Potential of islet to arrest cell destruction at onset of type 1 diabetes?

Adrian Scott, Consultant Physician, Waikato Hospital, Hamilton, New Zealand

The possibility that, at the onset of type 1 diabetes, the destruction of islet cells might be arrested by some novel intervention such as immune suppression, has always been tempered by the knowledge that less than 20% of functioning islets remained, by the time the diagnosis was made. Or so we thought.

This fascinating observational study (part of the control arm of a randomised trial of immunotherapy in new onset type 1 diabetes) looked at insulin secretion over a 2 year period in the 20 controls who did not receive active treatment. Peripheral measurement of insulin does not accurately reflect endogenous insulin secretion since 50% is removed during first pass of the liver. C-peptide (secreted on an equimolar basis) has been used as an indicator of insulin secretion, though as a single measurement still has it limitations. For the purposes of this study, insulin secretory responses were measured to a mixed meal for 4 h every 6 months. A far greater insulin response was seen (approximately 50% of controls without diabetes) during the first 10 weeks after diagnosis, than has previously been noted. β cell function declined to negligible values over the study period but the possibility remains of preserving function, which is known to be associated with improved glycaemia and better long-term outcomes.

Whilst finding a safe immunosuppressant, which can be taken indefinitely, remains elusive, there may be other interventions available. Intensive insulin management from diagnosis has still not been adequately tested, though the DCCT study (which waited until patients had been diagnosed for at least a year before being entered) did show prolonged preservation of C-peptide in the intensive arm and this was associated with lower HbA_{1c}. Perhaps this study may be the stimulus we needed?

PEDIATRIC DIABETES

Glycaemic control as a predictor of weight change

Readability	✓✓✓✓
Applicability to practice	✓✓✓✓
WOW! factor	✓✓✓✓

1 Most studies have looked at mean HbA_{1c} and weight change from the beginning to the completion of puberty rather than between clinic visits.

2 This study postulated that the worsening glycaemic control observed between clinic visits could be associated with inadequate weight gain.

3 Changes in weight, HbA_{1c} levels, and reported total daily insulin dose were determined between consecutive visits for 94 adolescent boys with type 1 diabetes.

4 The average quarterly weight gain was 2.7 kg during periods of improving glycaemic control, 1.5 kg during periods of minimal change in glycaemic control, and 1.0 kg during periods of worsening glycaemic control.

5 There was a significantly greater weight gain during intervals when the family reported a decreasing insulin dose compared with intervals when the family reported no change in insulin dose.

6 However, weight change during times of reported increasing insulin dose was similar to that when the family reported that the insulin dose had not changed.

7 Clinicians should review the child's internal growth data and the family's responsibilities in diabetes management to explain discrepancies in weight velocity and insulin doses .

Quinn M, Ficociello LH, Rosner B (2003) Change in glycaemic control predicts change in weight in adolescent boys with type 1 diabetes. *Pediatric Diabetes* **4**: 162–67

DIABETES

Insulin secretory response in type 1 diabetes

Readability	✓✓✓✓
Applicability to practice	✓✓✓
WOW! factor	✓✓✓✓✓

1 Type 1 diabetes is caused by autoimmune destruction of β-cells. Previous studies have suggested few functioning islets remain at diagnosis.

2 There is evidence of sustained β-cell function in some individuals years after the onset of type 1 diabetes but there is relatively little information about changes in insulin secretion over time.

3 This is a qualitative and quantitative study of insulin secretion to a 4 h mixed meal in 41 patients with newly diagnosed type 1 diabetes. This response was followed up for 24 months in 20 patients.

4 Insulin secretion to a mixed meal was cut by a half in patients with type 1 diabetes compared with controls without diabetes.

5 There was a significant correlation between the total insulin secretory response and control of glucose, measured by HbA_{1c}.

6 Two patterns of insulin response were seen depending on the peak insulin following the oral meal. This pattern was consistently seen in the majority of individuals studied for 2 years.

7 These results demonstrate that there is a greater insulin secretory capacity at diagnosis of type 1 diabetes than previously thought.

8 Studies of insulin secretory response in patients with type 1 diabetes may provide insights into disease mechanisms and have implications for the design of clinical trials.

Steele C, Hagopian WA, Gitelman S et al (2004) Insulin secretion in type 1 diabetes. *Diabetes* **53**: 426–33

Type 1 diabetes

DIABETIC MEDICINE

Body composition in adolescents

Readability	✓✓✓
Applicability to practice	✓✓✓✓
WOW! factor	✓✓✓✓

1 Glycaemic control is thought to deteriorate during adolescence in patients with type 1 diabetes.

2 This population-based study compared body compositions of 18 adolescent post-menarcheal females with diabetes with age-matched healthy controls.

3 BMI was 2.7kg/m^2 higher in the patients with diabetes than in the controls. Fat distribution was significantly correlated with HbA_{1c}, daily dose of insulin expressed per kg bodyweight and total cholesterol.

4 Overweight in adolescent females with diabetes can be explained by an increased upper body fat mass.

Ingberg CM, Sarnblad S, Palmer Y et al (2003) Body composition in adolescent girls with type 1 diabetes. *Diabetic Medicine* **20**: 1005–11

INDIAN JOURNAL OF PEDIATRICS

Incidence of neuropathy in children

Readability	✓✓✓
Applicability to practice	✓✓✓✓
WOW! factor	✓✓✓✓

1 Peripheral neuropathy (PN) is a frequent chronic complication in children with type 1 diabetes.

2 In this study, electrophysiology was used to determine the incidence of PN in 40 children with diabetes and 30 controls.

3 PN was present in 24(60%) of the children with diabetes. Nerve conduction velocities were also lower in the patient group.

4 Electrophysiological studies could be important to investigate the presence of neuropathy in children with type 1 diabetes.

Cenesiz F, Sonel Tur B, Tezic T, Gurer Y (2003) Nerve conduction in children suffering insulin dependent diabetes mellitus. *Diabetologia* **70** (12): 945–51

DIABETES METABOLISM

Computers and insulin therapy

Readability	✓✓✓
Applicability to practice	✓✓✓✓
WOW! factor	✓✓✓✓

1 Patients are reluctant to take the responsibility to increase or decrease their insulin dose.

2 This study assessed the safety of a computer programme in intensive insulin therapy.

3 Participants followed 89% of the computer's recommendations, and made more insulin dose adjustments as a consequence.

4 Intensive treatments with and without computer assistance resulted in a similar improvement in pre-meal/postprandial capillary blood glucose.

5 Use of a computer programme is feasible and safe.

Boukhors Y, Rabasa-Lhoret R, Langelier H (2003) The use of information technology for the management of intensive insulin therapy in type 1 diabetes mellitus. *Diab Metab* **29**(9): 619–27

DIABETIC MEDICINE

Renal outcomes in teenagers

Readability	✓✓✓✓
Applicability to practice	✓✓✓✓
WOW! factor	✓✓✓✓✓

1 The influence of young age at onset of diabetes on long-term complications is unclear.

2 In this study, proteinuria occurred earlier and nephropathy outcome was worse in childhood-onset diabetes than in adult-onset controls.

3 There was no significant difference in background retinopathy between the different age-at-onset groups, but younger onset patients were more likely to need laser treatment.

4 Events in teenage years appear to have an adverse effect on risk of developing long-term microvascular complications.

Harvey JN, Allagoa B (2003) The long-term renal and retinal outcome of childhood-onset type 1 diabetes. *Diabetic Medicine* **21**: 26–31