Validation of the Homeostatic Model Assessment (HOMA) of beta cell function in pancreas transplantation

Barnes J, Franklin R, Sharples E, James T, Friend P, Gough S, Levy J, Mittal S

INTRODUCTION

- Pancreas 5 year graft survival remains low
- There are no validated biomarkers of early graft dysfunction

HOMA

- Combines modelling of glucose and insulin dose response curves in all tissues
- Can quantify beta-cell function (B) and insulin sensitivity (S) in patients with diabetes
- Requires fasting glucose/insulin/c-peptide
- Relies on **portal venous** insulin delivery

AIMS

- To develop and validate a HOMATx model for use in pancreas transplantation

METHODS

- HOMATx created to allow for post-hepatic insulin delivery from pancreas graft
- 12 pancreas Tx patients & 12 matched controls

- Fasting B and S calculated from HOMATx and correlated with clamp insulin & C-peptide

RESULTS

Table 1: Patient demographics

	Pancreas Tx	Controls	P value
Total	12	12	-
Age [†]	50.1 (8.87)	47.2 (2.08)	0.282
Gender - Male	10	10	-
BMI [†]	27.2 (3.33)	26.5 (1.80)	0.528
eGFR [†]	72.3 (13.85)	>90	-
HbA _{1c}	36.2 (2.55)	-	-
Fasting Glucose [†]	5.9 (0.74)	5.4 (0.36)	0.047
Fasting Insulin [†]	76.9 (30.11)	40.2 (15.79)	0.001
Fasting C-peptide [†]	577.5 (141.61)	444.2 (148.40)	0.035
%B [†]	64.43 (14.73)	71.53 (17.51)	0.294
%S [†]	114.23 (34.70)	138.23 (64.28)	0.267

[†]Values are mean (s.d.)

Figure 1: Correlation of %B and mean serum insulin in pancreas transplant recipients

Figure 2: Correlation of %B and mean serum insulin in matched controls

CONCLUSIONS

- HOMATx is the 1st model developed for the assessment of pancreas graft function
- It is quick and simple to use
- Correlates well with directly measured function
- It may provide a useful tool for longitudinal graft monitoring