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The Impact of High Sensitization to ABO Compatible and Incompatible Kidney Transplantation Outcome

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Background: Sensitization is considered as a risk factor worsens the kidney transplantation (KT) outcome. But when it combines with ABO incompatibility, it is controversial that if they worsen the outcomes of KT synergistically. The aim of this study was to investigate whether high degree of sensitization influenced the outcomes of KT in different ABO blood type compatibility groups.

Method: Using the Korean Organ Transplantation Registry (KOTRY), total 3043 living donor (LD) KTs performed at 57 kidney transplantation centers in Korea between Jan. 2009 and Dec. 2012 were analyzed. According to ABO blood type incompatibility and degree of sensitization (highly sensitized, defined as % PRA over 50% or positive for crossmatch test, vs. low immunologic risk), LDKT recipients were divided into 4 groups. We compared the outcomes of KT among 4 groups and investigated risk factors affecting the outcomes.

Result: The percentage of highly sensitized patients was higher in ABO incompatible KT than ABO compatible KT (21.1% vs. 11.8%, $p<0.001$). Among the highly sensitized ABO incompatible KT recipients (ABOi-HS n=79), low risk ABO incompatible KT recipients (ABOi-LR, n=295), highly sensitized ABO compatible KT recipients (ABOc-HS, n=315), and low risk ABO compatible KT recipients (ABOc-LR, n=2345), recipient age and sex, donor age and sex, vintage of KT, induction and maintenance immunosuppressive regimen were different. The three-year death censored graft survivals (DCGS) of 4 groups were 93.6%, 94.0%, 95.9%, and 96.6 % respectively (ABOi-HS vs. ABOc-LR, p=0.04; ABOi-LR vs . ABOc-LR, p=0.014). The three-year patient survivals (PS) of 4 groups were 93.6%, 97.5%, 96.9%, and 99.1% respectively (ABOi-HS vs. ABOc-HS, p=0.02; ABOi-HS vs. ABOc-LR, $p<0.001$; ABOi-LR vs ABOc-LR, p=0.011). The high degree of sensitization was not the independent risk factor of DCGS, PS, and biopsy proven acute rejection (BPAR)-free survival. ABO incompatibility also did not affect DCGS, but it increased the risk of all-cause death (p= 0.006, HR=2.89, 95% CI [1.365, 6.121]) and the risk of BPAR (p=0.010, HR=1.467, 95% CI [1.095, 1.965]) independently.

Conclusion: High degree of sensitization did not affect the outcomes of KT when it combined with ABO incompatibility. Therefore, highly sensitized ABO incompatible KT is not a risky option of KT and can be widely applicable.

Key Words: ABO incompatibility, Sensitization, Kidney transplantation