Advances in dialysis treatment may improve kidney transplant outcomes

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Conflict of Interest Disclosure

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I declare that I have no relevant financial relationships to disclose

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Introduction:
Improvement in Life Prognosis for Dialysis Patients

Age[a] (years old)	2015 Expected remaining lifetime (years)		2003 Expected remaining lifetime (years) [1]		HY-R[b]		HY-D[c]	
	Male	Female	Male	Female	Male	Female	Male	Female
30	30.8	34.1	27.4	30.3	1.12	1.12	3.41	3.78
40	23.9	26.9	20.5	23.2	1.16	1.16	3.38	3.69
50	17.3	20.4	14.6	16.7	1.19	1.22	2.73	3.68
60	11.9	14.1	9.9	11.3	1.20	1.25	2.01	2.79
70	7.7	8.9	6.2	7.1	1.24	1.25	1.48	1.78
80	4.6	5.0	3.8	4.4	1.20	1.14	0.74	0.62
90	2.4	2.2	2.3	2.6	1.02	0.86	0.04	− 0.35

[a]The expected remaining lifetime at each age was excerpted every 10 years
[b]HY-R = (expected remaining lifetime in 2015) ÷ (expected remaining lifetime in 2003)
[c]HY-D = (expected remaining lifetime in 2015) − (expected remaining lifetime in 2003)

The expected remaining lifetime of dialysis patients in Japan in 2015 was 10-20% longer than it was in 2003. These findings indicate that advancements in dialysis technology have contributed to improved survival rates for dialysis patients.

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(Nakai S, et al. Ren Replace Ther. 2020)

Purpose and Methods

Purpose
This study aimed to examine the impact of pre-transplant dialysis duration on kidney transplant outcomes across different periods.

Methods
We analyzed 965 kidney transplant cases performed by the Osaka University Kidney Transplant Group between 2000 and 2023, excluding preemptive transplants. The cases were divided into two groups based on the period of transplant: 470 cases from 2000 to 2009 and 495 cases from 2010 onward. Additionally, each period group was further divided based on dialysis duration into those with less than 5 years of dialysis (DD<5 group) and those with 5 or more years of dialysis (DD≥5 group), and comparisons were made between these groups.

Patient Background

Before Propensity Score Matching

Factor	DD<5 (n=626)	DD≥5 (n=339)	p-value
Age of Recipient	43.53 (14.05)	48.63 (11.64)	<0.001
Gender of Recipient (female)	232 (37.1)	137 (40.4)	0.331
Calcineurin Inhibitors			<0.001
None	1 (0.2)	0 (0.0)	
Cyclosporin	160 (25.6)	87 (25.7)	
Tacrolimus	184 (29.4)	140 (41.3)	
Tacrolimus Extended Release	281 (44.9)	112 (33.0)	
Antimetabolites			0.241
None	3 (0.5)	1 (0.3)	
Azathioprine	17 (2.9)	3 (1.0)	
Mizoribine	28 (4.7)	12 (3.8)	
MMF	544 (91.9)	296 (94.9)	
Malignant Tumors	46 (7.3)	50 (14.7)	<0.001
Hypertension	258 (41.2)	116 (34.2)	0.038
Diabetes Mellitus	95 (15.2)	38 (11.2)	0.097
Pre-transplant Dialysis Duration	1.57 (1.35)	13.19 (6.87)	<0.001
Age of Donor	56.90 (10.76)	54.46 (12.52)	0.002
Gender of Donor (female)	396 (63.3)	182 (53.7)	0.005

After Propensity Score Matching

Factor	DD<5-PSM (n=272)	DD≥5-PSM (n=272)	p-value
Age of Recipient	47.53 (14.16)	48.85 (11.65)	0.208
Gender of Recipient (female)	111 (40.8)	108 (39.7)	0.861
Calcineurin Inhibitors			0.310
None	0 (0.0)	0 (0.0)	
Cyclosporin	84 (30.9)	75 (27.6)	
Tacrolimus	86 (31.6)	103 (37.9)	
Tacrolimus Extended Release	102 (37.5)	94 (34.6)	
Antimetabolites			0.664
None	1 (0.4)	1 (0.4)	
Azathioprine	4 (1.5)	1 (0.4)	
Mizoribine	13 (5.0)	11 (4.2)	
MMF	244 (93.1)	246 (95.0)	
Malignant Tumors	28 (10.3)	30 (11.0)	0.890
Hypertension	114 (41.9)	96 (35.3)	0.134
Diabetes Mellitus	29 (10.7)	29 (10.7)	0.587
Pre-transplant Dialysis Duration	1.58 (1.35)	13.50 (7.11)	<0.001
Age of Donor	54.74 (11.12)	54.90 (12.20)	0.872
Gender of Donor (female)	159 (58.5)	159 (58.5)	1.000

