1743-P: Metabolic Characteristics of Diabetes among Low-BMI Individuals in India

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Abstract

Diabetes among low BMI individuals has been recognized globally for over 60 years, and classified by WHO as malnutrition-related diabetes mellitus in 1985. Despite its prevalence in low and middle income countries, this condition has never been compreh`ensively studied.

State of the art metabolic studies were performed in 20 South Indian men with Low BMI Diabetes (LD; BMI 18.3 ± 0.9 kg/m2), after excluding monogenic and immune diabetes, and visible pancreatic pathology. Other groups were studied: T1D, T2D, and nondiabetic subjects (BMI-matched to LD and T2D). Insulin secretion was assessed by C-peptide deconvolution following a mixed-meal tolerance test. Peripheral and hepatic insulin sensitivity were analyzed using tracer-based (6,6-deuterated glucose), stepped hyperinsulinemic-euglycemic pancreatic clamps following correction of glucose toxicity.

LD subjects were distinct from both T1D and T2D. Insulin secretion was significantly lower in LD than in T2D subjects, yet higher than in T1D. LD subjects were more insulin sensitive than T2D; glucose uptake and endogenous glucose production did not differ from lean nondiabetic or T1D subjects.

These comprehensive studies are the first to demonstrate that LD individuals are characterized by markedly impaired insulin secretion yet preserved insulin sensitivity. Thus, diabetes in low BMI individuals is a distinct entity that warrants further investigation.

Table 1. Metabolic Characteristics of Low BMI Diabetes as Compared with T1D, T2D and Non-Diabetic Subjects

Variables	LD (n = 20)	T1D (n= 15)	T2D (n =15)	Lean non-diabetic subjects (n = 16)	Overweight non diabetic subjects(n =9)	p-value
Age (years)	41.5 (36.0, 42.5)	26.0 (25.0, 34.0)***	36.0 (32.0, 41.0)	26.0 (24.5, 37.0)**	41.0 (40.0, 41.0)	<0.01
Body mass index (kg/m²)	18.3 ± 0.22	20.5 ± 0.43***	25.0 ± 0.28***	19.1 ± 0.55	25.4 ± 0.35***	<0.001
HbA1c (%)	8.7 (7.8, 11.0)	9.3 (7.8, 9.9)	8.7 (8.5, 9.3)	5.1 (5.1, 5.3)***	5.4 (5.1, 5.5)***	<0.01
Insulin secretion AUC during MMTT (Total AUC)	383.3 (199.8, 557.3)	0.09 (0.09, 0.09)*	838.5 (609.8, 1366.6)*	991.1 (547.1, 1260.5)**	1277.0 (1109.0, 1599.1)***	<0.01
Endogenous glucose production	0.5 ± 0.1	0.6 ± 0.1	0.84 ± 0.1*	0.4 ± 0.1	0.7 ± 0.1	<0.01
Glucose uptake	10.1 ± 0.7	8.5 ± 0.4	4.2 ± 0.5***	10.8 ± 0.7	7.6 ± 0.5	<0.001

LD: Low BMI Diabetes, T1D: Type 1 diabetes, T2D: Type 2 diabetes, MMTT: mixed-meal tolerance test, AUC: area under the curve

*,**,***significantly different from the LD group; *p=0.05, ** p=0.01, ***p=0.001