

Human Islet Isolation and Transplantation in Chronic Pancreatitis Using the Automated Method

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CHRONIC pancreatitis is the most frequent cause of pancreatogenous diabetes mellitus.¹ Pain is the major indication for surgical intervention and is the main complaint in about one third of the patients who undergo surgery.² The choice of surgical technique is generally dictated by the ductal anomalies and the presence of associated disease.³ Most of the cases that present small-duct pancreatitis must be resected as definitive procedure for pain release.⁴ Islet autotransplantation has been used to prevent pancreatectomy-induced diabetes.⁵ We have applied the automated method⁶ to separate islets from pancreases resected in patients with chronic pancreatitis.

MATERIALS AND METHODS

Two patients with chronic pancreatitis (13 and 26 years old) underwent subtotal pancreatectomy. The islets were isolated immediately after pancreas resection. A combination of intraductal and intraparenchymal collagenase injection (Boehringer-Mannheim, type P, 2.8 mg/mL) was used. The distended pancreas was placed inside the digestion chamber and processed as previously described.⁶ The dispersed pancreatic tissue was washed with endotoxin free Hanks (Sigma Chemical Co, St Louis, Mo) containing 5% human serum albumin (HSA) three times by centrifugation at 400g for 4 minutes. The final pellet was resuspended in 100 mL of Hanks with 5% HSA and transferred to a 300-mL plastic bag (Baxter). Quality control samples (counting, viability, histology) were taken immediately after isolation. The islets were infused in a mesenteric branch of the portal vein.

RESULTS AND DISCUSSION

The pancreases that were processed for islet separation weighed 26.1 and 93.5 g, respectively. The patients received 130,500 and 262,500 equivalent islets (average diameter = 150 μ m) in a volume of 1.7 mL and 4.8 mL, respectively. The islets were reinfused in the two patients immediately after separation. The procedure was uneventful. Both patients became insulin independent within 1 month and 1 week after islet autotransplantation and still

do not require any exogenous insulin (15 and 6 months later, respectively).

One of the advantages of the automated method is that a partial purification occurs during the digestion phase,⁷ because the fibrous component of the pancreas is retained in the chamber. This resulted in a decreased volume that was infused in the portal vein, without the complications previously described.⁸⁻¹⁰ Our preliminary results indicate that the automated method can be used effectively to separate islets from chronic pancreatitis glands. The separated islets can be safely reinfused and appear to be functionally competent.

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