

SUPPLEMENTAL DIGITAL CONTENT

Figure S1

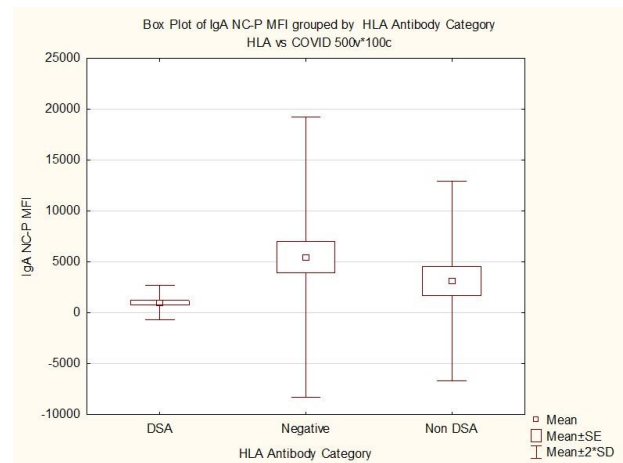
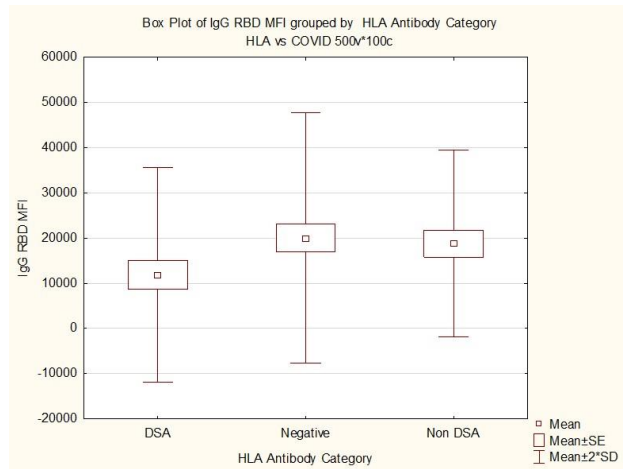
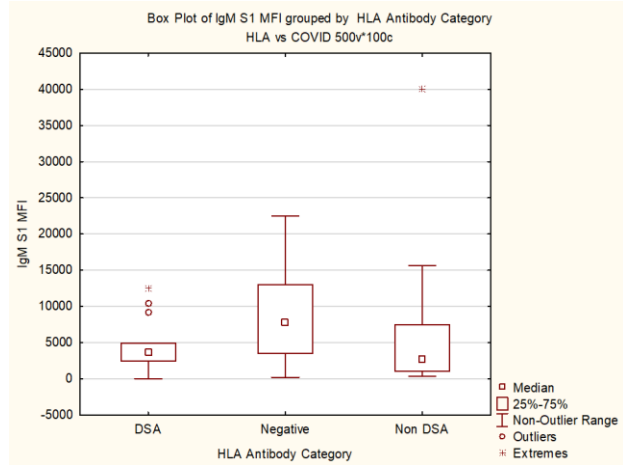


FIGURE S1. Anti-SARS-CoV-2 antibodies exhibited reduced strength (MFI) in patients with DSA versus patients without DSA or without anti-HLA antibody. SARS-CoV-2, severe acute respiratory syndrome coronavirus 2; S, trimeric spike protein; NCP, nucleocapsid protein; HLA, human leukocyte antigen; DSA, anti-HLA donor-specific antibody; MFI, mean fluorescence intensity; Ig = immunoglobulin.

