

Maturity-Onset Diabetes of the Young (MODY): tracking and clinical follow-up

Arthur Pires Bezerra, Alberto José Santos Ramos, Madeleyne Palhano Nóbrega, Adriana Farrant Braz.

Federal University of Campina Grande (UFCG) – Alcides Carneiro University Hospital (HUAC), Campina Grande, Brazil.

INTRODUCTION

Maturity-Onset Diabetes of the Young (MODY) is a monogenic form of diabetes, with an autosomal dominant mode of inheritance and high penetrance. To this date, it is known 13 subtypes of MODY with different genetic etiologies. It is characterized by high incidence in the family, an early onset and primary defect in pancreatic β -cell function.

The main objective of this study was to identify MODY patients, in addition to analyze which are the most frequent MODY subtypes in our region. Furthermore, other goals of this study was to provide genetic counseling for the patients and identify other family members that might have the same type of monogenic diabetes.

METHODS

This research was a cross-sectional study, with a quantitative approach. The study was developed in the Alcides Carneiro University Hospital (HUAC) of the Federal University of Campina Grande - Paraíba - Brazil (UFCG), in the Endocrinology Clinics of the Hospital, between december 2015 through June 2016. Patients diagnosed with diabetes mellitus type 1 (DM 1) were interviewed and, if they matched at least 3 of our study inclusion criteria, a blood sample was taken for the genetic analysis of the 5 most frequent MODY (MODY 1 to 5) mutations. Some interviews were also scheduled, after the examination of the patients medical records, with the ones that had a high prevalence of diabetes in the family.

Our study inclusion criteria were the following:

- Diabetes diagnose before 25 years old in, at least, one family member;
- At least one family member affected with diabetes in each of 3 family generations, showing the MODY autosomal dominant mode of inheritance;
- Being able to control the glicemic levels without the use of insulin (and without having an episode of ketoacidosis), for at least 2 years, or having significant serum levels of C-peptide;
- Do not have antibodies like anti-GAD, anti-insulin or anti-islet cells in serum analysis;

RESULTS

During our research, 91 DM type 1 diagnosed patients were interviewed. After this pre-selection process, 8 patients filled at least 3 of our inclusion criteria and were included in our study. After the genetic analysis of their blood sample, all of the 8 individuals had the MODY diagnosis confirmed, with 6 patients MODY2 and 2 patients MODY3.

Thereby, in a total of 565 patients that have been treated in the Endocrinology clinicis of HUAC, we found 1,41% (8/565) MODY patients, with 1,06% of MODY2 and 0,35% of MODY3.

For more results, see Tables 1 and 2 and Figure 1.

Figure 1: Heredogram of MODY patients families

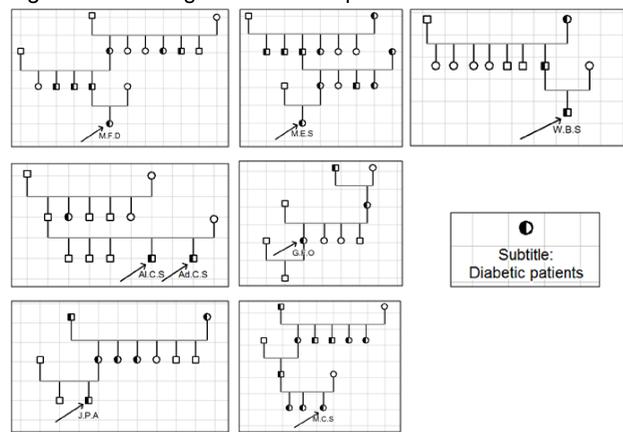


Table 1: Type of Mutations in MODY diagnosed patients

	Age (years)	Sex	Age at DM diagnosis (years)	MODY subtype	Mutated gene	Gene locus	Mutation
M.E.S	9	F	6	MODY2	GCK	7p13	Exon 2 R36W c.106C>T
M.F.D	32	F	18	MODY2	GCK	7p13	Exon 3 G72R c.214G>A
J.P.A	23	F	20	MODY2	GCK	7p13	Exon 6 G223S c.667G>A
M.C.S	29	F	21	MODY2	GCK	7p13	Exon 4 F150del c.449-451delTCT
G.F.O	34	F	28	MODY2	GCK	7p13	Exon 5 A188T c.562 G>A
W.B.S	25	M	24	MODY2	GCK	7p13	Exon 7 T22M c.683 C>T
A.C.S	17	M	2	MODY3	HNF-1 α	12q24.31	Exon 3 c.638 T>C
A.C.S	15	M	11	MODY3	HNF-1 α	12q24.31	Exon 3 c.638 T>C

Table 2: Clinical data of the MODY diagnosed patients

	Age (years)	Time since Dm diagnoses (years)	Weight (Kg)	Height (m)	IMC (kg/m ²)	Fasting Blood Glucose (mg/dl)	HbA1C (%)	Current Treatment	Diabetes complications
M.E.S	9	3	47	1,41	23,6	123	8,6	Glargina Insulin + Lispro Insulin	N/A
M.F.D	32	14	58	1,57	23,5	107	7,1	Glimeperide 4mg/day	N/A
J.P.A	23	3	65	1,62	24,8	104	7,5	Metformin 850mg 2x/day	N/A
M.C.S	29	8	63	1,58	25,2	138	7,9	Glimeperide 4mg/day e Metformin 850mg 2x/day	N/A
G.F.O	34	6	82	1,69	28,7	119	5,9	NPH Insulin + Novorapid Insulin	N/A
W.B.S	25	1	74,8	1,72	25,3	126	8,1	NPH Insulin + Metformin 850mg 2x/day	N/A
A.C.S	17	15	41,3	1,51	18,1	382	10,5	NPH Insulin + Regular Insulin	N/A
A.C.S	15	4	43,2	1,55	18	343	10,6	NPH + Regular Insulin	Nephropathy

CONCLUSIONS

The prevalence of MODY diabetes in previously diagnosed Type 1 diabetes mellitus patients was 1,41%. MODY2 and MODY 3 were the most frequent MODY subtypes found in our population. Patients have mutations already described in literature.

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