

A comprehensive lifestyle intervention for a patient with morbid obesity and associated metabolic disorders

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Abstract

The new concept of cardiometabolic-based chronic disease is highlighting the key role played by adiposity in further metabolic alterations. In the context of pandemic obesity, morbid obesity treatment represents a challenge. Lifestyle recommendations are the first step in the prevention and delay of metabolic alterations and obesity. This paper presents the case of a patient with morbid obesity, which achieved not only a significant minus 40 kg weight reduction but also a metabolic profile improvement and blood pressure stabilization without prior treatment. How lifestyle medicine principles have been used to achieve this success is outlined below. Also, the importance of the doctor-patient relationship where the doctor acts as a role model will be emphasized in the article.

Keywords: Cardiometabolic-based chronic disease, lifestyle medicine, nutritional intervention, physical activity, mindful eating.

Introduction

The latest harmonized definition of metabolic syndrome, written by Alberti and Zimmet and published in 2009, includes the following criteria: elevated waist circumference, elevated triglycerides >150 mg/dl, reduced high-density lipoproteins (HDL), elevated blood pressure, systolic >130 and/or diastolic ≥ 85 mmHg, elevated fasting glucose ≥ 100 mg/dl [1].

In 2020, a new concept was proposed by Jeffrey Mechanick in order to replace the metabolic syn-

drome definition [2]. This is the model of cardiometabolic-based chronic disease. Four distinct stages may be identified based on pathophysiological events for adiposity-based chronic disease (ABCD), dysglycaemia-based chronic disease (DBCD), and cardiometabolic-based chronic disease (CMBCD) (Table 1). This new concept highlights better the key role played by adiposity, mainly abdominal adiposity, in further metabolic alterations [2].

Highlights

The prevention plan for CMBCD targets patients with chronic cardiovascular diseases in order to implement sustainable and early protocols. This plan for chronic heart disease targets insulin resistance, glycaemic disorders, adiposity and behavior. This

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prevention plan includes structured lifestyle change, encompassing healthy eating models associated with physical activity, integrated with pharmacotherapy for cardioprotection. Bariatric procedures may be considered as well [2].

The context: Morbid obesity

An important public health challenge, obesity is associated with economic, social, medical, and psychological consequences. The obesity prevalence in US adults is 34.9%, severe obesity, defined by BMI > 40 kg/m², representing 6% [3]. An increase of 130% is expected in the next 20 years. Romanian data about obesity prevalence, as revealed by the PREDATORR study, show that 34.7% are overweight and 31.9% are obese [4].

Case description

V.P. is a 51-year-old patient that visited our clinic at one month after surgical intervention for a resection of a benign tumor of the large intestine, completely recovered, asking for competent medical advice regarding lifestyle changes. This patient was diagnosed with severe obesity (abdominal obesity) (Table1).

At our clinic for obesity management, we considered a diagnose of morbid obesity based on bioimpedance analysis (~46% fat mass from the whole body mass, BMI>40 kg/m²). All biochemical parameters (Table 2) have been evaluated, suggesting a pre-diabetes state, hypercholesterolemia, hypertension under treatment, and the picture of metabolic syndrome was highlighted. Hypertension was previously diagnosed, with ongoing treatment with Perindopril 5 mg and Indapamide SR 1.5 mg. Dur-

ing an endocrinological examination conducted at another clinic (Table 3), a normal thyroid function and normal cortisol, testosterone, and sexual hormones values were noted. The menopausal status was noticed, based on hormone analysis, despite irregular menses.

Figures 1 and 2 show body weight, fat percentage, free fat mass, muscle mass, BMI and calculated basal metabolic rate.

Weight composition changes have been measured with the in-house (Nutriscience clinic) bioimpedance analyser, Pro-Tanita, with records at all visits. The results can be observed in Figure 3. Body fat decreased from 59.9 kg at the beginning of the comprehensive lifestyle intervention to 26.9 kg at the last visit. Visceral fat decreased from level 14 to level 7. The weight decreased from 128.8 kg to 87.5 kg. BMI shows the evolution from morbid obesity (41.6 kg/m²) to overweight (28.2 kg/m²). Also, a significant decrease in fat mass was achieved, but with a preserved muscle mass.

