

CLINICAL CASE 2

CLINICAL HISTORY

12 years old boy with generalized obesity. He has family history of obesity: maternal grandfather, mother and maternal aunts.

Exercises 5 days per week, occasionally eats junk food, does not smoke, does not drink alcohol.

He has been given adequate diets, adapted to his age and the physical exercise he practised.

Very concerned mother. But the family had a Filipino domestic and he used to eat rice at every diner. The child had trouble communicating with friends.

Weight: 89 kg

Height: 169 cm

BMI: 31,2

Impedanciometry: Fat: 31,4% (27,9 Kg).

Blood pressure: 11/7

Central obesity: waist perimeter: 93 cm.

GENETIC STUDY

Performed by DNA extraction from oral mucosa sample on swab, followed by DNA amplification by PCR and DNA analysis with molecular biology techniques. 18 genes were studied. Results of the genetic study are presented in table 1.

GENE	VARIANT ANALISED	PATIENT'S GENOTYPE	ASSOCIATED WITH:
MC4R	rs17782313T>C	TC	Increased BMI. Higher risk of overweight and obesity development.
FTO	c.46-23525T>A	TA	Increased risk of overweight and obesity development.
POMC	G236	H	Early onset of severe obesity Poor satiety control
BDNF	c.196G>A (p.Val66Met)	GG	
UCP1	c.-3826A>G	AG	In conjunction with R64 variant of gene ADRB3, tendency to weight gain in adulthood.
UCP3	c.-2078C>T	CT	Increased BMI, higher percentage of fat and higher waist: hip ratio.
ADRB2	c.79G>C (p.Q27E)	CG	
ADRB3	c.190T>C (p.W64R)	TC	In conjunction with UCP1 variant, tendency to weight gain in adulthood.
PPARG	c.34C>G (p.P12A)	CC	Ancestral genotype not adapted to the present eating habits. Increased risk of insulin resistance, diabetes and obesity.
ACE	IVS16-407ins(289nt)	DD	Increase body weight and blood pressure.



IL1B	c.315C>T	TC	Total fat mass increase. Impaired immune function of IL-1 and development of obesity.
IL1RN	IVS4-515ins(86nt)	*2/*2	Increased total fat mass. Impaired immune function of IL-1 and development of obesity.
TNFA	c.-175-313G>A	GG	
GNB3	c.825C>T	TT	Higher body mass index (BMI) and increased risk of progression to a more severe hypertension.
APOA5	c.-73-571C>T	TT	
LEP	R105	Without risk	
FABP2	c.163A>G (p.T55A)	GA	Insulin resistance and risk of atherosclerosis.
ADIPOQ	c.214+62G>T	GG	

Table 1. Patient's genetic test results

RESULT

Result: Very high genetic load

According to the results of this analysis, we can conclude the following:

- Deficient food intake control.
- Low thermogenic control.
- Moderate risk of fat tissue inflammation, with the consequent risk of obesity maintenance.
- Increased fat absorption through the intestine.
- Risk of essential hypertension, hypertrophy of left ventricle and salt retention.
- Very well fitted for physical exercise at competition level.

These risks interact with one another.

Recommendations:

- Consume milk and goat cheese containing 50% of MCFA (medium-chain fatty acid).
- Consume coconut oil and milk.



- Do not exercise on an empty stomach.
- Intense cardiovascular training.
- Diet supplemented with PUFA (polyunsaturated fatty acids) and MUFA (monounsaturated fatty acids).
- Do not overuse salt.
- Diet low in saturated fat.
- Avoid stress or learn to control it.
- Control carbohydrates at night, better eat them after sport to recover muscle glycogen.
- Take **Orlistat** (Xenical), to remove 30% of ingested fat.
- Take L-carnitine to improve beta oxidation of fatty acids by muscle during exercise.
- Ketogenic diet would be appropriate to start, supplemented **with omega-3 (DHA)** to reduce inflammation.
- Low-salt intake.
- Take **L-carnitine** before exercise, 1500 mg.
- Use relaxation techniques, massage, spa therapy etc.
- If there is hypertension, the drug of choice is Enalapril.
- Control left ventricular hypertrophy.
- Control blood pressure.
- **Practice intense physical exercise.**
- Get cardiology checkups.
- Monitor thyroid, and if at thyroid levels are limit, take **Levothroid**.

EVOLUTION

The patient is currently 22 years old, weighs 80 kg and measures 180 cm. BMI: 24.7

The mother's influence was essential, genetic analysis helped her understand that she had to take seriously the nutrition of her three children and inculcate them good health habits for life.