UAM (Ultrasound - Assisted Megaliposuction) effects in obesity and its possibility of application in Romania

PhD THESIS

SUMMARY

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GENERAL PART. DEGREE OF KNOWLEDGE
INTRODUCTION

Obesity is a complex, multi-factorial disorder, a serious medical condition as a result of persistent weight gain at the expense of adipose tissue (energy intake exceeds consumption). In recent decades, obesity has become one of the most common nutritional diseases in the world, reaching the magnitude of a pandemic, according to the WHO report in 2011, being considered the disease of the 21st century (1).

Prevalence of obesity in Romania reaches 37% in the adult population, currently there are over four million untreated obese patients, and of these, 16, 3% are overweight and 20, 7% clinically obese. Local and regional epidemiological data available in Romania estimate prevalence of overweight at 30-60% in adult population and of obesity at 20-25%.

Up to this moment, several ways for the treatment of obesity have been proposed. Treatment of obesity must be a combined type treatment. Basically, there are three major therapeutic principles: lifestyle changes, medical treatment, surgical treatment. Unlike pharmacological and non-pharmacological treatments (diet, exercise, acupuncture), which are beneficial only to patients with mild or moderate obesity (BMI <35 kg/m²), surgical treatment is the most effective way to combat morbid obesity (BMI > 40 kg/m²), according the US National Institutes of Health (316).

After bariatric surgery, the patient may benefit from a series of plastic surgery interventions for body remodelling: liposuction, inguinal and crural dermolipectomy, brachioplasty, abdominoplasty. UAM has developed as a modification of traditional liposuction. The technique is based on the surgical use of ultrasonic energy that allows the selective destruction or emulsification of adipose tissue, which is then aspirated. Due to this method, blood loss is minimal (12,13) and the lipoaspirated amount that can be removed in one session can reach up to 20 litres. Therefore, UAM can be used to treat obesity.

There are not publications relating to the application of this method in Romania, although it has become in Europe and the U.S. one of the basic techniques in the arsenal of methods for body remodelling since 2001.

The topic discussed in this thesis belongs to a public health priority for the European Union and in the world. The implementation of the new methods of treatment in Romania, as an EU member country, must constitute a matter of national interest and a priority of the Ministry of Health.

This paper is structured in two parts: a general part - the degree of knowledge and a personal part - personal contribution.

In the first part divided into chapters, we tried to make a presentation of the latest theoretical data in the literature regarding the topic. This first part of the thesis is a valuable and of actuality aperçu that can serve both to the current documentation of all those who need it and that provides a source of information. We entitled this section “degree of knowledge”, which shows the up-dated anchoring of the knowledge in this domain.

The first chapter represents the introduction.

Chapter 2 presents data on obesity: definition, classification, physiological data, and metabolic modifications in obesity, role of endocrine organ of the adipose tissue, the most common and also the latest diagnostic methods used in the treatment of obesity.

Chapter 3 presents the latest data on bariatric surgery techniques and their complications and Chapter 4 is dedicated to plastic surgery techniques and their complications.

Chapter 5 is an overview of the role of plastic surgery and especially of the UAM technique in the treatment of morbid obesity in the world, technique of actuality that, however, has not yet been introduced in our country. We tried to systematize all essential data on this technique: definition, anamnensis, classification, physical and biological effects of ultrasounds, indications and
contraindications of the method, operative technique, pre- and postoperative management and complications of the technique.

**Part two**, reserved to personal contributions, presents in *Chapter 6* the purpose and motivation of the study.

In *Chapter 7*, the modern methods used in the study are duly presented.

*Chapter 8* presents the results obtained, summarized in tables and charts derived from a statistical processing performed with the help of modern methods (SPSS 11).

*Chapter 9* and *Chapter 10* were intended to discussion based on the results obtained, together with data from the literature and findings that reveal the place and importance of this technique in the treatment of obesity.

*The last part* is dedicated to originality of the thesis and to future perspectives that this study provides to future researchers. The work is illustrated with images of personal casuistry and uses a bibliography totalling 400 references, which we tried to focus on clear, concise and carefully conducted directions of investigation.

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**SPECIAL PART. PERSONAL CONTRIBUTION**

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**CHAPTER 6**

**PURPOSE AND MOTIVATION OF THE PERSONAL STUDY**

Global epidemic of obesity (*GLOBesity*) requires a strong stance on the need for health education of the general population and on the need for aggressive, yet effective therapeutic methods, because its consequence is a higher rate of comorbidities (2,3) and premature death (4,5) in this group of population.

In Romania there are over 3,5 million obese people, a Romanian in three is overweight and one in four is obese, only 10% of them undergoing a medical examination and only 1% of them being included in a national program of education against obesity (source: survey conducted by the company Abbot Laboratories).

Bariatric surgery is an effective method of treatment of morbid obesity (316).

