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HLA Allele Distribution in Patients with End-Stage Renal Disease: A Cross-Sectional Study

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Abstract

Objective: Our study was conducted to analyze the association between HLA polymorphism and end stage renal disease (ESRD) in patients and to determine the underlying mechanisms of the onset and progression of renal failure.

Materials and Methods: In our study we included 120 patients on the kidney transplant waiting list and 100 unrelated donors who underwent HLA typing using the polymerase chain reaction-sequence specific primer (SSP) method at the Tissue Typing Laboratory of Demiroğlu Bilim University Gayrettepe Florence Nightingale Hospital in between 2021-2023. The frequencies of HLA-A,-B,-DRB1 alleles were compared between ESRD patients and the control group, and the relationship between ESRD risk factors, HLA allele frequency (AF), haplotype frequency (HF) was investigated.

Results: Similar alleles were observed at high frequencies in both the ESRD patient and control groups, with these alleles which are HLA-A*02 (0.239/0.245), HLA-B*35 (0.225/0.183), and HLA-DRB1*11 (0.230/0.216). The most common haplotypes in patients were A*24~B*35~DR*11 (0.0495), A*02~B*51~DR*11 (0.0485), A*03~B*44~DR*04 (0.0270), A*11~B*35~DR*01 (0.0225), A*02~B*35~DR*04 (0.0225), while in controls they were A*24~B*35~DR*11 (0.0231), A*23~B*49~DR*11 (0.0192), A*02~B*51~DR*13 (0.0179), A*03~B*18~DR*11 (0.0149), A*02~B*18~DR*04 (0.0142) in the controls. For the HLA-B locus, the risk factors were B*50 (*p*:0.017), B*51 (*p* <0.0001), B*52 (*p*:0.023), B*55 (*p*:0.0017), B*57 (*p*:0.0017) were identified as risk factors, while B*14 (*p*:0.016), B*15 (*p*:0.002) were identified as protective factors. Furthermore, in patients with a primary diagnosis of diabetic nephropathy, A*11 (25.0%), B*51 (31.3%), DRB1*11 (25%) were found at high frequencies. A*02 (27.3%), B*35 (36.4%), DRB1*04 (22.7%) were found at high frequencies in patients with a primary diagnosis of polycystic kidney disease.

Conclusion: This study has revealed the relationship between HLA polymorphism and susceptibility to ESRD in the patient population. In patients awaiting kidney transplantation, five susceptible alleles and four susceptible haplotypes were identified. These HLA alleles and haplotypes might serve as genetic markers for susceptibility to ESRD in our population.

Keywords: End stage renal disease, human leukocyte antigen, haplotype, alleles frequency

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