ELSEVIER

Influence of Donor Criteria on Early Outcome After Intestinal Transplantation

H. Furukawa, C. Smith, R. Lee, A.S. Knisely, W. Irish, J. Reyes, K. Abu-Elmagd, T.E. Starzl, and S. Todo

OVER the last 6 years, intestinal transplantation has become a feasible therapeutic option for patients with irreversible intestinal failure.[1] However, it has never been elucidated whether donor factors affect the recipient outcome. In this study we analyzed the influence of donor criteria on early outcome after intestinal transplantation.

MATERIALS AND METHODS

From May 1990 to September 1995, a total of 72 patients received 77 intestinal grafts (27 isolated intestine, 36 liver and intestinal, and 14 multivisceral) at our center. Donors ranged from newborn to age 48 years. Fifty-one donors were male, and 26 were female. The most common causes of death were motor-vehicle accidents, cerebrovascular accidents, and gunshot wounds. Length of hospital stay for the donors was 1 to 21 days. Ten of 77 donors had cardiopulmonary resuscitation, and 18 were maintained on high vasopressor (either higher than 10 μg/kg per minute of dopamine, norepinephrine and/or epinephrine) during the donor operation. A total of 2 to 4 L (50 to 100 mL/kg in children) of University of Wisconsin (UW) solution was used for in situ perfusion in the donor operation. Cold ischemia time (CIT) ranged from 2.8 to 17 hours, with a mean of 7.7 hours. Donor and recipient procedures are described elsewhere.[2] Postoperative immunosuppression was with tacrolimus (FK 506), steroids, and in selected cases azathioprine (AZA).

In an effort to predict the quality of early posttransplant graft function, donor variables such as age, sex, hospital stay, CPR, vasopressor, oxygenation (ratio of Po_2/Fio_2), sodium, creatinine, total bilirubin, AST, ALT, and CIT were studied. The donor variables were analyzed in regard to 3-month actual graft survival and grading of tissue damage of postperfusion intestinal specimens (2 to 4 hours after reperfusion) as well as posttransplant intestinal biopsy (within 7 days after transplantation). The grading of histology was by Park classification on a scale of 1 to 8.[3] Multivariate stepwise (backward elimination method) logistic regression for survival and linear regression for intestinal histology were used for statistical analysis.

RESULTS

Use of high vasopressor ($P = .019$) and prolonged cold ischemia time ($P = .041$) significantly worsened 3-month survival. High donor sodium ($P = .002$) significantly worsened the ischemic injury on the postperfusion histology. Both high donor sodium ($P = .020$) and use of high vasopressor ($P = .022$) significantly worsened the ischemic damage on the posttransplant histology. However, grafts recovered within 7 days in most cases.

DISCUSSION

Our analysis showed that high vasopressor, prolonged cold ischemia time, and high sodium affect the early graft survival and intestinal graft injury. It is well known in liver transplantation that prolonged cold ischemia time deteriorates liver graft function and causes high incidence of primary nonfunction and retransplantation.[4] Also, high sodium in donor has been recently recognized as a risk factor to cause early graft dysfunction in liver transplantation.[5] This is the first study in humans to delineate risk factors affecting the early graft outcome in intestinal transplantation. Both proper donor management and selection as well as adjustment of the timing of donor and recipient surgery to minimize cold ischemia time are essential for the early success of intestinal transplantation, although the use of high-risk donors is sometimes inevitable owing to the shortage of organs and the urgent requirements of recipients.

REFERENCES

1. Furukawa H, Reyes J, Abu-Elmagd K, et al: Transplant Proc 29: (this issue), 1997

2. Furukawa H, Abu-Elmagd K, Reyes J, et al: Surg Technol Int 2:165, 1993

3. Park PO, Haglund U, Bulkley GB, et al: Surgery 107:574, 1990

4. Furukawa H, Todo S, Imventarza O, et al: Transplantation 51:1000, 1991

5. Figueras J, Busquets J, Grande L, et al: Transplantation 61:410, 1996

From the Thomas E. Starzl Transplantation Institute, University of Pittsburgh Medical Center, Pittsburgh, Pennsylvania.

The work was aided by research grants from the Veterans Administration and Project Grant No. DK-29961 from the National Institutes of Health, Bethesda, Maryland.

Address reprint requests to H. Furukawa, Thomas E. Starzl Transplantation Institute, University of Pittsburgh Medical Center, Pittsburgh, PA 15213.

0041-1315/97/$17.00
PII S0041-1345(96)00406-X