



Comparison of Preoperative Desensitization Strategies in ABO-Incompatible Living Kidney Transplantation and Subsequent COVID-19 Infection



Tian Puxun¹

¹Department of Kidney Transplantation, Hospital of Nephropathy, The First Affiliated Hospital of Xi'an Jiaotong University, Xi'an, Shaanxi Province, People's Republic of China

Introduction: ABO-incompatible (ABOi) kidney transplantation presents a significant challenge due to preformed antibodies against donor blood antigens. Successful transplantation often necessitates robust preoperative desensitization to mitigate these antibodies. With the emergence of COVID-19, it is crucial to understand how these methods impact susceptibility to the virus post-transplantation. This study aims to compare the efficacy of two desensitization protocols in ABOi living kidney transplant recipients.

Methods: The outcomes of 8 ABOi living kidney transplantations were retrospectively analyzed, divided into two groups based on the preoperative desensitization regimen. Group 1 (n=6) underwent conventional immunoadsorption (IA) or plasmapheresis (PP), while Group 2 (n=2) received lymphoplasmapheresis. Anti-blood type antibody titers were assessed before and after desensitization, as well as post-transplantation, with monitoring of serum creatinine levels and immune function changes. Lastly, the incidence and severity of COVID-19 infection after transplantation were also evaluated.

Results: Both desensitization approaches effectively reduced anti-blood type antibody titers to below 16 preoperatively. Post-transplantation, only one Group 1 patient exhibited elevated antibody titers. Significant decreases in serum creatinine within the first post-transplantation month were observed in both groups (ranging from 62-179 $\mu\text{mol/L}$). No notable differences in immune function were noted between the groups. Among the two patients who received lymphoplasmapheresis, one did not contract COVID-19, and the other developed a mild case with a PCR cycle threshold (Ct) value <30 , indicating low viral load. Conversely, four out of six patients who underwent IA/PP developed COVID-19, presenting with more severe symptoms, including pulmonary infiltrates, and all had Ct values >30 , suggesting higher viral loads.

Conclusion: This study suggests that both conventional immunoadsorption/plasma exchange and lymphoplasmapheresis are viable for preoperative desensitization in ABOi kidney transplantation. These methods successfully decrease blood type antibody levels, enhance transplantation outcomes, and maintain comparable post-transplantation renal function and immune status. Larger studies are warranted to determine the optimal desensitization strategy for ABOi kidney transplant recipients.

Keywords: ABO-incompatible, Kidney Transplantation, Desensitization, Immunoadsorption, Plasma Exchange, Lymphoplasmapheresis, Antibody Titer.



Results



Table 1. Patient characteristics

Donor		Age of recipient(yr.)	Donor blood group		Recipient blood group		Preoperative desensitization regimen
Relationship	Age(yr.)		ABO	RH	ABO	RH	
Mother	52	29	AB+	+	B+	+	RTX+Lymphoplasmapheresis
Father	63	38	A+	+	O+	+	RTX+Lymphoplasmapheresis
Mother	50	27	A+	+	B+	+	RTX+IA/PP
Mother	45	24	B+	+	O+	+	RTX+IA/PP
Mother	47	20	B+	+	A+	+	RTX+IA/PP
Father	51	35	A+	+	B+	+	RTX+IA/PP
Mother	47	24	AB+	+	A+	-	RTX+IA/PP
Mother	55	31	AB+	+	A+	+	RTX+IA/PP

