

Racial Differences in Organ Donation, Recipient Diseases, and Survival Following Liver Transplantation

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DESPITE genetic differences in the prevalence of blood groups and HLA antigens between the various races, the effect of the race of the donor and that of the recipient on outcome in clinical liver transplantation have never been investigated.

The aims of the present study were to determine:

1. The proportion of organs contributed to the liver transplantation program at the University of Pittsburgh by the major racial groups present in the United States
2. If transplantation across racial groups has any effect on transplantation outcome of the recipient
3. The frequency of the various liver diseases that required liver transplantation in individuals of different races seen at this center

MATERIALS AND METHODS

A retrospective analysis of all adult patients undergoing their first liver transplantation at the Presbyterian University Hospital of the University of Pittsburgh between January 1, 1981, and December 31, 1988, was undertaken. For the purpose of this study, a transplant failure was defined as a graft failure leading to the patient's death or retransplantation within 60 days of the initial liver transplant.

The three major racial groups included white, black, and Hispanic. Minor racial groups included American Indian/Alaskan, Asian/Pacific Islander, Japanese, Arab, South East Asian, and continental whites. This group of patients was excluded from the analysis because the small numbers of each group prohibited any statistical analysis.

Statistical Analysis

The data were analyzed using χ^2 . A *p* value <0.05 was considered to be significant.

RESULTS

A total of 1313 liver transplants were performed in adult recipients (individuals over 18 years of age). Of these, 861 donor-recipient pairs undergoing liver transplant were available within the three major racial groupings for inclusion in the study. There were no significant differences in recipient survival for whites or blacks when the race of the donor was unknown.

Number of Organs Donated

The results of transplanting an organ from a black donor into a white recipient (both Hispanic and non-Hispanic), and vice versa, are shown in Table 1. The total number of livers donated by blacks (67) was far less than that by whites (794) (Hispanic and non-Hispanic). Of the 51 black recipients, only 5 (10%) received an organ donated by a black, whereas

46 (90%) received an organ donated by a white. Conversely, of the 810 white recipients, 748 (92%) received an organ from a white donor, and 62 (8%) received an organ from a black donor (*p* = <0.001). The total number of organs donated by blacks for either black or white recipients was far less than that observed for whites and is well below their population fraction. However, the number of black donors used was proportional to the number of recipients who were black.

A breakdown of the white population into Hispanic and non-Hispanic groups showed that the number of organs donated by the Hispanic group is even smaller than that donated by the black population.

Graft and Patient Survival

Analysis for black → total white (Hispanic and non-Hispanic) pairs and for white non-Hispanic or Hispanic white → black are as follows. The failure rate for an organ transplanted from a black donor into a white recipient was 14.5% (15% in the case of a white non-Hispanic), whereas the failure rate for an organ obtained from a white donor and transplanted into a black was 28% (30% for white non-Hispanics). These differences were not significant. The graft survival for organs transplanted between white Hispanics and white non-Hispanics revealed a higher failure rate (8/20, or 40%) than when an organ obtained from a non-Hispanic white donor was transplanted into a white Hispanic (3/16 or 18%) (*p* = 0.016). The proportion of seriously ill recipients who died was equal in these two groups.

Principal Diseases

Postnecrotic cirrhosis (PNC) due to a variety of individual causes (chronic viral infections, alcohol, cryptogenic cirrhosis) was the single most common chronic liver disease indication for liver transplantation in all three racial groups. Acute hepatic failure (AHF) occurred at the same rate in the black and white recipient groups. Primary biliary cirrhosis

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Table 1. Number of Organs Donated and Outcome in Black and White Patients (Hispanic and Non-Hispanic)

Donor	Recipient	Number	Failure (%)
Black	black	5	1 (20)
Black	white (total)	62	9 (14.5)
White (total)	white (total)	748	124 (16.5)
White (total)	black	46	13 (28)
White (His) ^a	white (His)	0	0
White (His)	white (non-His)	20	8 (40)
White (non-His)	white (His)	16	3 (18)
White (non-His)	white (non-His)	712	113 (16)
White (non-His)	black	44	13 (30)
Black	white (non-His)	61	9 (15)

^aHis, Hispanic; non-His, non-Hispanic.

(PBC) and primary sclerosing cholangitis (PSC) were uncommon in the black population.

Because of small numbers, there was no statistical difference in the failure rate for recipients with either PBC, PSC, or AHF among the various races.

DISCUSSION

The data in this study demonstrate several important facts. First, the number of livers donated by both the black and the Hispanic population is significantly less than that donated by the white population ($p < 0.01$). Indeed, only 8% of all livers donated are obtained from blacks, and even fewer (2%) are obtained from Hispanics.

The reasons for a low organ donation rate have never been determined. A study investigating the attitudes of Mexican Americans,¹ however, indicates that 100% of this group surveyed were aware of transplantation and that 85% would be willing to donate their own organs. However, only 56% were willing to donate the organs of a loved one.

The present study confirms the low rate of donation of livers among blacks and Hispanics. It also shows that

transplantation across racial groups has no effect on the transplant outcome. The likelihood of graft failure due solely to the presence of a genetic difference between the races of the donor and recipient is not tenable. This conclusion is consistent with a similar study done on renal transplant patients.²

It is important to note that the American white non-Hispanic population is projected to increase by 11% and then to decline somewhat over the next 40 years. Blacks are expected to have a substantial growth rate of 50% by the year 2030. The Hispanic population is expected to increase by 30%.^{3,4} These figures clearly suggest that organ procurement in the future will be impaired if the present rate of donation among blacks and Hispanics is maintained and not increased.

In conclusion, this study has highlighted the low organ donation rate for livers in the black and Hispanic populations. It clearly demonstrates that there is no effect on transplant survival where an organ is transplanted across racial barriers. Thus, race cannot be considered to be an important factor in assessing whether a given recipient might benefit from a given donor organ.

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