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Impact of Low Level Donor-Specific HLA Antibodies in Living and Deceased Donor Kidney Transplantation: a nationwide cohort study

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Objectives: The aim of the present study was to investigate the impact of low level DSA on post-transplant renal outcomes in living donor - (LDKT) and deceased donor kidney transplantation (DDKT) using the Korean Organ Transplantation Registry (KOTRY) database, the nationwide cohort.

Methods: This study included 2958 cases of kidney transplantation (LDKT; 2435 cases, DDKT; 523 cases) between Jan 2014 and Dec 2020. Low level DSA was defined as the presence of DSA, in patients with negative crossmatch results; both complement-dependent cytotoxicity (CDC) and flow cytometry (FCXM) methods. Finally, there were 295 DSA (+) LDKT, 2140 DSA (-) LDKT, 27 DSA (+) DDKT and 496 DSA (-) DDKT patients. We compared the incidence of biopsy proven acute rejection (BPAR), allograft and patient survival rates, change of allograft function, and post-transplant infection rate.

Results: The incidence of acute antibody-mediated rejection (ABMR) within 1 year was significantly higher in DSA (+) group compared to DSA (-) group in LDKT (5.8%, 17/295 versus 1.9%, 41/2140, p = 0.000) and DDKT (14.8%, 4/27 versus 1.8%, 9/496, p=0.003). **(Table 1)**. The impact of DSA on the occurrence of acute ABMR was greater in the DDKT compared to LDKT. (Odds ratio (OR) 14.232, 95% CI: 3.532-57.345, p = 0.000 versus OR 2.285, 95% CI: 1.201-4.347, p = 0.012). **(Table 2)**. There was no difference in the change of allograft function, allograft and patient survival rates, and post-transplant infection rate according to the presence of DSA.

Conclusions: In conclusion, pre-transplant low level DSA are significant risk factor for acute ABMR in LDKT and DDKT, which was more pronounced in DDKT than in LDKT. However, this impact did not lead to the long-term allograft outcomes, such as changes of allograft function, allograft and patient survival rates, and post-transplant infection rate.

Table 1

Table 1. Occurrence of rejection in the first year with and without pre-transplant donor-specific HLA antibodies(DSA)

	DSA	No DSA	p value
Total cohort	**n=322**	**n=2636**	
Any rejection, n	27(8.4)	146(5.5)	**0.040**
acute TCMR, n	11(3.4)	93(3.5)	0.918
acute ABMR, n	21(6.5)	50(1.9)	**0.000**
Living donation	**n=295**	**n=2140**	
Any rejection, n	23(7.8)	110(5.1)	0.060
acute TCMR, n	10(3.4)	70(3.3)	0.915
acute ABMR, n	17(5.8)	41(1.9)	**0.000**
Deceased donation	**n=27**	**n=496**	
Any rejection, n	4(14.8)	36(7.3)	0.143
acute TCMR, n	1(3.7)	23(4.6)	1.000
acute ABMR, n	4(14.8)	9(1.8)	**0.003**

ABMR, antibody-mediated rejection; TCMR, T-cell mediated rejection.

Table 2

Table 2. Prediction of the biopsy-proven acute antibody mediated rejection (ABMR) within 1 year of transplantation

Total cohort	β coefficient	Standard error	Odds ratio (95% CI)	p-value
DSA	0.969	0.295	2.636(1.477-4.703)	**0.001**
Desensitization	0.682	0.264	1.978(1.178-3.322)	**0.010**
Living donation				
Patient age	-0.019	0.012	0.097(0.981-0.959)	0.097
Dialysis vintage	-0.007	0.005	0.993(0.983-1.003)	0.148
DSA	0.826	0.328	2.285(1.201-4.347)	**0.012**
Desensitization	0.689	0.282	1.992(1.145-3.463)	**0.015**
Deceased donation				
DSA	2.655	0.711	14.232(3.532-57.345)	**0.000**

DSA, donor-specific antibodies.