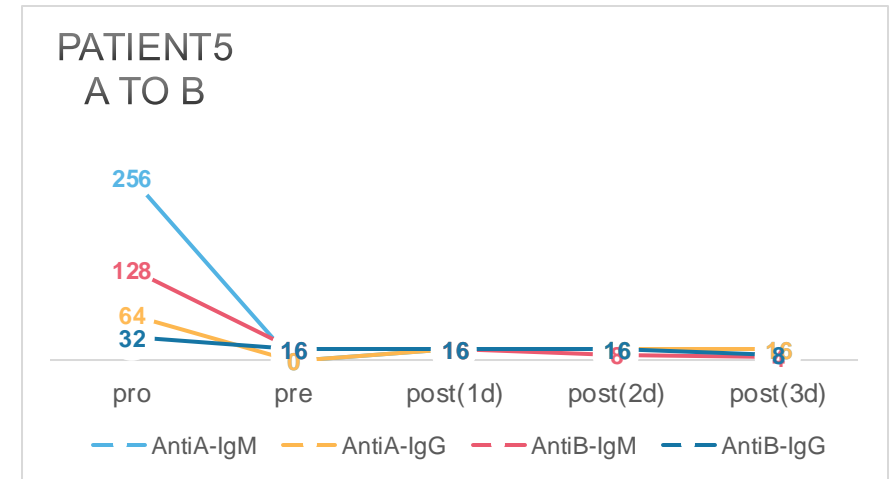
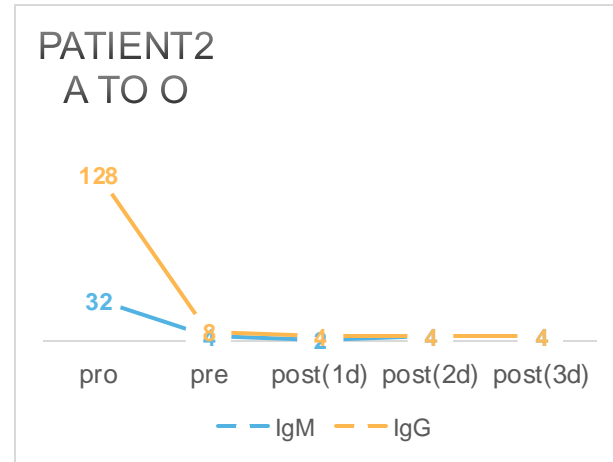
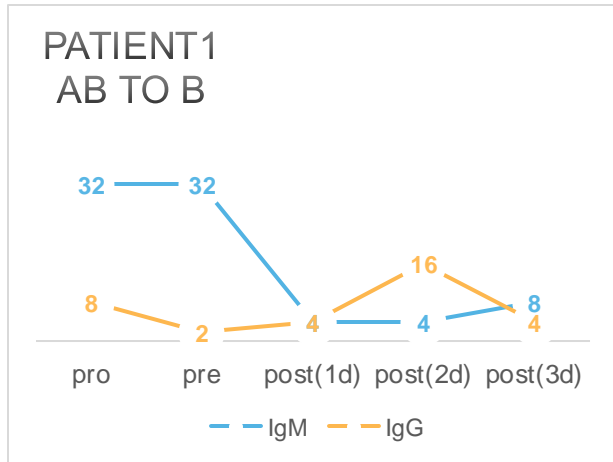


