Early Retained C-peptide is Associated with Markedly Reduced Hospital Admissions and Improved Glycaemic Control in Adult-Onset Type 1 Diabetes but Does Not impact Quality of Life (QOL) Measures.

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Background

- Emerging therapies aim to preserve insulin secretion (measured using c-peptide) in type 1 diabetes.
- The impact of preserved insulin secretion in adult-onset diabetes, and on non glycemic outcomes, is unclear.

Aims

- To determine the impacts of retained endogenous insulin secretion on glycemic control, healthcare utilisation and patient quality of life (QOL) in adult on-set type 1 diabetes.

Methods

StartRight Study: prospective study

Study Population:
- Age 17-81 years
- Newly diagnosed type 1 diabetes (duration < 12 months)

Assessed annually:
- Healthcare utilistation
- HbA1c
- QOL: assessed using SF-12 questionnaire

Post meal plasma C-peptide at median 4 years diabetes duration

223
Retained insulin secretion c-peptide (≥ 200 pmol/L)

276
Severe insulin deficiency c-peptide (< 200 pmol/L)

Figure 1. Classification of participants by c-peptide status

- Assessed the relationship between post-meal blood c-peptide (< 200 pmol/L/ ≥ 200 pmol/L, see figure 1 above) and HbA1c/QOL (at the time of c-peptide testing) and healthcare utilisation (outpatient appointments, hospital admissions) over the previous year.

Results

Participants with retained insulin secretion (c-peptide ≥ 200 pmol/L), in comparison to those with c-peptide <200pmol/L had significantly:

- **Better glycaemic control**: mean HbA1c 6.5 mmol/mol lower than those with severe insulin deficiency (c-peptide < 200 pmol/L) (58.0 vs 64.5 mmol/mol, p< 0.001) (Figure 2)
- **Fewer hospital admissions** over the prior year for any cause in comparison to the severe insulin deficient group: (4% vs 13%, p< 0.01) (Figure 3)

Where ≥1 admission**:**

- **Less nights in hospital** (mean 2.2 vs 4.9 nights, p= 0.001, Figure 4) and **less likely to report ketoacidosis** (0% vs 32.4% of admissions, p= 0.001, Figure 5) compared to participants with severe insulin deficiency.

- Participants with severe insulin deficiency (c-peptide < 200pmol/L) attended **fewer outpatient healthcare appointments** (including general practitioners, diabetes specialist doctors, diabetes specialist nurses, community diabetes nurses, community diabetes clinics) over the previous 12 months (3.5 vs 4.3 appointments, p> 0.05).
- QOL did not differ by c-peptide status (mean SF-12 102 vs 101, p= 0.5).

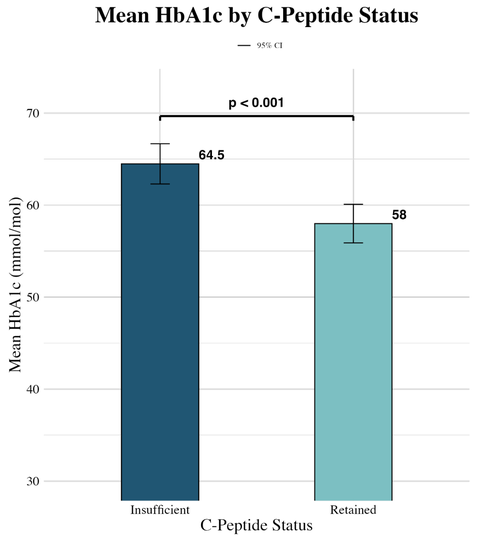

Figure 2. Mean HbA1c levels with 95% confidence intervals by levels of preserved insulin secretion (c-peptide status), showing better glycaemic control in those with absence of severe insulin deficiency. HbA1c was assessed over the year prior to c-peptide measurement.

