Endogenous C-peptide secretion and complications in patients with over 50 years duration of Type 1 diabetes (the Golden Years cohort)

Prior SL[1], Luzio SD[1], Dunseath GJ[1], Gill GV[2], Stephens JW[1], Bain SC[1]

[1]Diabetes Research Group, Swansea University, Swansea, UK

[2]Insitute of Ageing & Chronic Disease, University of Liverpool, Liverpool, UK

Introduction

- Type 1 diabetes (T1DM) is thought to proceed to absolute insulin deficiency; with C-peptide falling to undetectable concentrations within 5-10 years of diagnosis
- However, recent reports suggest that some patients, even those with long-term diabetes, secrete low levels of endogenous insulin
- It has been suggested that even small amounts of residual β-cell function may result in fewer complications including lower rates of hypoglycaemia and incidences of retinopathy and nephropathy

Aims

- We aimed to assess detectable C-peptide levels in a cohort of patients with T1DM of >50 years and determine the association with the presence/absence of complications

Methods

- The Golden Years cohort are subjects with Type 1 diabetes duration ≥50 years. Previous studies have shown them to be at low risk of developing complications
- Random serum C-peptide was measured on stored, frozen (-20°C) samples from 334 patients, using a commercially available immunometric C-peptide assay (Invitron, Monmouth, UK). Assay detection limit was 5 pmol/L
- Subjects were divided into 'non secretor' (<5 pmol/L) and 'secretor' (≥ 5 pmol/L) groups

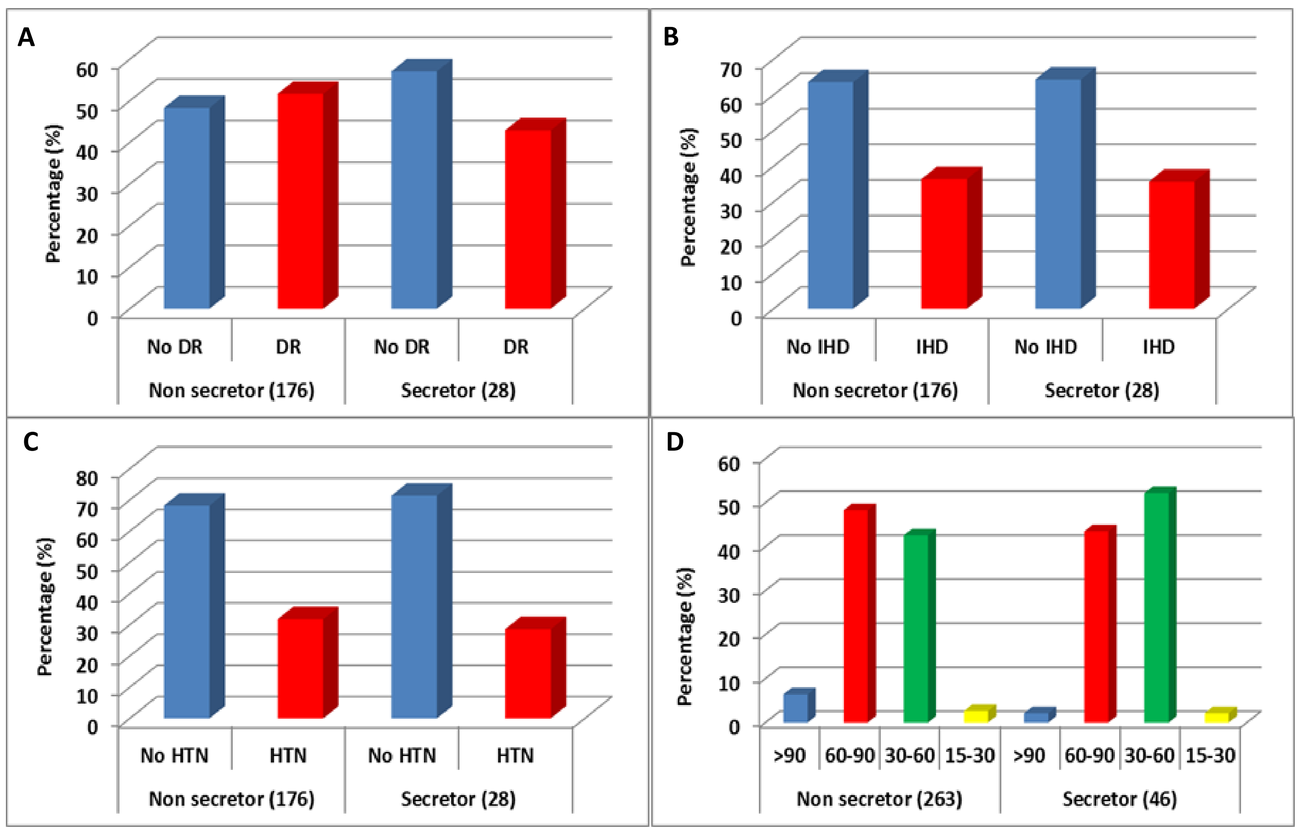

Fig 2. Percentage of "Non secretors" vs "secretors" with and without (A) diabetic retinopathy (DR) (B) ischaemic heart disease (IHD) (C) hypertension (HTN) and (D) renal impairment according to eGFR (ml/min)