Theoretical base for this case

Guidelines for metabolic syndrome

Applying guidelines in clinical practice [5,6] are critical for preventing and delaying the onset of metabolic syndrome elements in predisposed individuals, as well as type 2 diabetes mellitus (T2DM) and cardiovascular (CVD) prevention for those with metabolic syndrome. The most effective approaches for lifestyle changes are summarized in the following recommendations.

The most important meal of the day must be before 3 PM (Chronobiology).

Regarding food, fruits and vegetables, whole grains, olive oil, fish, nuts, low-fat dairy products, and only a moderate intake of red wine or beer should be included in the patient's diet;

Table 1. Cardiometabolic chronic disease stages, adapted from Mechanick [2].

	Stage 1: risk	Stage 2: pre-disease	Stage 3: disease	Stage 4: complications
ABCD	Genetics Environment Behavior	Increased amount, abnormal distribution or function	Based on body mass index (BMI), anthropometrics or biochemical tests	Cardio-metabolic and bio- mechanical
DBCD	Insulin resistance	Pre-diabetes	Type 2 diabetes	With associated complications, macro and micro vascular
CMBCD	Elements of Metabolic syndrome	Sub-clinical coronary heart disease (CHD)	Asymptomatic CHD	Symptomatic CHD

Table 2. Initial/6 months/10 months biochemical parameters levels.

Metabolic parameters	Initial	After 3 months	After 6 months	Normal range
ALT	26	12		9-52 U/L
AST	30	15		14-36 U/L
ALP	85			38-126 U/L
GGT	59			12-43 U/L
Glycaemia	110	97	70	65-115 mg/dl
Lipase	431	234		23-300 U/L
Lipids	848			400-800 mg/dl
Triglycerids	192			15-150 mg/dl
Cholesterol	275	209	228	50-200 mg/dl
HDL Cholesterol	32	43	51	40-60 mg/dl
LDL Cholesterol	191	156	159	50-129 mg/dl
Fibrinogen	608	309	97	200-400 mg/dl
CRP	5.41	1.19	1.03	0-5 mg/L

Note: ALT - alanine aminotransferase, AST - Aspartate aminotransferase, GGT- gamma glutamyl transpeptidase, ALP - alkaline phosphatase, HDL - High-density lipoprotein, LDL- Low-density lipoprotein, CRP - C Reactive Protein.

Table 3. Endocrinologic results.

Endocrinologic results	Initial	After 3 months	After 10 months	Normal range
FSH	26.2	40.5		2.3-11.3 UI/L
LH	10.5	13.8		1.1-11.6 UI/L
Estradiol	32	32		12.4-233 pg/mL
FT4	0.82			0.7-1.48 pg/mL
Salivary cortisol	1.5			<24.1 nmol/L
ACTH	28.99			7.2-63.3pg/mL
Plasmatic cortisol	426			133-537 nmol/L
25 (HO) D	11.3	23.5	31	>30µg/L

Note: FSH - Follicle-stimulating hormone, LH - luteinizing hormone, FT4 - Free thyroxine, ACTH - Adrenocorticotrophic hormone, 25 (HO) D - 25-hydroxyvitamin D.

Nutrients intake should focus on fibers, unsaturated fatty acids, bioactive compounds like choline, and carnitine.

As dietary patterns, a Mediterranean diet, Dietary Approaches to Stop Hypertension (DASH), the new Nordic Diet, or a Vegetarian Diet are suitable options. Negative remarks are available for a Western-type diet, which is very common in our societies.

Also, there are negative scientific proofs for excessive meat intake, alcohol intake, high sucrose, saturated fatty acids, trans-fatty acids.

Smoking cessation is also a part of managing metabolic syndrome. Additionally, 30-60 minutes

of daily physical activity must be performed. For overweight and obese persons, calorie restriction and increased physical activity should be personalized based on assessed comorbidities and fitness levels. The latest research in nutrition epidemiology switched from a single food strategy to a dietary pattern approach in regard to the complex interactions between multiple nutrients and health status. Mediterranean Diet, with energy restriction if weight loss should be achieved, is an effective component of the general treatment [5,6].

