patients.[1] However, based on the results of kidney transplantation in extended-hours hemodialysis patients, the proportion of delayed graft function was increased, and the graft survival rate did not differ from that of conventional hemodialysis patients.[2,3] There have been no reports that have indicated that extended-hours hemodialysis improves the graft survival of kidney transplant patients.

Long-term hemodialysis vintage is known to cause vascular calcification[4] and to decrease graft survival in kidney transplant patients.[5] In this paper, we report a case of successful cadaveric kidney transplantation in an extended-hours hemodialysis patient with long-term hemodialysis vintage for 297 months.

Case presentation

The patient was a 41-year-old male with end-stage renal disease due to chronic glomerular nephritis who had been maintained on hemodialysis for 297 months. He was diagnosed with chronic glomerular nephritis when he was 10 years old and introduced to hemodialysis when he was 17 years old. In the beginning of hemodialysis treatment, he had received hemodialysis thrice weekly for a weekly total of 12 dialysis hours. According to the patient's request, dialysis hours were extended gradually over time. He has received on-line hemodiafiltration therapy thrice weekly for a weekly total of 24 treatment hours for the last ten years.

Hemodiafiltration condition (immediately before kidney transplant): The patient received predilution on-line HDF with 9 L per hour of substitution flow. The HDF duration was 8 hours thrice weekly. The quantity of blood flow was 400 ml/min, and the dialysate flow rate was 650 ml/min. The dialyzer membrane was polyether sulfone with a membrane size of 2.5 m^2.

His height was 163.2 cm, his dry weight was 61 kg and his BMI was 22.9. The patient had no history of smoking and was a social drinker. His blood pressure was 110–140 mmHg during hemodialysis and took no antihypertensive drugs. The patient's laboratory data were well controlled before kidney transplantation as shown in Table 1. His Kt/V level was 1.98–2.86, and his β-2 microglobulin level was 25.1–29.0 μg/l.

The imaging findings are shown in Fig. 1. The patient's lung field was clear, and his chest thoracic ratio was 42%. These findings indicate that his volume status was well controlled. Computed tomographic scanning before surgery revealed largely normal findings without vascular calcification and ectopic calcification despite long-term hemodialysis.

The donor was a 50-year-old man who had been healthy. He collapsed suddenly and was diagnosed with a subarachnoid hemorrhage and a vertebral aneurysm. The next day, he was declared to be brain dead. The immunological data showed a donor blood type of O (+), 3 mismatches in histocompatibility locus antigen class I and 1 mismatch in

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Table 1
Laboratory findings on admission.

Laboratory Data								
Hematology			Blood chemistry					
WBC	6700	/μL	TP	7.2	g/dL	Na	137	mEq/L
RBC	410×10^4	/μL	Alb	4.2	g/dL	K	4.4	mEq/L
Hb	13.1	g/dL	AST	39	IU/L	Cl	104	mEq/L
Ht	38.8	%	ALT	34	IU/L	Ca	9.3	mg/dL
Plt	22.6×10^4	/μL	LDH	296	IU/L	IP	3.5	mg/dL
Blood coagulation			ChE	247	IU/L	Mg	2	mg/dL
PT	103.9	%	BUN	40.0	mg/dL	Glucose	108	mg/dL
PT-INR	0.97		Cre	8.14	mg/dL	Serology		
APTT	30	s	UA	5.5	mg/dL	CRP	0.15	mg/dL

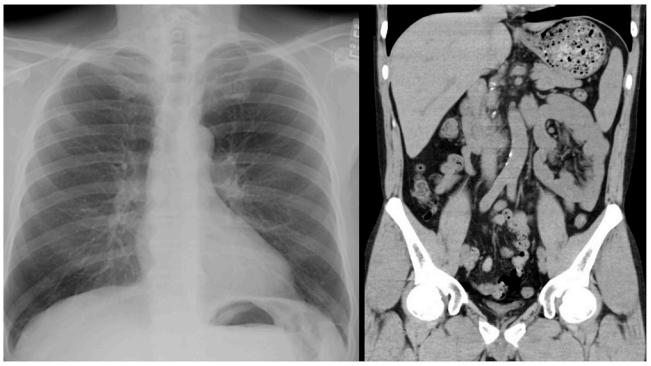

Fig. 1. Image findings of chest X-rays and Computed tomography.