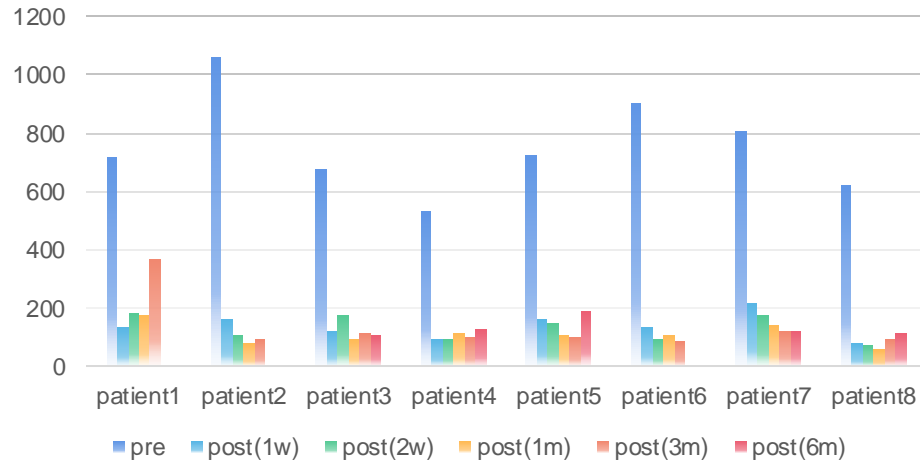
Fig 1. Changes in antibody subclasses



Results



SCR



EGFR

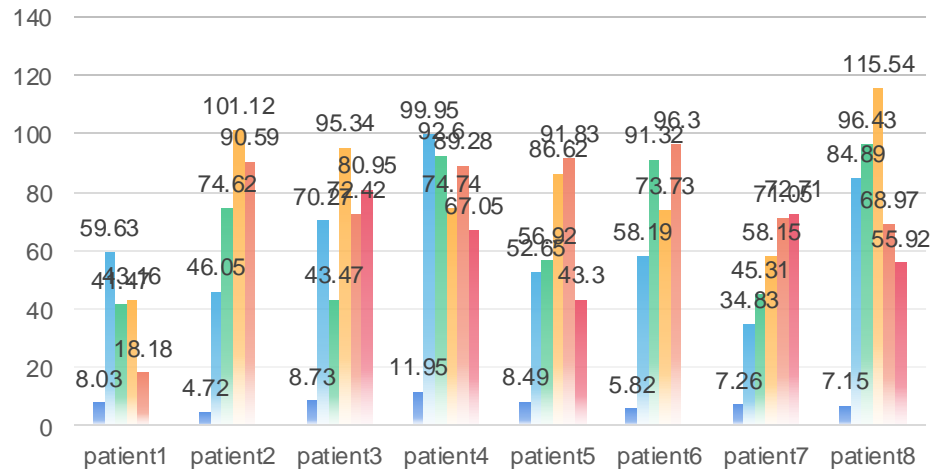


Fig 2. Changes in Kidney Function

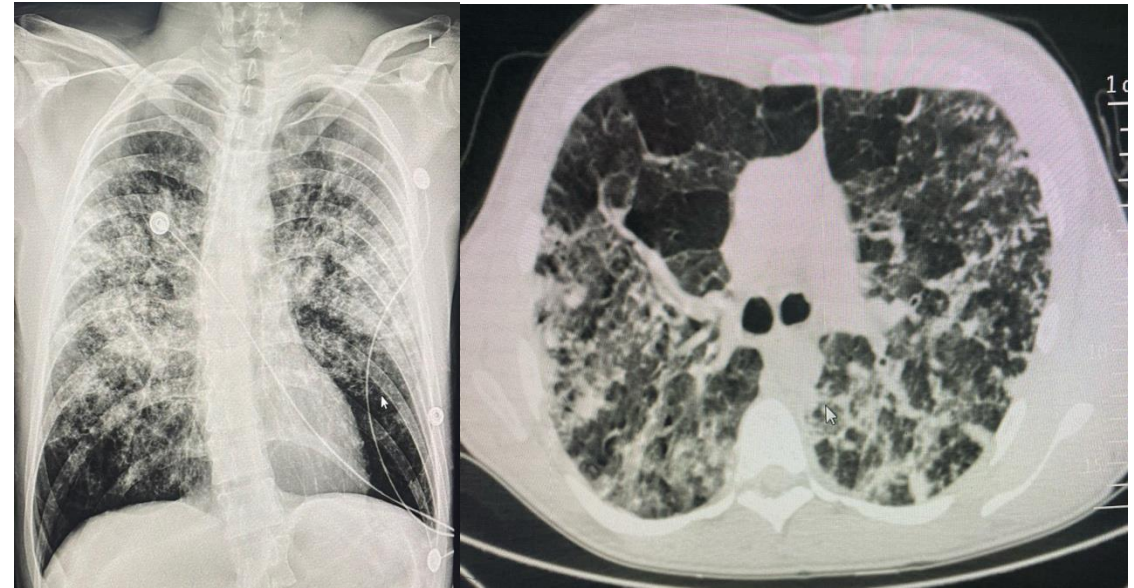


Fig 3. Chest CT of Patients with COVID-19 Infection



Conclusions

This study suggests that both conventional immunoadsorption/plasma exchange and lymphoplasmapheresis are viable for preoperative desensitization in ABOi kidney transplantation. These methods successfully decrease blood type antibody levels, enhance transplantation outcomes, and maintain comparable post-transplantation renal function and immune status. Larger studies are warranted to determine the optimal desensitization strategy for ABOi kidney transplant recipients.

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