Regarding the therapeutical options in severe obesity, bariatric surgery is a guideline recommen-

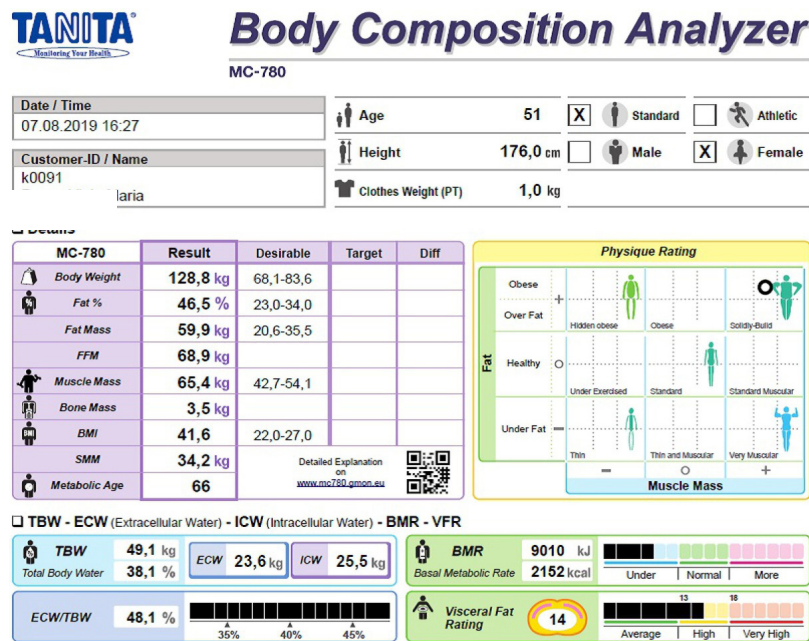


Figure 1. Initial measurement with in-house (Nutriscience clinic) body composition analyser.

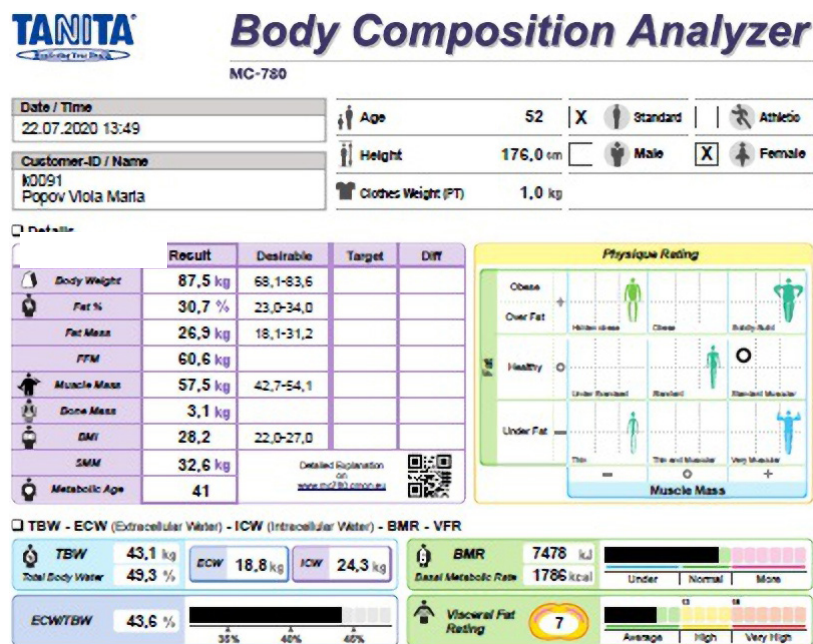


Figure 2. Measurement at the last visit.

dation [6]. In severe obesity, drugs and surgical procedures may be considered, not only lifestyle changes. However, eligibility for these procedures due to comorbidities and risk evaluations may reduce this choice in morbid obesity [3].

