Autotransplantation of pancreatic islets. A single-center first experience

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INTRODUCTION: Islets auto-transplantation (IAT) is a well-known procedure that may improve glycemic control after total or completion pancreatectomy compared to insulin therapy alone.

CASE REPORT: We herein report our experience in IAT with the case of a sixty years old woman underwent completion pancreatectomy for recurrent pancreatitis. She received IAT by percutaneous trans-hepatic intra-portal injection. The patient recovered well, except for a surgical wound infection that was treated with vacuum therapy. She was discharged on p.o.d. 27th in good general conditions and tolerating a diet.

DISCUSSION: Data in literature demonstrate that IAT is cost-effective on the long-run compared to insulin therapy in patients with diabetes. 30-days mortality rate for islets auto-transplantation (IAT) following total pancreatectomy is 5%, which is comparable with previous reports on total pancreatectomy without IAT. Our report may expand the literature on this procedure in order to further develop and improve both technique and outcomes, and clarify the correct indication to surgery.

KEY WORDS: Auto-transplantation, Chronic pancreatitis, IAT, Pancreatic islets, Total pancreatectomy

Introduction

Islets auto-transplantation (IAT) is a well-known procedure that may reduce insulin dependence incidence after total or completion pancreatectomy. In a recent meta-analysis by Dong and colleagues, 15 articles reporting IAT outcomes after total and partial pancreatectomy were analyzed and discussed.

We herein report our experience in IAT. In detail, the case and the follow-up results of a woman that underwent a completion total pancreatectomy for complications of chronic pancreatitis and then treated with IAT at Niguarda Ca’ Granda Hospital (Milan, Italy).

Case Report

A sixty years old woman came to our attention complaining of recurrent abdominal pain. Six years before she underwent duodenopancreatectomy at another institution for chronic pancreatitis in a setting of pancreas divisum, complicated by a grade B pancreatic fistula, and perianastomotic gastric ulcerations. Furthermore, she lat-
er underwent endoscopic stenting of the main pancreatic duct due to persistence of abdominal pain. About her past medical history she reported tonsillectomy, appendectomy, hysterectomy, glaucoma, melanoma. Preoperative fasting glucose blood level was 62 mg/dl. Given her past history, the recurrent abdominal pain and relapsing pancreatitis, after multidisciplinary discussion she underwent on March 2014 a completion total pancreatectomy and islet autotransplantation.

According to the literature 4, pancreatic islets isolation consists of six steps: (1) cleaning of the resected pancreas and cannulation of the main duct; (2) organ perfusion; (3) digestion; (4) dilution, tissue collection and rinse; (5) purification through a density gradient; (6) islets number evaluation. The aim is to obtain as much as possible islets combining both enzymatic and mechanic harvesting from the pancreatic tissue. After the perfusion with an enzymatic solution using peristaltic pumps, the tissue is manually centrifuged to obtain small cell clusters that are then diluted with a cold solution. Then the endocrine fraction is harvested through a purification phase, that allows obtaining islets with different grade of purity. To determine the number of islets a known volume of cell suspension is colored with an insulin-specific marker and analyzed under the microscope (10x). The standard range for islets size is 50 mm and purity is then calculated as the proportion of 100 mm islets found in sample. For IAT cell culturing is usually not needed.

Islet infusion is then performed 24 hours after pancreatectomy under ultrasound and fluoroscopic guidance, by intra-portal trans-hepatic percutaneous injection. A color-doppler ultrasound is then performed to rule out bleedings or thrombosis of the portal vein. The patient recovered well, except for a surgical wound infection that was treated with vacuum therapy. She was discharged on p.o.d. 27th in good general conditions and infection that was treated with vacuum therapy. She was monitored perioperatively and during the follow up at 3, 6, 12, 24, 36 months. Moreover, during the follow up a quality of life questionnaire will be administered to evaluate patients’ satisfaction.

Conclusions

Pancreatic islets auto-transplantation is a safe and effective procedure and good outcomes have been reported after total pancreatectomy for chronic pancreatitis. We reported our experience of a successful treatment for a
completion pancreatectomy for chronic pancreatitis. Considering the acceptable metabolic control attainable by IAT after total pancreatectomy, this approach might be a suitable alternative to standard duodenopancreatectomy for patients affected by neoplasms of the head of the pancreas at high risk to develop a postoperative fistula.

Riassunto

L'autotrasferimento d'isole pancreatiche (IAT) è una procedura ben nota che consente di migliorare il controllo glicemico dopo una pancreasectomia totale (o completamento di pancreasectomia dopo duodenocefalopancreasectomia) rispetto alla sola terapia insulinica. In questo lavoro presentiamo la nostra esperienza nel campo dell'IAT riportando il caso clinico di una donna di sessant'anni, sottoposta a completamento di pancreasectomia per episodi ricorrenti di acuità in un quadro di pancreatite cronica. Il trattamento IAT è stato somministrato mediante iniezione trans-epatica intra-portale. Il recupero post-procedurale è stato ottimale, fatta eccezione per un'infezione di ferita che ha richiesto un trattamento con tecnologia a pressione negativa. La paziente è stata dimessa in ventisettesima giornata post-operatoria, in buone condizioni generali, dopo regolare ripresa dell'alimentazione e della canalizzazione. I dati presenti in letteratura dimostrano che l'IAT è una procedura sicura, garantendo nel lungo periodo un vantaggio rispetto alla terapia insulinica in termini di rapporto costo-beneficio. Riguardo alla procedura chirurgica, è qui utile ricordare che la mortalità a 30 giorni dopo pancreasectomia totale associata a IAT è del 5%, ed è pertanto sovrapponibile ai risultati della pancreasectomia totale senza IAT. Riportando questa esperienza intendiamo contribuire alla crescita della casistica chirurgica attuale in questo campo, proponendo nel futuro un più ampio sviluppo e una più estesa applicazione di tale approccio.

References