Red Blood Cell Transfusions and the Risk of Allosensitization in Patients Awaiting Primary Kidney Transplantation

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BACKGROUND: Most studies of HLA sensitization after red blood cell transfusion in transplant candidates were done before widespread use of leuko reduced blood and based on relatively insensitive, nonspecific antibody assays. We evaluated the effect of transfusion on the breadth and magnitude of HLA antibody formation using current, sensitive, HLA-specific immunoassays.

METHODS: Serial HLA antibody data were merged with transfusion data from the US Renal Data System for 1324 patients on the kidney transplant wait list (2004-2010). Two study groups were identified: a matched cohort consisting of 89 patients who received transfusion and 251 patients who did not receive transfusion and a crossover cohort consisting of 69 patients. Changes in antibody levels and calculated panel-reactive antibody (CPRA) were compared using χ and Sign tests, respectively. Logistic regression was used to estimate the relative risk of antibody responses.

RESULTS: Among the matched cohort, 20% of those who received transfusion compared to 3% of those who did not receive transfusion exhibited an antibody response (P=0.001), whereas in the crossover cohort, 19% exhibited a response in those who received transfusion compared to 1% of those who did not receive transfusion (P=0.0001). Moreover, 26.3% of those who received transfusion had increased CPRA compared to 5.8% of those who did not receive transfusion. These effects were greater in women and blacks compared to men and whites, respectively. Importantly, patients who received transfusion were at an increased risk of a potentially crossmatch positive response (odds ratio=9.6, 95% confidence interval=3.0-30.7). CONCLUSIONS: Sensitization from transfusion can occur in up to 20% of transplant candidates, resulting in higher antibody levels and CPRA values that adversely impact access to transplantation. These results support transfusion avoidance whenever possible.