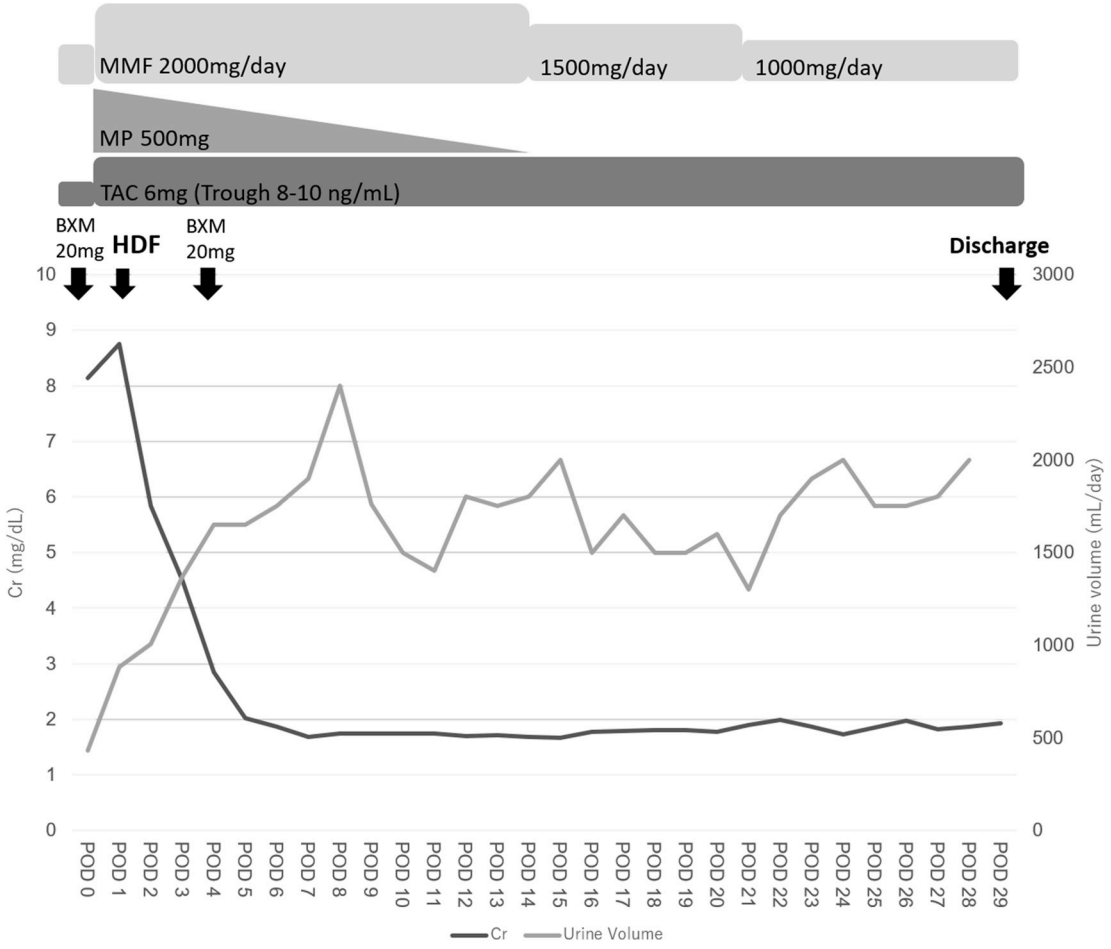

Fig. 2. Clinical course. Abbreviations: BXM, Basiliximab; HDF, Hemodiafiltration; MMF, Mycophenolate mofetil; MP, Methylprednisolone; TAC, Tacrolimus.

class II, lymphocyte cytotoxicity test results of T-warm (−), B-warm (−) and B-cold (−), and flow cytometry crossmatch T (−).