Comprehensive lifestyle interventions may be considered as an alternative. Severe obesity may limit eligibility for bariatric surgery, even if this type of intervention could be selected. According to Profes-

sor Rippe, the creator of the lifestyle medicine concept, comprehensive lifestyle changes are the first-line option as a cornerstone of obesity treatment [7]; this means providing lifestyle training sessions with a frequency of more than 14 sessions in the first six months delivered by a team specialized in nutrition, physiotherapy and psychology. Comprehensive lifestyle interventions for morbid obesity will include a healthy hypocaloric model, based on

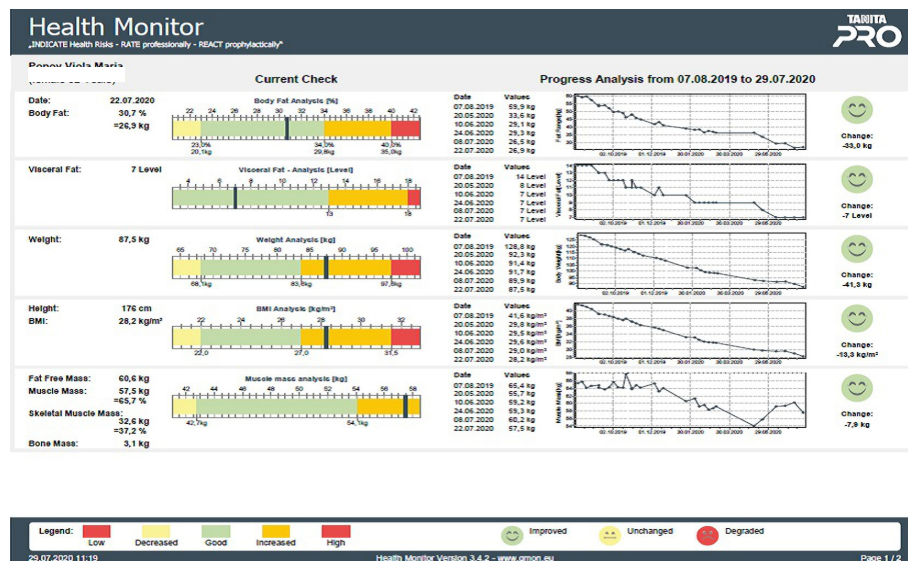


Figure 3. Evolution of bioimpedance.

the Mediterranean style, physical activity with an incremental increase if the physical condition allows it, and behavioral counseling.

Large randomized controlled trials, such as the diabetes prevention program (DPP), demonstrated that behavioral lifestyle intervention is decreasing diabetes incidence by 58 % vs. placebo, being even superior to metformin with 31%. Lowering weight is the predictor of decreased diabetes risk [7].

The simple advice recommended by the doctor evolved into structured interventions, patient-centered communication, named motivational interviewing [8-18]. This is a goal-oriented communication style, in which the partnership with a health care professional will lead to finding solutions together, to discuss health information instead of obeying rules. This cooperative style is leading the patient to self-discovery [19]. Another possible approach in counseling is the rule of the 5A': assess, advise, agree, assist and arrange (follow-up) [20]. In this framework, guidelines suggest performing weight assessment, associated risks identification, and a common agreement of goals and targets. The clinician is in charge of accountability, monitoring progress and plan adjustments, as needed.

All these steps are included in a frame based on the lifestyle medicine approach [7].

How was the theory implemented in practice? Which were the options of a medical doctor in this case?

Even if bariatric surgery is a recommended option, it was considered a second-line option. Due to strong motivation and high education of the patient, we assumed together, in a partnership, that lifestyle intervention should be the first-line option.

The practical approach in this case: a comprehensive lifestyle intervention

We started a comprehensive lifestyle intervention for 6 months with weekly sessions and bi-monthly sessions afterward. This is an ongoing intervention with the frequency of visits limited at one per 3 weeks or once per month. During the whole period, a nutrition and physical activity diary was recorded by the patient and checked by the clinician.

1. Nutritional approach/education. This intervention was realized in an ongoing training about nutrition, healthy foods, and calorie requirements, in a partnership model.

