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CHRONIC FAILURE OF INTRAHEPATIC CANINE ISLET AUTOGRAFTS

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BACKGROUND: Successful islet transplantation has helped patients with type 1 diabetes achieve insulin independence. However, its long-term outcome is disappointing. In the present study, we performed canine autotransplantation to investigate the nonimmunological factors associated with islet graft failure.

METHODS: A total of 21 mongrel dogs were used as donors and recipients. The pancreas was distended with collagenase via pancreatic duct and digested using an automated method. Islets were purified by density gradient and then injected into the portal vein of the same dog within 6 hours.

RESULTS: Ten recipients achieved normoglycemia and were maintained for more than 12 weeks without exogenous insulin. The mean transplanted islet mass was 8221±4918 vs. 3875±2337 IEQ/kg in successful and failed transplants, respectively ($p < .05$). Between the two groups, there was no significant difference in body weight, pancreas weight, digested pancreas weight, unpurified islet mass, islet purity, cold ischemic time and time for islet isolation and transplantation. In addition, WBC, platelet, fibrinogen and ESR levels were comparable. The islet mass was the major factor determining the success of transplantation ($p=0.011$). Three dogs became hyperglycemic 98, 133 and 196 days after transplantation, respectively. Compared with other successful recipients, they showed lower serum insulin after transplantation.

CONCLUSIONS: In canine intraportal islet autotransplantation: (1) the islet mass was the major determinant of success; (2) hyperglycemia can occur 3 –to 7 months after successful transplantation; and (3) beta cell dysfunction can be a cause of chronic graft failure.

KEY WORDS: islet autografts, chronic failure, diabetes mellitus