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Demographic, Immunogenetic and Survival Analysis in Kidney Transplantation: A Single-Center Experience

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Abstract

Objective: To evaluate the impact of HLA mismatch level, donor type, donor relationship, sex matching, and age group on mortality among kidney transplant recipients in a single-center cohort.

Materials and Methods: A total of 365 kidney transplant cases were analyzed. Recipient and donor HLA-A, -B and -DRB1 loci were typed using sequence-specific oligonucleotide and sequence-specific primer methods. Donors were categorized as nuclear family members, other relatives, spouses, or cadavers. Total HLA mismatch (0–6) was calculated, and mortality outcomes were assessed. Statistical analyses were performed using JASP, with significance set at $p<0.05$.

Results: HLA mismatch increased progressively with decreasing donor relatedness ($\rho=0.87$). Sibling donors demonstrated the lowest mean mismatch (2.29), while spouse donors had the highest (4.33). Higher mismatch levels showed a strong correlation with mortality ($\rho=0.857$; $R^2=0.97$), with mortality reaching 10–25% at ≥4 mismatches. Mortality varied by donor type: 7.7% in nuclear family donors, 13.0% in other relatives or spouses, and 17.6% in cadaveric donors. Increased mortality in cadaveric transplantation appeared to reflect both immunologic and non-immunologic factors, including prolonged cold ischemia and higher rejection frequency.Sex matching influenced outcomes, with mortality rising from 9.4% in sex-matched to 13.4% in sex-mismatched pairs. Pediatric recipients had significantly lower mortality compared with adults (5.6% vs 11.6%; $p=0.048$). Presence of the DRB1*11 allele demonstrated a protective trend, with mortality of 7.4% in positive versus 12.1% in negative cases.

Conclusion: Survival after kidney transplantation is shaped by HLA compatibility as well as donor type, sex matching, age, donor relationship, and specific allelic characteristics. Optimizing both immunologic and non-immunologic risk factors—particularly in cadaveric transplantation—remains essential for improving long-term patient outcomes.

Keywords: Kidney transplantation, HLA mismatch, donor type, mortality, immunogenetics, DRB1*11

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