Key principles:

- **Caloric deficit:** Total energy intake will be lower with 500-1000 kcal/ day, in order to obtain a 3500-7000 kcal weekly deficit. In our situation, the weekly deficit was around 7000 kcal/week, with small variations. The daily plan was built on 1200 kcal/day. Bioimpedance measurements were performed weekly.
- **Macronutrient proportion:** We selected a proportion with 45-50% carbohydrates, 20-25% proteins and 30% fats using a Mediterranean model, which was the most appropriate for our target and the patient's values. As studies are revealing, during negative energy balance, reducing the fat or carbohydrate content is not meaningful, while a similar caloric reduction is achieved [21-23]. High carbohydrates and a low-fat diet is leading to the achievement of reduced body weight, as the combination of proteins with carbohydrates induces higher dietary thermogenesis in contrast with a high-fat diet [24, 25].

- Chrononutrition: is having the most important meal of the day 9 hours before sleep time. Essentially, the main meal was before 3 pm. An organized model with 3 meals and 2 snacks, respecting an interval of a few hours was followed in a satisfactory manner by the patient, but under strict, weekly supervision. Any change from the plan was discussed, analyzed and explained [26].

Basic nutritional principles have been understood from the beginning. Changing the mindset from old behaviors was sometimes difficult, like a fight with traditional, cultural values, but with strong messages supported by basic science.

A diary, with daily records of food intake and physical activities, was used as a simple tool for auto-evaluation, auto-monitoring and evaluation together with the doctor.

2. *Physical activity/sedentarism.* At the beginning of the intervention, due to high weight, physical activity was extremely limited. A small accident banned any physical activity in the first month. Then, the introduction of any movement thoughts in the mindset change was done step by step. A noticed resistance at the start was followed by changes in mentality, then by trying to find places where to practice, such as gym facilities. As it is advised, physical activity started with slow movements in water, which are the most protective of the joints. As the Physical Activity Guidelines Advisory Committee is suggesting, full sedentary behavior was replaced, slowly, but increasingly with 30 minutes, one hour of light intensity activity (1.6-3.0 METs) then with moderate activity (3-6 METs) and now achieved an hour daily of vigorous physical activity (>6 METs) by cycling [27]. The energy spent while resting is defining one metabolic equivalent of task (MET). For the majority of people, that means an oxygen uptake of 3.5 milliliters per kilogram per minute.

3. *Mindfulness-based cognitive therapy.* Defined as a mental state characterized by attention to the present moment, but with complete awareness of the present in a non-judgmental way, mindfulness is used in healing for different diseases [28]. Very impactful regarding eating disorders, the concept is applied in mindful eating, which is the method applied to interrupt automatic responses to food stimuli and prevention of emotional triggers, which may lead to excessive food intake. Stopping automatic eating, compulsive episodes is an essential step in any nutritional intervention and an important tool in managing obesity.

The partnership patient-clinician is based on the lifestyle medicine principles [19]. The goals are established in a team and acceptance will lead to healthier habits. Intrinsic powerful motivation is including three basic principles of self-determination: connection, autonomy and self-determina-

tion. Changing the mindset is leading the patient to self-discovery.

Discussion

This case is a successful example of a strong partnership between patient and doctor, with an impressive weight reduction, at the correct rate. It was not easy, but a strong motivation supported by a partnership with the doctor led to these results. Weight loss allowed the stabilization of arterial tension without medicines and a good glycemic profile. A healthy diet was the key to maintaining a good lipid profile, too.

The weight target is still ahead, as 5-7 kilograms still need to be lost. Then, the maintenance period will follow in a consolidation process.

For the future, during maintenance, it will be important to be sure of the stabilization of all good habits and to continue the connection with low-frequency, check-up visits. Any possible drop-up has to be assessed, understood, and approached immediately.

Conclusions

The lifestyle medicine approach in obesity allows achieving a healthy weight with metabolic profile improvement. Healthy lifestyle principles, with the right nutrition, physical activity, no smoking, moderation in alcohol, optimal sleep, and mindfulness, can be integrated into a comprehensive intervention program that may finally change lives.

Conflict of Interest

The author confirms that there are no conflicts of interest.

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