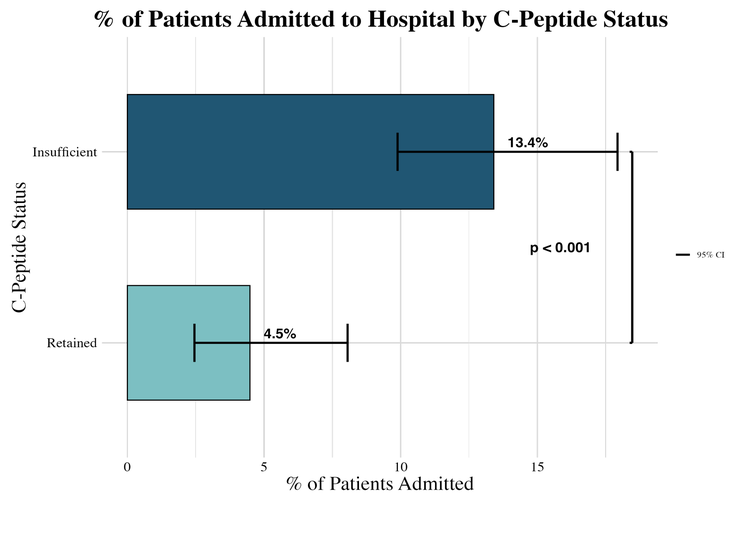

Figure 3. Percentage of patients admitted to hospital by levels of preserved insulin secretion (c-peptide status), indicating fewer admissions in those without severe insulin deficiency. Hospital admissions were assessed over the year prior to c-peptide measurement.

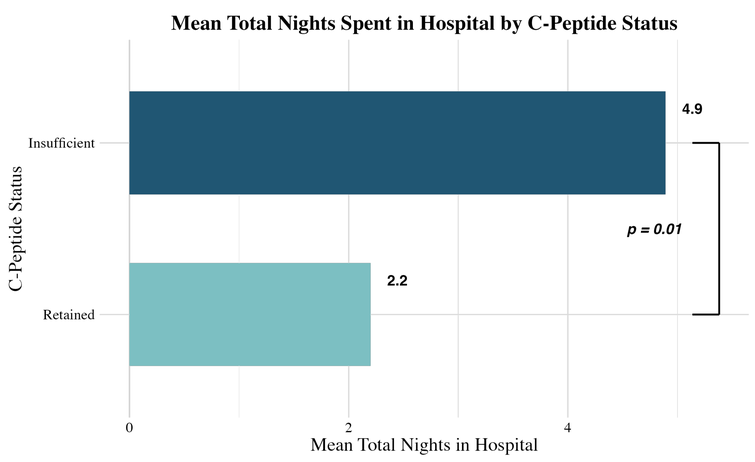

Figure 4. Mean total nights spent in hospital by levels of preserved insulin secretion (c-peptide status), indicating fewer nights in those without severe insulin deficiency. Hospital stays were assessed over the year prior to c-peptide measurement.

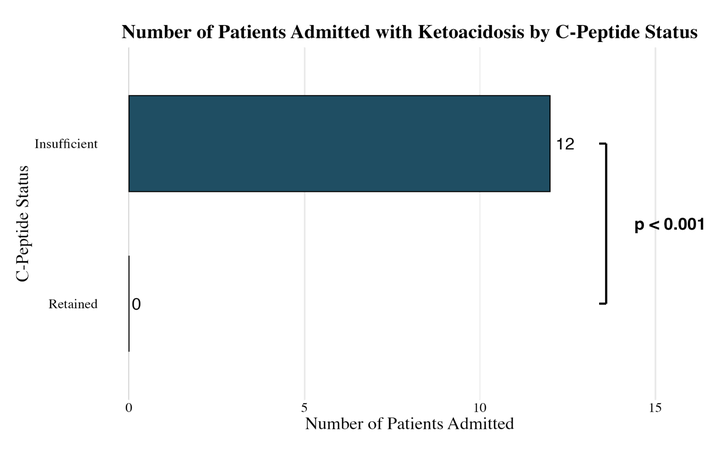

Figure 5. Number of total hospital admission due to ketoacidosis by levels of preserved insulin secretion (c-peptide status), showing that 12 patients with severe insulin deficiency were admitted with DKA in the year prior to c-peptide measurement.

Conclusion

- In adult-onset type 1 diabetes, retained c-peptide level >200pmol/L four years post-diagnosis is associated with significantly better glycemic control, fewer hospital admissions, reduced total nights in hospital, fewer episodes of diabetic ketoacidosis and reduction in outpatient contact with healthcare professionals.

- This supports the commissioning of therapies to preserve beta cell function to shift adult-onset type 1 diabetes management and reduce strain on healthcare resources.

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