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Naïve and Central Memory T Cell Lymphopenia in End-Stage Renal Disease

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Background : ESRD is associated with increased propensity to infections, diminished response to vaccination, impaired cell-mediated immunity and reduced CD4+/CD8+ T lymphocyte ratio. Four subsets of CD4+ and CD8+ T cells have been recently identified; naïve cells (as-yet uncommitted), central memory cells (previously programmed), CD45RA-positive and CD45RA-negative effector memory cells (programmed to perform specific effector functions). The effect of ESRD on subpopulations of T lymphocytes is unclear and was studied here.

Methods : Twenty one hemodialysis patients and 21 age-matched controls were studied. Pre- and post-dialysis blood samples were obtained and analyzed by 3-color flow cytometry.

Results : CD4+/CD8+ ratio, and the numbers of the naïve and central memory CD4+ and CD8+ T cells were significantly reduced, whereas, the numbers of effector memory CD4+ and CD8+ T cells were unchanged in the ESRD group. The reduction of the naïve and central memory T cell counts in the ESRD group was associated with increased apoptosis of these cells. Negative correlations were found between severity of azotemia, oxidative stress and hyperphosphatemia with the number of naïve T cells. Comparison of diabetic with non- diabetic ESRD patients revealed higher numbers of total CD8+ cells and effector memory CD8+ T cells in the diabetic group. Dialysis did not significantly change the naïve and central memory CD4+ or CD8+ cell counts, but significantly lowered CD8+ effector memory cell count.

Conclusion : ESRD results in increased apoptosis and diminished populations of naïve and central memory T lymphocytes. This phenomenon may, in part, contribute to the impaired immune response in this population.