

THE PREVALENCE OF MELANOCORTIN-4 RECEPTOR GENE MUTATIONS IN TURKISH OBESE CHILDREN AND ADOLESCENTS

Selma TUNÇ¹, Korcan DEMİR², F. Ajlan TÜKÜN³, Cihan Topal⁴, Filiz HAZAN⁵, Burcu Sağlam⁶,
Özlem NALBANTOĞLU¹, Melek YILDIZ¹, Behzat ÖZKAN¹



¹Clinics of Pediatric Endocrinology, Behçet Uz Children's Hospital, İzmir, Turkey

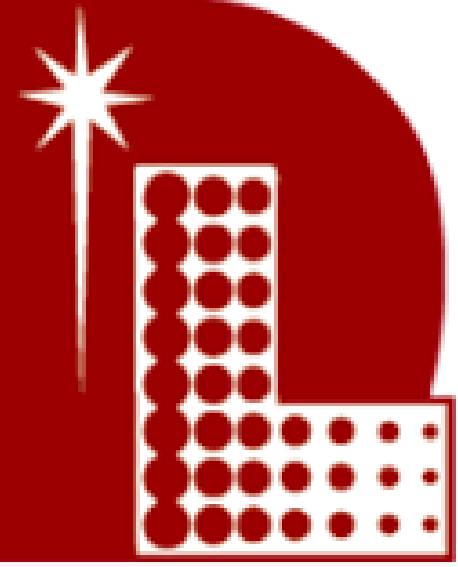
²Division of Pediatric Endocrinology, Dokuz Eylül University of Medicine, İzmir, Turkey

³Department of Genetics, Ankara University of Medicine, Ankara, Turkey

⁴Clinics of Pediatrics, Behçet Uz Children's Hospital, İzmir, Turkey

⁵Department of Genetics, Dr. Behçet Uz Children's Hospital, İzmir, Turkey

⁶Division of Genetic Diagnosis Center, Duzen Laboratory, Ankara



BACKGROUND

- Melanocortin-4 receptor (MC4R) mutations are the most common known cause of monogenic obesity (1).
- Prevalence of *MC4R* mutations in children with severe obesity varies from 0.3% up to 6.3% (2).
- >150 different mutations have been reported (1).

OBJECTIVE

- To establish the prevalence of *MC4R* mutations in a group of Turkish obese children and adolescents with morbid obesity.

METHODS and SUBJECTS

MC4R gene was sequenced in **47** morbid non-syndromic obese children and adolescents (28 girls and 19 boys) aged **1-18 years**. Body weight, height and Body mass index (BMI), weight z-score, height z-scores and BMI z-scores were recorded using Turkish national anthropometric references (3).

Cases were included if BMI was **≥120 percent of the 95th percentile values** or **≥35 kg/m²** (whichever is lower). This corresponds to approximately the **99th percentile or BMI Z-score ≥2.33**

RESULTS

- Mean age was **13.2±4.1 years**, mean age at onset of obesity 5.1±2.1 years, mean height SD score 1.21±0.93, mean BMI 40.0±8.8 and **BMI SD score 2.72±0.37**.
- In four cases (**8.5%**), we detected three mutations one of which was **novel (c.870delG)** (Table 1).
- In addition, screening of family members revealed six more cases (one child, five adults) with a *MC4R* mutation.

Case	Genotype	Age (years)	Gender	BMI SDS	Height SDS	Age at onset of obesity (years)
1	c.496 G>A	16	F	2.47	1,36	4
2	c.496 G>A	8	M	3.05	3,4	3
3	c.870delG	6	M	3.01	1.94	2
4	c.346_347delAG	10	F	3.07	1.06	1

Table 1. Genotypes and phenotype characteristics of mutation carriers

- No differences were present regarding the anthropometric (BMI, height, and weight SD scores) and biochemical (fasting blood glucose, lipids and fasting blood insulin levels) between mutation carriers and noncarriers.

CONCLUSIONS

There is no published study regarding *MC4R* mutations in Turkish children and adolescents with morbid obesity. In the present study, prevalence of *MC4R* mutations was found to be 8.5%. We speculate that *MC4R* gene mutations are an important cause of morbid obesity with early onset in the Turkish children and adolescents as well.

REFERENCES

1. Polak E, Vitariusova E, Celec P et al. The prevalence of melanocortin-4 receptor gene mutations in Slovak obese children and adolescents. J Pediatr Endocrinol Metab. 2015
2. Beckers S, Mertens I, Peeters A, Van Gaal L, Van Hul W. Screening for melanocortin-4 receptor mutations in cohort of Belgian morbidly obese adults and children. Int J Obes (Lond). 2006 Feb;30(2):221-5
3. Neyzi O, Bundak R, Gokcay G, Gunoz H, Furman A, Darendeliler F1, Bas F. Reference Values for Weight, Height, Head Circumference, and Body Mass Index in Turkish Children. J Clin Res Pediatr Endocrinol 2015;7(4):280-293

