

# Targeting Optimal Metabolic Parameters in Type 1 Diabetes Mellitus and Coeliac Disease: An Extra Challenge

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**Introduction** GFD added to a diabetic dietary regimen imposes practical limitations and leads to considerable restrictions in patients' lifestyles. Prevalence of CD in the general population is approximately 1%. In patients with T1DM, the prevalence of CD is higher with studies reporting rates between 0.6% to 16.4%<sup>1</sup>. Gluten free diet (GFD) (the cornerstone of managing coeliac disease) imposes practical limitations in dietary options. Many of the GFD have a high glycemic index potentially making glycemic targets more difficult to achieve.

**Objective** To determine whether differences in metabolic parameters exist in T1DM + CD compared to cohort of patients with T1DM attending the Diabetes Day Centre, Galway University Hospital

## Methods

A Single-centre, cross-sectional study. All patients with T1DM attending the Diabetes Day Centre, GUH. Data collection via DIAMOND and PAS, for clinic attendances June 2011 to June 2013  
Subgroup analysis for those with T1DM + CD: All patients have histology diagnosis. Compliance to GFD determined by Anti-tissue transglutaminase antibodies (anti-tTG) titre <10 U/ml  
Metabolic parameters: Weight, BMI, Blood Pressure, HbA1C, Lipid profiles, Use of lipid lowering drugs were all collected at routine clinic visits  
Statistical analysis: Minitab Version 16 Descriptive analysis. Student's t-test

## Results

- CD prevalence in T1DM attending Diabetes Day Centre, GUH was (4.1%)
- HbA1C in the T1DM + CD was statistically higher than T1DM, (76.4 mmol/mol  $\pm$  17.4 vs 70.3  $\pm$  17.7)
- HbA1C was higher in those with poor compliance to GFD (66  $\pm$  13.1 vs 81.2  $\pm$  23.5)
- CD patients tend to have better lipid profile and lower BMI
- \*targets are those of the American Diabetes Association<sup>2</sup>
- \* hypoparathyroidism, vitiligo, pernicious anaemia

**Table 1: Comparison of demographic and metabolic parameters**

Variables	T1DM + CD	T1DM	
Patients, n (%)	37 (4.1%)	868 (95.9%)	
Male, n (%)	17 (46%)	457 (52.6%)	
Age >18, n (%)	32 (86.4%)	766 (88.2%)	
Mean age (year), $\pm$ SD	38.9 $\pm$ 18	37 $\pm$ 17	
Metabolic Parameters			p-value
HbA1C (mmol/mol), (mean $\pm$ SD)	76.4 $\pm$ 17.4	70.3 $\pm$ 17.7	<b>0.04</b>
<18 y/o	83.6 $\pm$ 12.8	75.7 $\pm$ 15.7	0.25
>18 y/o	72.8 $\pm$ 21.4	69.6 $\pm$ 17.8	0.41
	p=0.15	<b>p&lt;0.05</b>	
Lipid Profile*			
Total cholesterol (mmol/L) (mean $\pm$ SD)	4.0 $\pm$ 1.0	4.6 $\pm$ 1.1	<b>0.001</b>
In target*, n (%)	32 (87%)	634 (73%)	0.85
Triglycerides (mmol/L), (mean $\pm$ SD)	1.0 $\pm$ 0.4	1.3 $\pm$ 1.2	<b>0.002</b>
In target*, n (%)	36 (97%)	712 (82%)	<b>0.001</b>
LDL (mmol/L), mean $\pm$ SD	2.0 $\pm$ 0.8	2.4 $\pm$ 0.8	<b>0.003</b>
In target*, n (%)	32 (87%)	538 (62%)	<b>0.003</b>
HDL (mmol/L), mean $\pm$ SD	2.0 $\pm$ 0.6	1.7 $\pm$ 0.5	<b>0.001</b>
In target*, n (%)	34 (93%)	738 (85%)	0.34
Patients on lipid lowering drugs, n (%)	11 (35%)	269 (31%)	N/S
Body Mass Index (kg/m <sup>2</sup> ) (mean $\pm$ SD)	24 $\pm$ 4.7	26.4 $\pm$ 4.8	0.004
In target <sup>†</sup> , n (%)	22 (68%)	399 (46%)	0.13

**Table 2: T1DM+CD group description**

T1DM + CD	
Duration of disease (year), mean $\pm$ SD	9.2 $\pm$ 8.0
Anti-tTG (U/ml), mean $\pm$ SD	43 $\pm$ 46.4
Autoimmune disease	
Hypothyroidism, n (%)	7 (18.9%)
Addison's disease, n (%)	0
Others, n (%)	3 (8.1%)
Metformin, n (%)	0
DAFNE, n (%)	5 (13.5%)
Insulin pump, n (%)	2 (5.4%)

**Table 3: T1DM+CD gp compliant vs non-compliant to Gluten free diet**

	T1DM + CD		p-value
	Compliant	Non-compliant	
Patients, n (%)	17 (45.9%)	20 (54.1%)	
Duration of disease (yrs)	9.3 $\pm$ 11.3	9.1 $\pm$ 4.12	0.9
Anti-tTG abs (U/ml)	2.12 $\pm$ 3.22	65.1 $\pm$ 50.2	<b>&lt;0.005</b>
Male, n (%)	7 (41.2%)	8 (40%)	N/S
BMI (kg/m <sup>2</sup> )	23.1 $\pm$ 4.63	25.22 $\pm$ 4.57	0.2
HbA1C (mmol/mol)	66 $\pm$ 13.1	81.2 $\pm$ 23.5	<b>0.02</b>

## Conclusions

The management of T1D with co-morbid coeliac disease presents an extra challenge. Lipid profiles tend to be better, but overall the HbA1c is worse.

Those with poor compliance to GFD have better HbA1c suggesting that the diet makes achieving target HbA1c more difficult

## References

1. Valerio et al, Diabetologia, 2002
2. Clinical Practice Recommendations Diabetes Care 2014

