Differential Analysis of Donor Characteristics for Pancreas and Islet Transplantation


ABSTRACT

Suitable selection of donors is key to the success of human islet isolation and transplantation. Although several important donor-related factors have been identified previously, they needed to be confirmed in our setting. The aims of this study were: (1) to compare the characteristics of islet donors with those of pancreas donors (national transplant registry), (2) to compare the characteristics of islet donors resulting in a successful isolation in our facility with the characteristics of pancreas donors, and (3) to compare the characteristics of islet donors at this facility, whether or not isolation was successful, with donors elsewhere whose islets were transplanted and included in the Collaborative Islet Transplant Registry. The 35 islet isolations completed at our facility were analyzed for various characteristics. Significant differences were seen in donor age body mass index (BMI), and body weight between our islet donors and our pancreas donors ($P < .001$). These differences were maintained in the subgroup analysis corresponding to donors of successful isolations compared to pancreas donors ($P < .01$). Most successful isolations in our islet isolation facility were associated with donors of BMI $\geq 25$. The percentage of successful isolation ($\geq 300,000$ IEq) was higher among donors with a body weight $\geq 90$ kg. We concluded that there was little overlap between the donor profiles for pancreas transplantation and for islet transplantation. More specific selection criteria relative to both BMI and body weight for islet donors may result in greater success of pancreas islet isolation and transplantation.

THE TRANSPLANTATION of pancreatic islets from cadaveric donors has become a promising therapy for the treatment of type 1 diabetes mellitus. The outcome of this therapy is still under debate. Some authors consider whole pancreas transplant a more satisfactory option. Pancreas or islet transplantation can provide good glycemic control and insulin independence. Pancreas transplantation has been associated with improvements in diabetic retinopathy, nephropathy, neuropathy, and vasculopathy but has the associated morbidity of major surgery. Both forms of therapy require long-term immunosuppression with its attendant risks. Both have been reported to achieve insulin independence rates of about 80% at 1 year.

Establishing the indications for a pancreas or islet transplant requires an analysis of the benefits and risks associated with each to derive an appropriate balance. Some studies have considered the outcomes and risks of pancreas and islet transplantation, the evidence for benefit in terms of diabetic complications, the risk of renal dysfunction, the presence of severe hypoglycemia and lability. Donor features are important in both processes. For this reason we focused our study on a proper selection of donors as one of the keys for human islet isolation and transplantation. With the current lack of organ donors for transplantation, it is
likely that, until the efficiency of islet isolation is improved, the procedure will not be available to all those who need it. Moreover, as the newly emerging modality of islet transplantation is demonstrating comparable results to whole pancreas transplantation, the transplant community faces a potential conflict over donor organ allocation between islet and whole pancreas programs.6 When both therapies can be offered in Andalusia (Spain), there might be competition for whole pancreas versus islet donors. In this work we examined differences between islet and whole pancreas donors in our environment. Although several critical factors relative to donors have been identified elsewhere,6 they needed confirmation in our setting. The aims of our study were: (1) to compare islet donor characteristics with those of pancreas donors, (2) to compare islet donor characteristics corresponding to successful isolation in our laboratory. However, these differences were maintained when the group of islet donors were compared with those of whole pancreas donors (ONT) for transferring their data on whole pancreas donors, which was transplanted and included in the Collaborative Islet Transplant Registry (CITR).

MATERIALS AND METHODS

Our Islet Isolation Facility received pancreata from the whole of Andalusia. We recorded data on 35 donors, whose pancreata were processed in our lab according to standard protocols for islet isolation.7,8 We considered a successful isolation process when the number of islet equivalents was ≥300,000. The features of our donors were compared with those of whole pancreas donors in Spain (ONT, national transplant registry) and donors whose islets were transplanted and included in the CITR. We performed the same analyses with the two groups of donors, corresponding to successful versus unsuccessful isolations. We assessed the impact on isolation success in our facility of several variables related to donors. Mean values were compared using student t test. Propor-

tions were compared according to Fisher test with a P value <.05 considered significant.

RESULTS

Age, body mass index (BMI), and body weight were significantly different when we compared our islet donors with pancreas donors (P < .001; Table 1). These significant differences were maintained when the group of islet donors with successful isolations was compared to pancreas donors (P < .01; Table 2). In our laboratory, most successful isolations corresponded to donors with BMI >25 and the percentage of success was higher in donors with a body weight >90 kg (Table 3).

The characteristics of donors included in the CITR display differences relative to body weight (P < .05) and BMI (P = .06), when compared with donors with unsuccessful isolation in our laboratory. However, these differences were not found in the group of successful isolations (Table 4).

DISCUSSION

There was a small overlap between donor profiles for pancreas and for islet transplantation. More specific selection criteria relative to both BMI and body weight for islet donors would result in greater success of pancreas islet isolation and transplantation.

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REFERENCES