

POSSIBLE MONOGENIC DIABETES MELLITUS INCLUDING MODY IS HIGHLY PREVALENT IN KOREAN CHILDREN WITH DIABETES MELLITUS

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Background: Gene related to maturity onset of diabetes of the young(MODY) is hardly found in Asian people and there is a shortage of studies on MODY and monogenic DM(MDM). However, the author reported a new MODY candidate gene found in Korean(Shim et al, Horm Res Pediatr, 2015) and met a number of children with MODY and possible MDM clinically.

Objective: This study was done to see the frequency of possible MDM and MODY in Korean children with DM and their clinical and laboratory characteristics.

Method: Study group were children with DM(n=126) who visited Kyungpook national childrens' hospital between 2008 and 2015. Their medical records were reviewed retrospectively. They classified into three groups; T1DM, T2DM possible MDM including MODY by the ADA classification of DM. Various clinical and laboratory data was analyzed. Additionally, diabetes before the age of 25, had three generations of family history and had fasting C-Peptide exceeding 0.6 ng/mL and BMI < 25 at the time of diagnosis, was named as MODY(three generations) and those with two generations of family history were named as MODY(two generations). For statistical analysis, ANOVA, Duncan and Mann-whitney u test were carried out and it was regarded to be significant when the p-value was under 0.05.

Results: The frequencies were 48(38%) in T1DM, 36(29%) in T2DM, and 42(33%) in possible MDM. Ages(years) at diagnosis were 9.2±4.1 in T1DM, 13.4±2.4 in T2DM, and 12.3±3.1 in MDM. The age at diagnosis was significantly older in T2DM compared to T1DM (p=0.000). BMI (kg/m²) was significantly higher in T2DM compared to T1DM or MDM, 25.9±4.7 vs 16.9±5.1 vs 19.7±5.1, respectively (p=0.001). C-peptide levels (ng/mL) were significantly higher in T2DM compared to T1DM or MDM, 3.19±1.40 vs 0.29±0.15 vs 1.17±0.39, respectively (p=0.000). Total MODY was 22(17.4%) in total patients, 23.5% in T2DM and 31.8% in possible MDM. Three-generation MODY(n=8) and two-generation MODY(n=14) were in T2DM and possible MDM patients. The average age of each MODY group was 14.07±4.8 and 12.70±3.5 years old, and C-peptide was measured at 2.86 ±1.37 ng/mL and 2.46 ±1.06 ng/mL(p=0.27).

	MODY		p-value
	MODY (3 generation)	MODY (2 generation)	
Number	8	14	
M:F	1:1	1:2.5	
T2DM/MDM	1:1.6	1:1.8	
Age(yr)	15.13(±1.05)	15.29(±4.15)	0.97
Age at dx (yr)	14.07(±1.52)	12.70(±2.15)	0.17
BMI	24.03(±3.07)	23.29(±4.60)	0.62
HbA1c	10.99(±2.88)	11.44(±2.10)	0.62
Insulin	13.41(±10.70)	10.87(±9.01)	0.57
C-pep	2.86(±0.99)	2.46(±1.32)	0.27

Table 1. Comparison to MODY type of generations according to gender and age and serum HbA1c, insulin and c-peptide level.

