

Pancreas and Islet Transplantation in Type 1 Diabetes

AMERICAN DIABETES ASSOCIATION

This position statement presents the recommendations of the American Diabetes Association (ADA) on pancreas and islet transplantation in patients with type 1 diabetes. The recommendations are based on an ADA technical review (1) and recent extensive review on the subject (2), which should be consulted for further information.

Successful pancreas transplantation has been demonstrated to be efficacious in significantly improving the quality of life of people with diabetes, primarily by eliminating the acute complications commonly experienced by patients with type 1 diabetes (hypoglycemia, marked hyperglycemia, and ketoacidosis). Pancreas transplantation also eliminates the need for exogenous insulin, frequent daily blood glucose measurements, and many of the dietary restrictions imposed by diabetes. Pancreas transplantation is only partially successful in reversing or stabilizing the long-term renal and neural complications of diabetes. However, this procedure is usually performed after 20 years of established diabetes. No data are available to determine whether transplantation earlier in the course of the disease would prevent complications, as would be anticipated given the results of the Diabetes Control and Complications Trial.

Pancreas and pancreas-only transplants, as well as islet transplants, require lifelong immunosuppression to prevent rejection of the graft and potential recurrence of the autoimmune process that might again destroy pancreatic islet β -cells. Immunosuppressive regimens

used in transplant patients often involve side effects that are frequent and severe enough to restrict the use of these regimens to patients who have serious progressive complications of diabetes or whose quality of life is unacceptable. In addition to the side effects of lifelong immunosuppression, the procedure itself has significant morbidity and carries a small, but not negligible, risk of mortality. It is not known whether the mortality rate exceeds that inherent in the patient population that has undergone pancreas transplantation, i.e., patients with >20 years of chronic diabetes who have extreme swings in glycemia, overt diabetes complications, and poor quality of life.

Pancreas or islet transplantations should be performed in tertiary care centers that have an active kidney transplant program and are equipped to adequately handle the complex medical and psychosocial needs of transplant patients over the long term.

Recommendations

- Pancreas transplantation should be considered an acceptable therapeutic alternative to continued insulin therapy in diabetic patients with imminent or established end-stage renal disease who have had or plan to have a kidney transplant, since the successful addition of a pancreas does not jeopardize patient survival, may improve kidney survival, and will restore normal glycemia. Such patients also must meet the medical indications and criteria for kidney trans-

plantation and not have excessive surgical risk for the dual-transplant procedure. Medicare and other third-party payers of medical care should include coverage for pancreas transplant procedures meeting these criteria. The pancreas transplant may be done simultaneous to, or subsequent to, a kidney transplant. Pancreas graft survival is better when done simultaneous to a kidney transplant.

- In the absence of indications for kidney transplantation, pancreas-alone transplantation should only be considered a therapy in patients who exhibit these three criteria: 1) a history of frequent, acute, and severe metabolic complications (hypoglycemia, marked hyperglycemia, ketoacidosis) requiring medical attention; 2) clinical and emotional problems with exogenous insulin therapy that are so severe as to be incapacitating; and 3) consistent failure of insulin-based management to prevent acute complications. Program guidelines for ensuring an objective multidisciplinary evaluation of the patient's condition and eligibility for transplantation should be established and followed. Third-party payer coverage is appropriate only where such guidelines and procedures exist.
- Pancreatic islet transplants hold significant potential advantages over whole-gland transplants. Recent strides have been made in improving the success rates of this procedure. However, at this time, islet transplantation is a rapidly evolving technology that also requires systemic immunosuppression and should be performed only within the setting of controlled research studies.

References

1. Robertson RP, Davis C, Larsen J, Stratta R, Sutherland DER: Pancreas and islet transplantation for patients with diabetes mellitus (Technical Review). *Diabetes Care* 23:112–116, 2000
2. Robertson RP: Islet transplants as diabetes treatment: a work in progress (Review). *N Engl J Med* 350:694–705, 2004

The recommendations in this statement are based on the evidence reviewed in the following publication: Robertson RP, Davis C, Larsen J, Stratta R, Sutherland DER: Pancreas and islet transplantation for patients with diabetes (Technical Review). *Diabetes Care* 23:112–116, 2000.

The initial draft of this statement was prepared by R. Paul Robertson, MD; Connie Davis, MD; Jennifer Larsen, MD; Robert Stratta, MD; and David E.R. Sutherland, MD. It was peer reviewed, modified, and approved by the Professional Practice Committee and the Executive Committee in November 1999. It was revised by R. Paul Robertson, MD, and reviewed and approved by the Professional Practice Committee in 2006.

© 2006 by the American Diabetes Association.