

Posttransplant Diabetes Mellitus in African Americans After Renal Transplantation Under FK 506 Immunosuppression

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NEW-ONSET diabetes mellitus as a complication following transplantation has been previously reported by several workers.¹⁻⁴ However, the role of ethnicity as a factor has not been well defined, particularly with the newer immunosuppressive agents.^{4,5} In an attempt to understand the nature of this problem in the African American population, we retrospectively studied a group of African Americans who received renal allografts under FK 506 immunosuppression at the University of Pittsburgh Medical Center between October 26, 1989, and July 24, 1992.

PATIENTS AND METHODS

The study group consisted of 41 adult African Americans (27 males and 14 females) who had undergone renal transplantation only and received FK 506 immunosuppression from the time of transplantation. All patients had a minimum postoperative follow-up of 4 weeks. Blood glucose levels obtained preoperatively and during the first 12 weeks posttransplantation were evaluated. Patients were classified as diabetic or nondiabetic as defined by Scantlebury et al.⁴ Immunosuppression was with FK 506 and prednisone, although some patients in addition received azathioprine. Statistical analysis for observed differences was done using the Fisher Exact Test. Differences of $P < .05$ were considered significant.

RESULTS

There were four identifiable groups within the first 12 weeks after transplantation: group I, normoglycemic patients; group II, transient hyperglycemic, non-insulin-dependent patients; group III, persistent hyperglycemic, insulin-dependent (posttransplant diabetic) patients; and group IV, pretransplant diabetic patients. There were 39% (16 of 41) in group I, 27% (11 of 41) in group II, 20% (8 of 41) in group III, and 15% (6 of 41) in group IV. Since diabetes mellitus was already present preoperatively in group IV patients, they were excluded from further analysis in the study.

In comparison to the normoglycemic patients (group I), patients who were hyperglycemic (groups II and III) tended to be older: 58% (11 of 19) of patients in groups II and III were over 40 years of age as opposed to 25% (4 of 16) of the group I patients ($P < .09$). In addition, there was a trend toward more patients undergoing retransplantation in groups II and III—37% (8 of 19), than in group I—19% (3 of 16) ($P < .17$). No difference was seen in the number of patients who were highly sensitized (PRA > 40%), or in the cumulative steroid dose.

DISCUSSION

Although the occurrence of diabetes mellitus as a complication following transplantation has been previously described,¹⁻⁴ the significance of ethnicity, if any, in its frequency of occurrence, has not been clearly established.⁵ Reports of a higher occurrence in African Americans with no associated increase in morbidity has been reported,² but not confirmed. The finding of 20% occurrence in our study population is similar to other published series.^{3,4,5,7}

All our patients were on FK 506, a new investigational immunosuppressive agent.^{6,7} Perturbation of glucose metabolism either by central inhibition of islet cell insulin secretion or induction of peripheral insulin resistance, or a combination of both, in concert with the known diabetogenic influences of steroids have been theorized as possible mechanisms of FK 506 diabetogenicity.^{4,8} Similar mechanisms have been put forward for cyclosporine as well. It has been our experience that FK 506-induced diabetes mellitus is reversible when the steroids and FK 506 dosage are reduced.⁷

Our observation of an increased incidence of hyperglycemia in the older population, had been noted by others,²⁻⁵ and may be a reflection of the general tendency for diabetes to occur in the older population. The finding of an increased incidence of hyperglycemia in patients receiving more than one allograft, although not statistically significant, may be important and warrants further study.

In conclusion, although the number of patients in the study is small, the observed incidence of posttransplant diabetes mellitus, 20%, appears to be similar to that seen in other studies using a larger and more ethnically heterogeneous transplant patient population. Therefore, ethnicity is probably not an important factor in the development of posttransplant diabetes mellitus.

REFERENCES

1. Starzl TE, Marchioro TL, Rifkind D, et al: *Surgery* 56:296, 1964
2. Ruiz JO, Simmons RL, Callender CO, et al: *Surgery* 73:759, 1973

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3. Boudreaux JP, McHugh L, Canafax MD, et al: *Transplantation* 44:376, 1987
4. Scantlebury V, Shapiro R, Fung JJ, et al: *Transplant Proc* 23:3169, 1991
5. Sumrani NB, Delaney V, Daskalakis P, et al: *Diabetes Care* 14:760, 1991
6. Goto T, Kino T, Hatanaka H, et al: *Transplant Proc* 23:2713, 1991
7. Fung JJ, Alessiani M, Abu-Elmagd K, et al: *Transplant Proc* 23:3105, 1991
8. Carroll PB, Rilo H, Reyes J, et al: *Transplant Proc* 23:3171, 1991