

CORRELATION OF DQ-SPECIFIC EPLET MISMATCH LOAD AND PIRCHE-II WITH DE NOVO DSA IN LIVING DONOR KIDNEY TRANSPLANTS

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Molecular HLA mismatch at the eplet level and predicted T-cell epitopes have become promising tools for improving immunologic risk assessment in kidney transplantation. This study's aim is to investigate their association with the development of de novo donor-specific antibodies (dnDSA) in living donor kidney recipients. We retrospectively analyzed 19 nonsensitized, first kidney transplant pediatric recipients. For both donors and recipients, high-resolution HLA typing was available. Eplet mismatch load was calculated using the HLA Eplet Registry and PIRCHE-II scores via the PIRCHE platform. Anti-HLA antibodies were detected by single antigen bead assays (Immucor). Patients were stratified into DSA-positive and DSA-negative groups, and molecular mismatch parameters were compared. Out of 19 recipients, 11 developed dnDSA. Total eplet mismatch load did not differ significantly between groups ($p=0.281$). DQ-specific eplet mismatch load was significantly elevated in the DSA-positive group compared to the DSA-negative group ($p=0.000366$). PIRCHE-II scores specific to DSA loci were significantly elevated in the DSA-positive group ($p=0.0000642$), while total PIRCHE-II scores did not show a significant difference ($p=0.79$). A strong positive correlation was observed between DQ-specific eplet mismatch load and PIRCHE-II DSA scores ($p=0.00000274$). A statistically significant positive correlation was observed between antigen mismatch and eplet mismatch load ($p = 0.0303$). In contrast, the association between antigen mismatch and PIRCHE-II score did not reach statistical significance ($p = 0.234$). Our findings suggest that higher DQ eplet mismatch load and elevated PIRCHE-II scores are linked to dnDSA development, supporting molecular mismatch and T-cell epitope profiling as useful tools to reduce alloimmunization and improve transplant outcomes.

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