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Investigation of killer immunoglobulin-like receptor (KIR) and HLA genotypes to predict the occurrence of acute allograft rejection after kidney transplantation

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Background & Aim: After kidney transplantation, natural killer (NK) cells play a pivotal role in triggering the immune response to the allogeneic grafts primarily by their killer-cell immunoglobulin-like receptors (KIR). This process may be one mechanism that contributes to graft rejection. In this study, we have evaluated whether acute rejection after kidney transplantation was associated with predicted NK cell alloreactivity based on KIR gene and ligand along with KIR/HLA compound genotype analysis.

Material & Methods: DNA from 65 patients with biopsy-proven acute kidney allograft rejection (AKAR), 61 clinically well graft function (WGF) recipients and 176 healthy subjects was identified for the presence or absence of 10 variable KIR genes (both activating and inhibitory receptors) and their HLA ligands using polymerase chain reaction-sequence specific primers (PCR-SSP) assay.

Results: Although no significant difference in the frequency of individual KIR genes, the gene content and the haplotypic distribution between the three categories was detected, the frequency of the KIR3DL1+HLA-Bw4* A allele combination was significantly lower in AKAR patients compared to WGF recipients (p=0.004, OR=0.34, CI=0.16-0.72) and healthy subjects (p=0.019, OR=0.47, CI=0.25-0.89). Kaplan-Meier survival test showed that the KIR3DL1+HLA-Bw4* A allele combination could be considered protective for AKAR (p=0.04 by log-rank).

Conclusion: The results of this study suggest that KIR/HLA polymorphism may be a genetic susceptibility factor to alloreactivity dysfunction in the NK cells of patients with AKAR. It is likely that a KIR/HLA combinatorial study can be beneficial in predicting AKAR occurrence for the purpose of selecting donors appropriately.

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