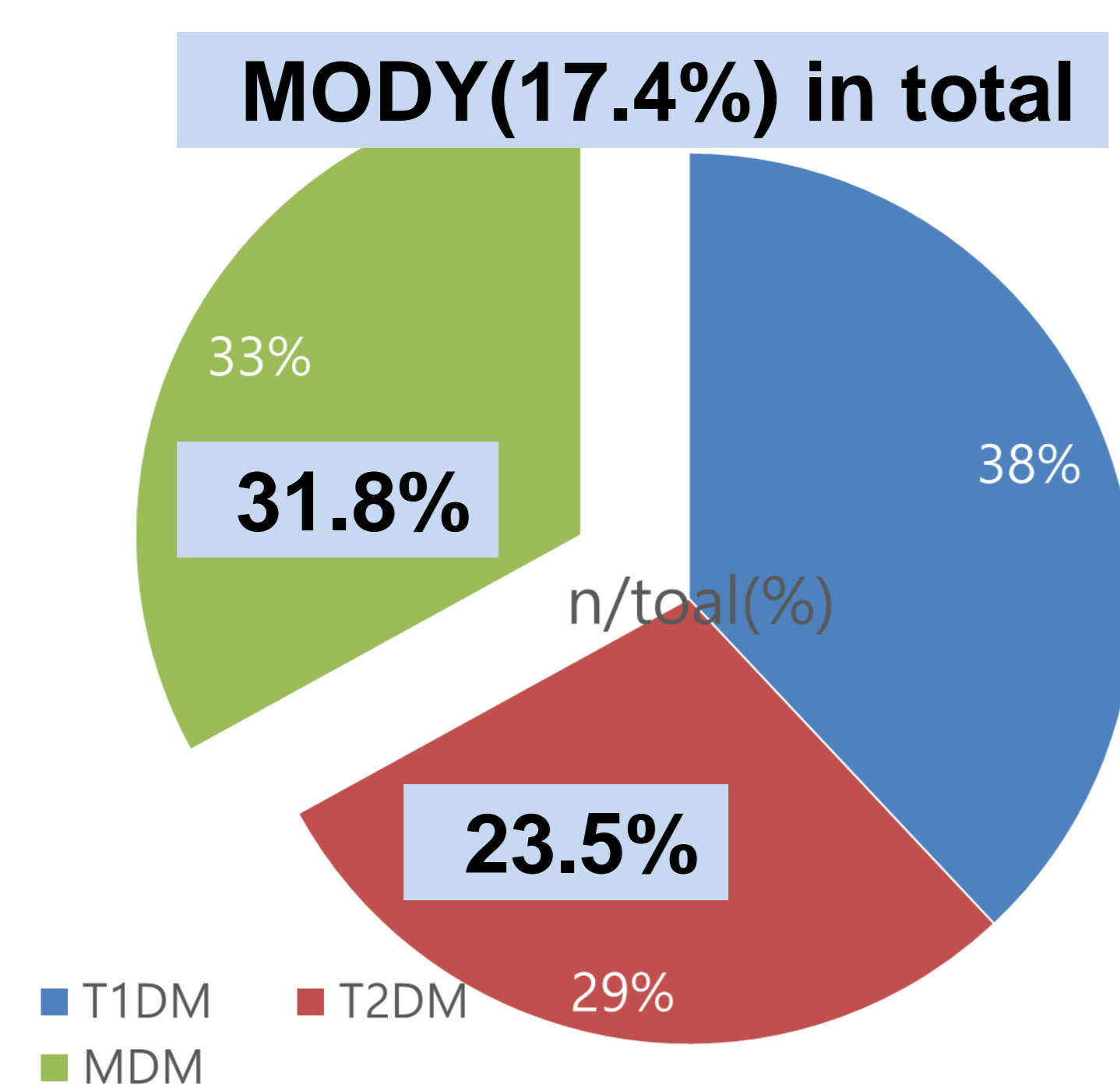


Figure 1. The frequencies according to type of DM, including MODY

	Type of DM											
	total			T1DM			T2DM			Monogenic DM		
N(%)	126(100)			48(38)			42(33)			36(29)		
M:F	01:00.8			01:00.6			01:00.8			1:01		
	total	M	F	total	M	F	total	M	F	total	M	F
Age(yr)	13.57 (±4.95)	13.24 (±4.52)	13.24 (±4.52)	11.46 (±5.77)	11.67 (±5.97)	11.19 (±5.50)	15.59 (±3.49)	16.3 (±3.46)	14.73 (±3.32)	14.03 (±3.99)	14.06 (±3.21)	14 (±4.74)
Age at dx(yr)	11.48 (±3.85)	11.56 (±4.24)	13.85 (±5.30)	9.19 (±4.17)	9.13 (±4.42)	9.26 (±3.82)	13.42 (±2.42)	13.73 (±2.65)	13.04 (±2.04)	12.29 (±3.08)	12.1 (±2.49)	12.49 (±3.66)
BMI	20.72 (±6.30)	21.58 (±6.97)	19.4 (±5.06)	16.87(±5.06)	18.03 (±6.30)	15.49 (±2.94)	25.92 (±4.72)	27.55 (±4.28)	24.02 (±4.49)	19.67 (±5.08)	18.11 (±3.54)	21.43 (±6.03)
HbA1c	12.32 (±2.91)	12.03 (±2.99)	12.64 (±2.81)	13.31 (±3.07)	12.76 (±3.05)	14 (±2.94)	11.22 (±2.40)	11.21 (±2.65)	11.24 (±2.21)	12.3 (±2.73)	12.55 (±2.43)	12.05 (±3.04)
Insulin	6.52 (±7.93)	6.58 (±7.97)	6.46 (±7.96)	2.1 (±2.68)	2.57 (±3.26)	1.51 (±1.46)	13.01 (±9.45)	12.39 (±9.21)	13.78 (±9.68)	4.85 (±5.25)	4.52 (±3.36)	5.19 (±6.72)
C-pep	1.51 (±1.51)	1.53 (±1.61)	1.49 (±1.38)	0.29 (±0.15)	0.27 (±0.15)	0.32 (±0.15)	3.19 (±1.40)	3.25 (±1.60)	3.13 (±1.06)	1.17 (±0.39)	1.12 (±0.42)	1.22 (±0.37)

Table 2. Comparison to type of DM according to gender, age and serum HbA1c, insulin and c-peptide level. and serum HbA1c, insulin and c-peptide level.

Conclusions: It appears possible MDM including MODY in Korean children is more prevalent than expected. Further large-scaled research on the frequency of MODY in Korean children and adolescents and MDM are necessary.