Figure S2

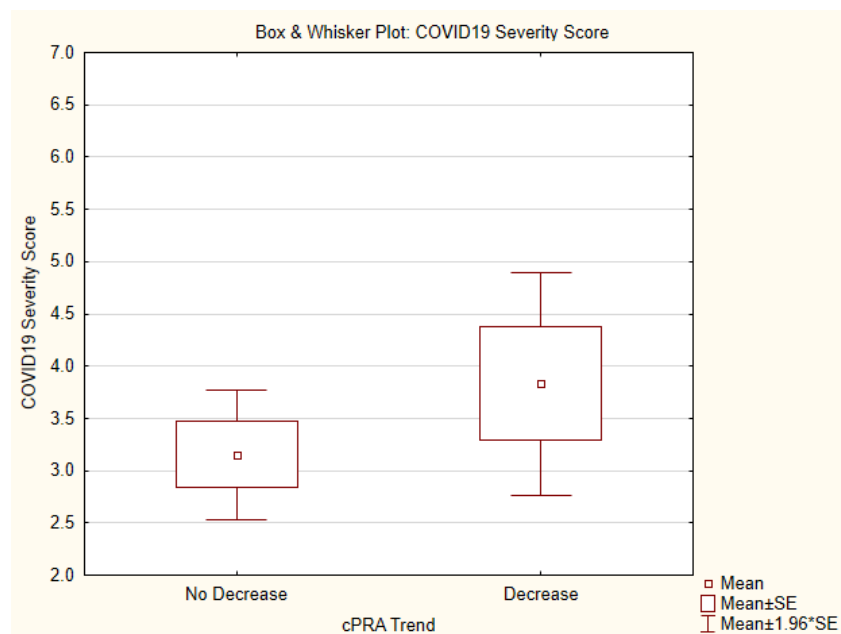


FIGURE S2. COVID-19 severity score in patients with no decrease in cPRA versus patients with decrease in cPRA. cPRA, calculated panel reactive antibody (%); . Peak clinical severity score: one, not hospitalized with resumption of normal activities; two, not hospitalized but unable to resume normal activities; three, hospitalized, not requiring supplemental oxygen; four, hospitalized, requiring supplemental oxygen; five, hospitalized, requiring nasal high-flow oxygen therapy, noninvasive mechanical ventilation, or both; six, hospitalized, requiring

extracorporeal membrane oxygenation, invasive mechanical ventilation, or both; and seven, death. IQR, interquartile range; N/A, not applicable.

Figure S3

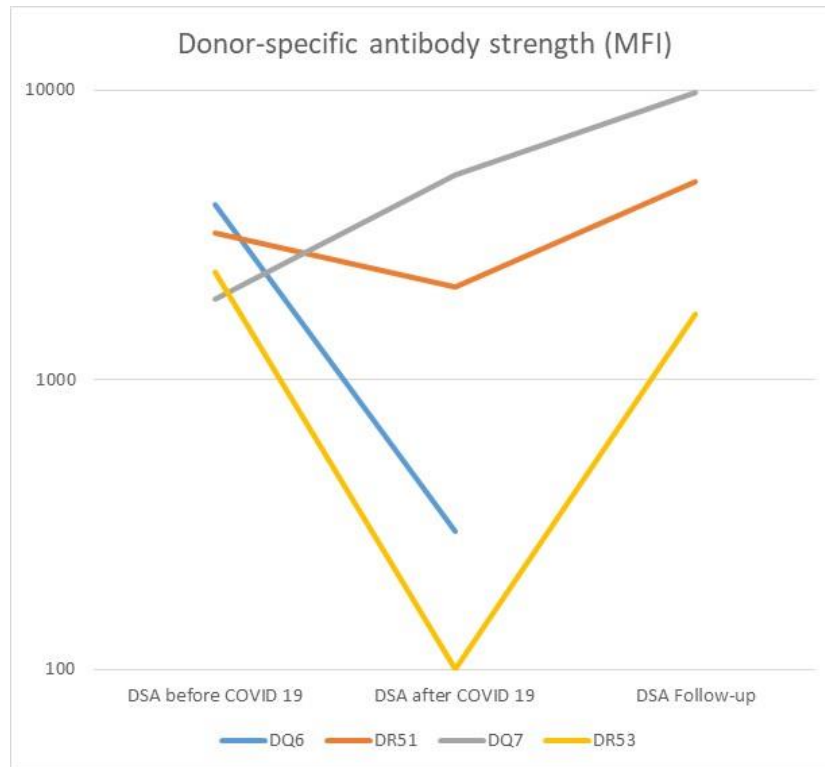


FIGURE S3. Anti-HLA donor-specific antibody strength before and after COVID-19 diagnosis. COVID-19, coronavirus disease 2019; MFI, mean fluorescence intensity.