The clinical course is shown in Fig. 2. We began the administration of tacrolimus, mycophenolate mofetil, methylprednisolone and basiliximab as induction therapy on POD0. The operation time was 3 hours and 47 minutes, the amount of bleeding was 200 g, the graft weight was 292 g, the total ischemic time (TIT) was 8 hours 25 minutes, the warm ischemic time (WIT) was 0 minutes and the time of initial urination was 20 minutes. The intraoperative blood pressure after declamping was elevated to 140–160/60-80 mmHg by the intravenous injection of dopamine and ephedrine, and after the operation, we continued to use the continuous intravenous injection of dopamine when the systolic blood pressure was under 120 mmHg. The operation was successful without complications. As the Cr level was not decreased (8.75 mg/dl) and the potassium level was 6.4 mEq/l on POD1, the patient received HDF therapy once after the operation. After POD2, his urine output was increased, and his Cr level gradually decreased. On POD30, he was discharged without major complications and followed as an outpatient. His Cr level was 1.48 mg/dl 18 months after the operation, and he had neither rejection history nor other complications related to the kidney transplant.

Discussion

McCormick BB et al. and See EJ et al. reported that graft survival in extended-hours hemodialysis patients did not differ from that of conventional hemodialysis patients.[2,3] However, the dialysis periods in these reports before kidney transplant were 37.4 and 62.0 months, which were far shorter than that of our case (297 months). Long-term hemodialysis vintage is known to cause vascular calcification and to decrease graft survival in kidney transplant patients,[4,5] and the efficacy of extended-hours hemodialysis has not been well studied in long-term hemodialysis patients. In this case, although the patient had long-term hemodialysis vintage, he had no vascular calcification and ectopic calcification, which are thought to be associated with long-term dialysis, and his kidney transplant was successful without major complications. This could be because his volume status, blood pressure and levels of serum calcium, phosphate and intact-PTH were well controlled due to extended-hours hemodialysis before the kidney transplant.

Conclusion

Extended-hours hemodialysis in long-term dialysis patients may improve renal transplant outcomes by reducing vascular calcification and ectopic calcification, especially in countries such as Japan, where the waiting time for cadaveric kidney transplant is very long. A clinical study that evaluates the effects of extended-hours hemodialysis on graft survival in long-term hemodialysis patients is desired.

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Declaration of competing interest

The authors declare that there is no conflict of interest regarding the publication of this article.

References

1. Tentori F, Zhang J, Li Y, et al. Longer dialysis session length is associated with better intermediate outcomes and survival among patients on in-center three times per week hemodialysis: results from the Dialysis Outcomes and Practice Patterns Study (DOPPS). *Nephrol Dial Transplant*. 2012;27:4180–4188.
2. McCormick BB, Pierratos A, Fenton S, Jain V, Zaltzman J, Chan CT. Review of clinical outcomes in nocturnal haemodialysis patients after renal transplantation. *Nephrol Dial Transplant*. 2004;19:714–719.
3. See EJ, Hawley CM, Cho Y, et al. Comparison of graft and patient outcomes following kidney transplantation in extended hour and conventional haemodialysis patients. *Nephrology*. 2019;24:111–120.
4. Goodman WG, Goldin J, Kuizon BD, et al. Coronary-artery calcification in young adults with end-stage renal disease who are undergoing dialysis. *N Engl J Med*. 2000; 342:1478–1483.
5. Goldfarb-Rumyantzev A, Hurdle JF, Scandling J, et al. Duration of end-stage renal disease and kidney transplant outcome. *Nephrol Dial Transplant*. 2005;20:167–175.