Results

- A substantial proportion (15.9%) of the cohort continued to secrete detectable levels of C-peptide (5-245 pmol/L) (Fig 1)

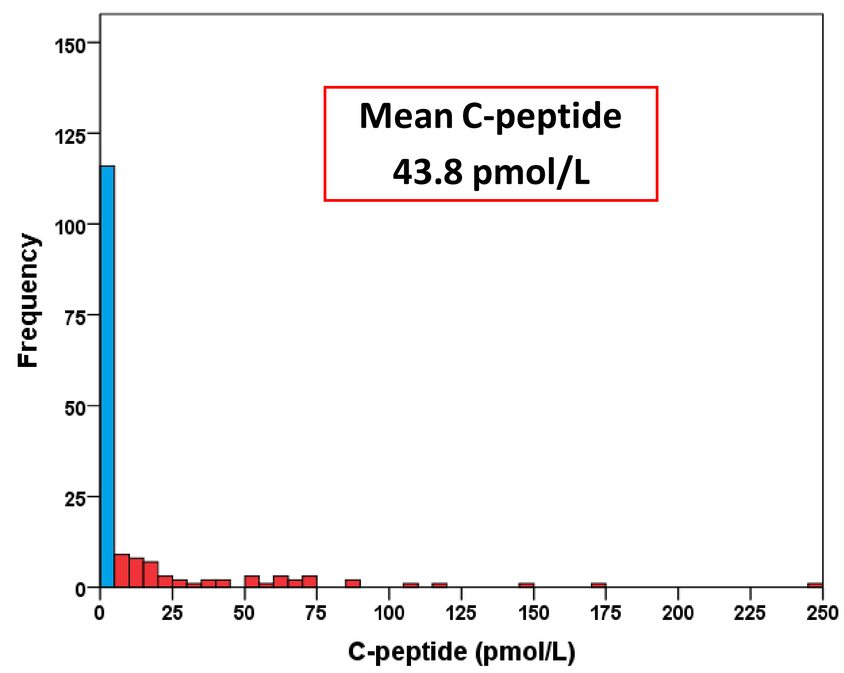

Fig 1. C-peptide distribution

- Both 'non secretor' and 'secretor' groups were well matched, with no significant difference in age, age at diagnosis, duration of diabetes, BMI, HbA1c or lipid levels. There was however, a significant difference in insulin dose (p=0.002) between the groups (Table 1)
- No difference in renal impairment, or prevalence of diabetic retinopathy, ischemic heart disease or hypertension could be observed between non-secretors and secretors (Fig 2)

Measurement	'Non secretor' (281)	'Secretor' (53)	P
Age (yrs)	69.0 (9.0)	69.2 (9.5)	0.879
Males % (n)	54.8 (154)	43.4 (23)	0.127
BMI (kg/m^2)	24.8 (3.7)	24.4 (2.7)	0.599
Age at diagnosis (yrs)	13.8 (7.0)	14.1 (6.7)	0.805
Duration (yrs)#	54.0 [52-58]	55.5 [52-61]	0.301
Insulin dose (U/24hr)*	34.4 (5.9)	26.7 (4.8)	0.002
Insulin dose (U/kg)	0.53 (0.2)	0.44 (0.1)	0.010
HbA_{1c} (%)	9.0 (1.6)	8.7 (1.2)	0.168
Cholesterol (mmol/L)	5.8 (1.1)	5.8 (1.0)	0.975
LDL (mmol/L)*	3.2 (0.4)	3.2 (0.4)	0.971
HDL (mmol/L)	1.9 (0.6)	1.8 (0.5)	0.599
Triglyceride (mmol/L)*	1.3 (0.3)	1.4 (0.3)	0.253

Table 1. Mean (SD) for normally distributed data.
*Geometric mean and approximate SD. #Median and IQR

Conclusions

- Some level of endogenous C-peptide production is evident in many subjects with T1DM and this can persist for decades after disease onset
- The presence of detectable C-peptide did not appear to confer protection against diabetes related complications such as retinopathy, IHD or albuminuria