Table 1s Demographics of the study population with longitudinal data

	All patients (n = 21)	DSA (n = 8)	HLA antibodies, no DSA (n = 7)	No HLA antibodies (n = 6)	P value for differences between subgroups
Age (IQR)	58 (44-67)	59.5 (49.5- 65.5)	44 (41-65)	65.5 (39-69)	0.4 ^a
Sex (% male)	57	38	71	67	0.4 ^a
Race/Ethnicity (%)					0.8 ^a
Non-Hispanic White	10	13	0	17	
Non-Hispanic Black	24	38	29	0	
Hispanic	67	50	71	83	
Other	0	0	0	0	
Years since transplant (IQR)	3.6 (1.2- 6.9)	5.0 (1.5-8.1)	3.8 (1.4-5.3)	1.8 (0.4-8.5)	0.7 ^a
Percent deceased donor transplant	76	63	86	83	0.5 ^a
Percent with History of rejection	0	0	0	0	NA
Mean Peak PRA (SD)	33 (36)	47 (31)	46 (42)	0	0.01 ^b
Mean MMF dose pre COVID-19 in Mg (SD)	1380 (610)	1125 (641)	1714 (487)	1333 (605)	0.2 ^a
Mean MMF dose at time of first sample draw in Mg (SD)	428 (597)	250 (534)	714 (698)	333 (516)	0.3 ^a
Mean MMF dose one month after first sample drawn in Mg (SD)	1119 (545)	1000 (756)	1214 (267)	1166 (516)	0.7 ^a
MMF dose decreased before first COVID-19 antibody sample drawn (%)	85	71	86	100	0.4 ^a
Steroid administration before first COVID- 19 antibody sample drawn (%)	100	100	100	100	NA
Mean HLA A,B,DR mismatches ¹	5.1 (0.9)	4.1 (2.0)	4.4 (1.9)	4.3 (1.2)	0.4 ^a

Mean DQ mismatches ¹	1.1 (0.8)	1.1 (0.7)	0.9 (0.9)	1.2 (1.0)	0.7 ^a
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DSA, donor specific antibodies; HLA, human leukocyte antigen; MMF, mycophenolate mofetil.

1: missing in 1 sample

a: p values >0.05 for 1) DSA compared with HLA antibodies, no DSA; 2) DSA compared with No HLA antibodies; and 3) HLA antibodies, no DSA compared with No HLA antibodies

b: p value =0.8 for DSA compared with HLA antibodies, no DSA; p value = 0.01 for DSA compared with No HLA antibodies, no DSA; and p value = 0.01 for HLA antibodies, no DSA compared with No HLA antibodies

Table 2s Demographics of the study population without longitudinal data

	All patients (n = 25)	DSA (n = 6)	HLA antibodies, no DSA (n = 5)	No HLA antibodies (n = 14)	P value for differences between subgroups
Age (IQR)	51 (39-62)	50 (31-62)	39 (39-44)	60.5 (47-66)	0.09 ^a
Sex (% male)	60	67	80	50	0.5 ^b
Race/Ethnicity (%)					0.7 ^b
Non-Hispanic White	8	0	0	14	
Non-Hispanic Black	40	33	60	36	
Hispanic	40	50	20	43	
Other	12	17	20	7	
Years since transplant (IQR)	3.3 (0.9-8.9)	5.6 (0.1-11.7)	0.9(0.9-6.9)	3.7 (2.9-8.9)	0.9 ^b
Percent deceased donor transplant ¹	61	67	60	58	0.9 ^b
Percent with History of rejection	36	17	40	43	0.5 ^b
Mean Peak PRA (SD) ²	13.5 (19)	na	0	27*	0.3 ^b
Mean MMF dose pre COVID-19 in Mg (SD)	720 (693)	583 (801)	1000 (935)	679 (575)	0.7 ^b
MMF dose decreased before first COVID-19 antibody sample drawn (%)	94	100	100	90	0.7 ^b

Steroid administration before first COVID-19 antibody sample drawn (%)	84	100	80	79	0.5 ^b
Mean A,B,DR mismatches ³	4.3 (1.8)	4.75 (1.0)	5 (0.8)	3.8 (2.3)	0.8 ^b
Mean DQ mismatches ⁴	1.3 (0.8)	1.5 (0.6)	0.7 (1.2)	1.4 (0.7)	0.5 ^b

DSA, donor specific antibodies; HLA, human leukocyte antigen; MMF, mycophenolate mofetil.

* one patient had a pre-diagnosis PRA >0 but no detected HLA antibodies.

- 1: missing in 2 samples
- 2: missing in 23 samples
- 3: missing in 7 samples
- 4: missing in 10 samples

a: p value =0.6 for DSA compared with HLA antibodies, no DSA; p value = 0.2 for DSA compared with No HLA antibodies, no DSA; and p value = 0.03 for HLA antibodies, no DSA compared with No HLA antibodies

b: p values >0.05 for 1) DSA compared with HLA antibodies, no DSA; 2) DSA compared with No HLA antibodies; and 3) HLA antibodies, no DSA compared with No HLA antibodies