Results

Before PSM

2000-2009

2010-

Aftre PSM
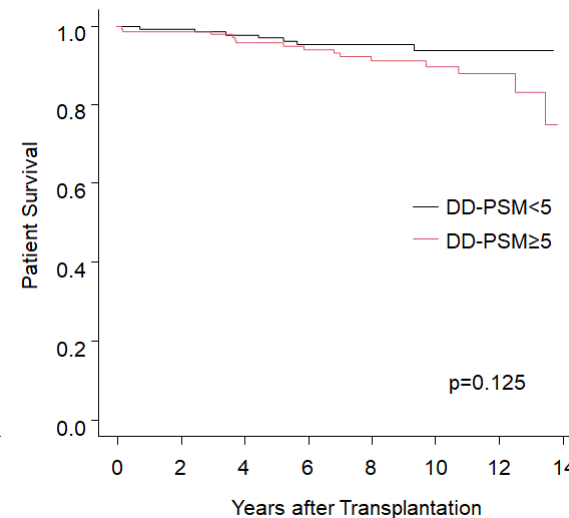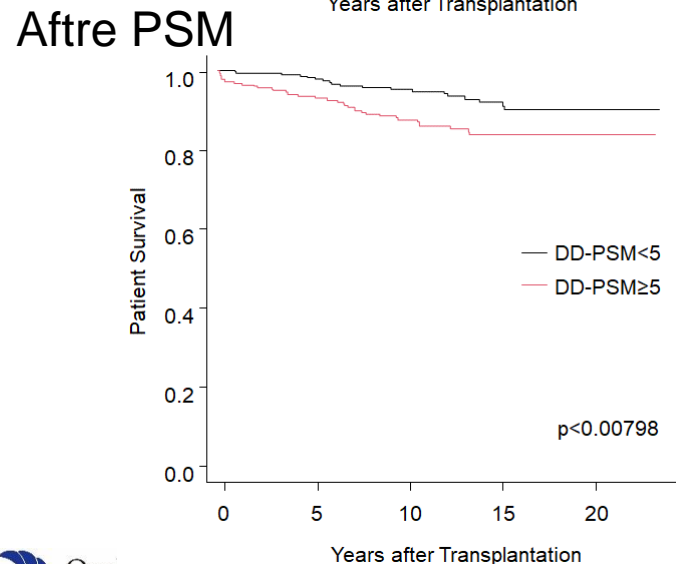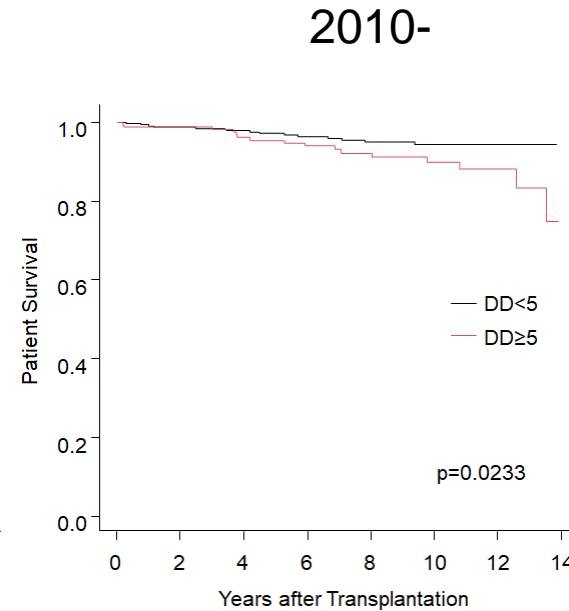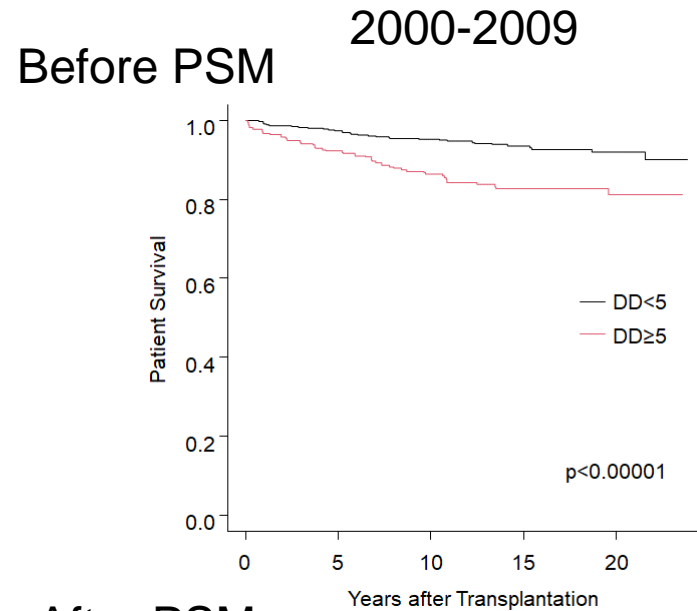
- ✓ Similar to the group from 2000-2009, the DD<5 group after 2010 had significantly higher survival rates than the DD≥5 groups. However, there was no significant difference between the two groups after matching.

- ✓ Death-censored graft survival rates were not significantly different between the two groups both before and after matching.

- ✓ Duration of dialysis was not a factor affecting patient survival in multivariate analysis after 2010.

- ✓ The incidence of cardiovascular and other events after transplantation tended to be lower in the group that underwent kidney transplantation after 2010 compared to the group from 2000-2009.

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Conclusion

✓ Our study highlights the importance of minimizing the duration of dialysis prior to kidney transplantation to improve patient outcomes. The findings consistently demonstrate that shorter dialysis periods before transplantation correlate with better survival rates in both the 2000-2009 and 2010 onwards cohorts.

✓ Significant advancements in dialysis treatment over the past two decades, such as improvements in drug therapy, dietary management, and exercise therapy, may have improved overall recipients' health and prognosis.

✓ While minimizing dialysis duration before kidney transplantation is ideal, advancements in dialysis treatment have significantly improved the prognosis for recipients. Continuous innovation in dialysis care is essential to further enhance transplant outcomes and patient quality of life.