Until now, plastic surgery methods were used only associated with bariatric surgery techniques to improve the aesthetically the result obtained and to increase the patient’s self-esteem. Nonetheless, the classical liposuction and its modern variants (UAM) proved to have a functional role (221,223,225-227,235), which currently makes liposuction to be practiced not only for the aesthetic purpose, but also for the therapeutic one, as to improve the quality of life of the obese patient (metabolic benefits of liposuction on cardiovascular risk factors, DZ and insulin resistance).

Studies, however, have also contradictory aspects, motivating us to do a new study that includes a larger group of patients properly selected, a longer *follow-up* and a well-known technique practiced by the same operatory team in all cases, as to investigate the effects of the UAM in obesity treatment aesthetically, psychologically, and especially metabolically.

There are not publications relating to the application of this method in Romania, although it has become in Europe and the U.S. one of the basic techniques in the arsenal of methods for body remodelling, this fact representing an additional motivation for researching the possibilities of application of this technique in the country, as to align Romania to current global trends.
CHAPTER 7
OBJECTIONS OF THE PERSONAL STUDY

This personal study consisted of 2 parts.

In the first part, we analyzed the effects of surgical removal of subcutaneous adipose tissues through UAM on leptin serum concentration and anthropological parameters in 30 patients undergoing this surgery and registered in the Plastic Surgery Clinic’s records of the Civil Hospital of Padua, Italy. It should be noted that the technique was performed together with a team of surgeons who dealt with seriously and discernment the multidisciplinary treatment of obesity, team which has an experience of 11 years in practicing the UAM technique. Essential is that this team was prepared and formed by one of the two parents of the UAM techniques in the world, Michele Zocchi.

The main objective was to analyze the efficiency of the UAM technique in the treatment of obesity, by determining its aesthetic role (the analysis of the anthropology parameters), psychological role (evaluation of satisfaction after surgery) and especially its metabolic role (determination of leptin serum concentration in evolution, pre and postoperatively up to 1 year).

The secondary objectives were:

- enrolment in the study of a lot of patients as large as possible, given that most data in the literature refers to a small number of cases (30 patients as compared to a maximum of 15 patients in the literature)
- long follow-up, made up to 1 year
- finding some correlations between our results and those already existing in the literature, that allow the formulation or finding of prognostic factors, given the fact that the data from literature is contradictory on this topic.

The second part of the study studied a group of 30 obese people in the country; answers to two questionnaires have been evaluated: Duke Health Profile and a questionnaire of personal opinion.

The main objective was to determine the quality of life of obese persons in Romania.

The secondary objectives were:

- determination of compliances regarding a possible surgical therapy, including this new technique of treatment of obesity,
- establishment, under the given correct information, of the preference of patients for bariatric surgery and this new technique for treatment of obesity.

CHAPTER 8
PATIENTS AND METHODS OF INVESTIGATION

8.1. PATIENTS

Achievement of the objectives was made in the first stage through observational, analytical, prospective study for a period of seven years (2001 - 2007), a group (group no. 1) of premenopausal 30 obese patients, which were subject to the UAM technique, technique superwet technique at the Institute of Plastic Surgery within the Civil University Hospital of Padua; the technique was performed by a surgical team led by Prof. Dr. Franco Bassetto. The 30 obese patients taken in the study were aged between 16 and 56 years (with an average of 39,60 + / - 12,48 years) and BMI between 30,7 kg/m² and 53,6 kg/m² ( with an average of 41,36 + / - 8,12 kg/m²). 66.6% of patients were morbidly obese. 4 patients were diagnosed with type 2 diabetes non-insulin-dependant treated by adjusting the diet; 7 patients were diagnosed with hypertension treated pharmacologically with diuretics and ACE inhibitors. A slight degree of hypercholesterolemia was revealed in 17
patients, while 2 patients had hypertriglyceridemia and none of the patients had low levels of HDL-cholesterol. There were not registered other comorbidities or pharmacological treatments other than those mentioned above.

In order to conduct this study, a careful selection was done of the obese patients included in the group, according to the inclusion and exclusion criteria detailed in the thesis.

For the patients included in the study, several parameters were determined (anthropological parameters, leptin serum concentration) pre- and postoperatively at 1 day, 3 days, 1 month, 6 months and 1 year. In the repeated postoperative controls at 1, 3, 6 months and 1 year postoperatively, patients’ satisfaction level was assessed (unsatisfactory, quite satisfactory, satisfactory and very satisfactory).

In the second stage of the study (prospective, monocentric), carried out in Iasi University Centre for a period of 4 years (2009 - 2012), a group was studied (group no. 2) consisting of 30 persons, 10 men and 20 women, with ages between 16 and 60 years (36.7 + / - 13.9) and BMI between 30.1 and 55.1 kg/m² (38.6 + / - 6.3). Answers to two questionnaires have been evaluated: Duke Health Profile and a questionnaire of personal opinion.

