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Rapid Decline in Vaccine Induced anti-SARS-CoV-2 Antibody Titers 3 Months After Kidney Transplantation: A Case Series From Belgium

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We and others previously reported a persistent immunogenicity of anti-SARS-CoV-2 vaccines in the first month after kidney transplantation (KT) with nevertheless a significant drop in antibody (Ab) titer.[1-3] However, the mid-term impact of starting immunosuppression for KT on Ab titers has not been described yet.

We report the evolution of anti-SARS-CoV-2 Ab titer 100 days after KT in 14 KT recipients (KTRs) transplanted between 01/2021 and 06/2021 who received at least 1 vaccine dose prior to KT.

We assessed the anti-receptor-binding domain (RBD) Ab titers (Elecsys anti-SARS-CoV-2, Roche Diagnostics GmbH, Mannheim, Germany - positive threshold ≥0.8 U/mL) on the day of transplantation (day 0), 28 days (day 28) and 100 days after (day 100). This work received IRB approval.

Ten patients had received their second dose of either the mRNA BNT162b2 (Pfizer-BioNTech, n=8) or ChAdOx1 nCoV-19 vaccine (AstraZeneca, n=2) a mean time of 57 (ranges 25-78) days before KT.[1] Four patients had received a single dose of vaccine (Pfizer-BioNTech n=2, AstraZeneca n=2) a mean time of 29 (ranges: 13-50) days before KT of which 2 received a second dose of the same vaccine 2 months after KT. The mean age was 58 (ranges 32-77) years; 57% were male. Twelve patients were on dialysis before transplantation (mean duration 54 (ranges 20-122) months). One patient had prior history of COVID-19. Sensitized patients (n=3) and KTRs who received a graft from a living donor (n=2) were inducted with thymoglobulin and basiliximab, respectively. All patients received an association of tacrolimus, mycophenolate and steroids. None developed COVID-19 infection so far.

Anti-SARS-CoV-2-RBD Ab levels significantly decreased from day 0 to day 100, with mean (± SEM) titers at 1124 ± 441 U/mL, 514 ± 205 U/mL and 146 ± 39 U/mL at day 0, day 28 and day 100, respectively (Figure 1). Compared to day 0, it represents a 54% (p=0.0034) and

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87% (p=0.0015) drop in Ab titers at day 28 and day 100, respectively. The patient with history of COVID-19 before KT showed a similar decline (54% and 85% drop at day 28 and day 100, respectively). Of the 4 patients who had received a single dose of vaccine, 2 had no detectable Ab on day 100 (despite one of them received a second dose in the meantime) and 2 had very low Ab titers (<1.5 U/mL). Similar to our previous report,[1] the Ab titer drop was not significantly different in patients inducted with thymoglobulin (n=3) or basiliximab (n=2) compared to the others (90% and 82% drop respectively vs 86% at day 100).

Our results contrast with the long-term persistent humoral response in immunocompetent hosts.[4] Doria-Rose et al showed that anti-SARS-CoV-2-RBD Ab activity remained high 6 months after the second dose of mRNA-1273 vaccine. This suggests that immunosuppressive therapy hinders the immunization rate in KTRs[5] and reduces the mid-term immunogenicity of mRNA vaccines administered prior to KT, highlighting the clinical relevance of a booster dose of vaccine early after KT. The optimal timing to administrate this additional dose needs further investigation.

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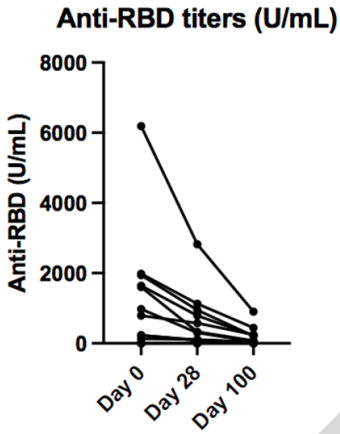
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Figure 1. Evolution of anti-RBD antibody titer. Mean (± SEM) antibody titer on day 0, day 28 and day 100: 1124 (± 441) U/mL; 514 (± 205) U/mL and 146 (± 39) U/mL (P = 0.003; 0.002, Wilcoxon test). RBD, receptor-binding domain; SEM, standard error of the mean.

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Figure 1



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