Autologous islet cell transplantation for chronic pancreatitis: cleveland clinic experience

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INTRODUCTION

- Total pancreatectomy (TP) with islet cell autotransplantation (IAT) can reduce or prevent diabetes by preserving beta cell function, and is normally performed with on-site isolation laboratory facilities.

- We examined factors associated with islet yield and metabolic outcomes in patients with chronic pancreatitis undergoing TP-IAT. We report our experience of TP-IAT with an off-site islet isolation laboratory.

METHODS

- Data (August 2008 - February 2014) were obtained from a TP-IAT database which included information from medical records, clinic visits, questionnaires and follow-up telephone calls.

- Each patient was assessed with pre- and post-operative 5-hour mixed-meal tolerance tests for metabolic measurements and with serial HbA1c determinations.

- Islet cell isolation performed off-site.

- Statistical analyses were performed using SAS software (Version 9.2;Cary, NC).

RESULTS

- Thirty-six patients with a mean age of 38 years (range 16-72 years) underwent TP-IAT for different etiologies (Table 1).

- At a median follow-up time of 28 months (range 3-66), 12 patients were insulin independent and 24 patients were on at least one insulin injection a day (Table 2).

- Pre-operative HbA1c and peak glucose levels during the pre-operative mixed-meal tolerance tests inversely correlated with islet yields (Figure 1).

- Patients with normal or minimal disease extent had higher islet yields in comparison to those with advanced changes (Figure 2).

RESULTS

Table 1 Baseline patient demographics and characteristics

Variables	Data (n=36)
Mean age at surgery (year) (range)	38 (16 - 72)
Gender n (%)	
Male	18 (50)
Female	18 (50)
Mean BMI (kg/m^2) (range)	26 (17.5 - 48.1)
Mean duration of symptoms (months) (range)	90 (12 - 336)
Etiology n (%)	
Idiopathic	16 (45)
Alcohol	7 (19)
Biliary	8 (22)
Other	5 (14)
Previous pancreatic surgery n (%)	
Yes	4 (11)
No	32 (89)
Pancreatic disease extent n (%)	
Normal or minimal change	22 (61)
Advanced changes of CP*	14 (39)
Pre-operative narcotic use n (%)	33 (92)
Median HbA1c (range) **	5.7 (4.6 - 6.8)
Median fasting C-peptide (ng/mL, range)***	1.4 (0.3 - 6.8)

*Based on Cambridge classification on pre-operative imaging
** n=35, within 3 months prior to TP-IAT
***n=33
n, number; BMI, body mass index; CP, chronic pancreatitis

Table 2 Islet graft characteristics, post operative surgical and metabolic outcomes

Variables	Data
Median days of post-operative stay (range)	10 (5 - 46)
Post-operative complications n (%)	18 (50)
Median IEQ (range)	358,959 (45,000 - 672,000)
Median IEQ/Body weight (IEQ/kg) (range)	4,308 (769 - 9,942)
Median purity (%islets/whole tissue) (range)	4 (2 - 13)
Median follow-up time (months) (range)	28 (3 - 66)
Mortality at last follow-up n (%)	2 (6)
Insulin dependent at last follow-up n (%)	24 (67)
Insulin independent at last follow-up n (%)	12 (33)
Median HbA1c at the last visit (%) (range)	6.8 (5.4 - 10.3)
Median fasting C-peptide (ng/mL) (range) *	0.8 (<0.2 - 1.5)
C-peptide ≥ 0.3 ng/mL (n,%) **	23 (70)
Hypoglycemia n (%)	24 (66)
Narcotic use at last follow-up n (%)	19 (53)

* In mixed-meal tolerance test within 6 months post-operation, n=21
** Random C-peptide, n=33
n, number; IEQ, islet equivalent

Fig 1

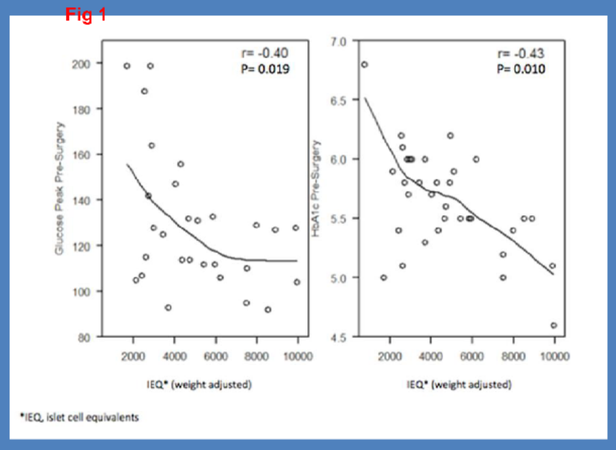
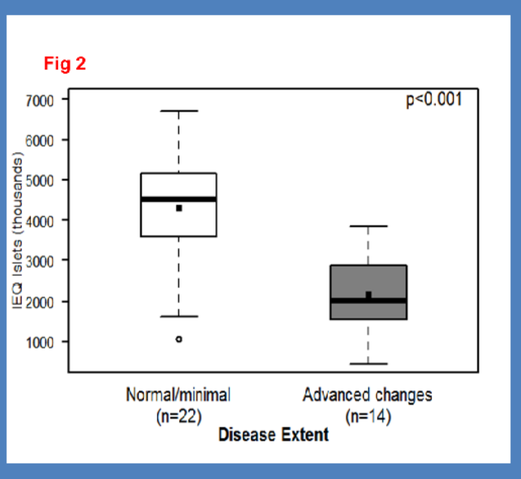


Fig 2



DISCUSSION

- In our series, one third of patients were insulin independent with a median follow-up time of 28 months.

- Our rates of insulin independence are comparable to those reported from other large centers with on-site islet isolation laboratories.

- Factors associated with insulin independence in our current study included islet yield, female gender and disease extent on pre-operative imaging.

CONCLUSION

- Islet cell autotransplantation after total pancreatectomy performed in our facility with an off-site islet isolation laboratory shows islet yield and rates of insulin independence that are comparable to other large centers with on-site laboratories.

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