The study complied with the ethical principles of medical research (the principle of interest and benefit in research, the principle of innocuousness of research, the principle of respect towards the individual and fairness); also, the study was approved by the ethics committee of the institution in which it had been held. Each patient was explained what the study meant and the enrolment was done only after the signing of the informed consent form.

8.2. METHODS OF INVESTIGATION

1. Anthropometry

When registering the patient, the anthropometric measurements were made with the patient standing, having light clothing, without wearing shoes. Height was determined with an accuracy of 0,01 m using a stadiometer mounted on a wall; body weight was determined with an accuracy of 0,05 kg using a calibrated scale. BMI and body circumference were determined at the level of the lower chest, waist, hips and thighs; the values obtained were expressed in inches.

2. Analysis of blood samples

The analysis of blood samples was performed in the Clinical Laboratory of the Civil Hospital of Padua. For quantitative determination of leptin in serum, pre- and postoperatively at 1 day, 3 days, 1 month, 6 months and 1 year, it has been used the ELISA kit specific DRG International, Mountainside, NJ, according to the manufacturer’s instructions.

3. Surgical technique - UAM

UAM was used as operative technique, superwet technique, which was practiced by the same team of surgeons in all cases studied. In the postoperative period, patients were followed by the same team of intensive care physicians. Patients included in the study showed no contraindications for this technique and signed an informed consent form before surgery. The study was approved by the Ethics Committee of the University of Studies of Padova, Italy.

In the morning of the operation, the preoperatively preparation was made with the patient standing. In the operating room, skin asepsis is done using a non-alcoholic solution (Cetramid) with the patient standing. After induction of general anaesthesia and orotracheal intubation on a special bed for bariatric surgery covered by sterile fields, the patient was inverted and placed supine on the operating table. After completing liposuction of the dorsal regions, the movement of the patient in prone is done in the same way.

UAM is performed using a Contour Genesis® System ultrasonic generator, Mentor, Santa Barbara, CA. The operative technique includes several steps:

- infiltration of the interested areas through a punctiform incision, with a large volume of saline solution with epinephrine (1 liter NaCl + 1.5 mg / l) using a peristaltic pump, integrated to
appliances as to reduce skin folds and in order to create a specific atmosphere to ultrasound propagation. The amount of infiltrated solution is determined preoperatively and completed intraoperatively according to each patient’s clinical situation but it will never exceed 1:1 ratio infiltrated/ aspirated solution (average of 0.6:1)

- application of ultrasonic energy with a specific blunt, full probe of titanium for 5 minutes/ region for adhesive areas and treating subdermal tissue
- application of ultrasonic energy with simultaneously vacuuming for 15 minutes/ region, using a cannula with orifice at the top, with a length of 35 cm and a diameter of 5 mm, for volumetric reduction.
- removal of lipid emulsion and saline solution, produced by the adipocytes rupture by administration of ultrasonic energy with the help of flexible cannulas used for traditional liposuction. At an average ratio of infiltrated/ aspirated solution of 0.70 + / - 0.11, there were removed between 9 and 26.3 litres of lipoaspirated substance (with an average of 17.39 + / - 4.88 litres). Both surface and deep adipose tissue will be removed from areas such as flanks, hips, thighs, buttocks, abdomen. The emulsified fat liposuction is performed traditionally using a flexible cannula with a length of 45 cm and a diameter of 3-5 mm
- 5 minutes of manual remodelling using an endermology tool adapted to surgical use, in continuous aspiration
- placement of suction drainage tubes in aspiration that will be removed in day 2 to 3 postoperatively
- evaluation of the results at the end of the intervention (pinch test=2.5 cm).

   In the repeated postoperative controls at 1, 3, 6 months and 1 year postoperatively, patients’ satisfaction level was assessed (unsatisfactory, quite satisfactory, satisfactory and very satisfactory). At discharge, patients were informed on the lifestyle they must comply (mid-level exercise, healthy diet, without trying to lose weight in the first 6 months). Food intake has not been strictly monitored.

   At home, patients wore special elasto – compressive clothing for 45 days; they made manual lymphatic drainage sessions of Vodder type (3 times/ week, 1 month) and endermology sessions (15 to 20 treatments of 45 minutes 2 times/ week, 3 months). The medication followed by patients at discharge from hospital is: Collagenvit, antioxidants, NSAIDs, low molecular weight heparin, Cefazolin, Escin Peros and for topical use.

4. Duke Health Profile

   Higher scores at Duke Health Profile indicate a worse quality of patients’ life. For physical, mental, social, general health, self-esteem and perceived health, 100 indicates the best health status and 0 indicates the worst health status. For anxiety, depression, anxiety - depression, pain and disability, 100 indicates the worst health status and 0 indicates the best health status.

5. Personal opinion questionnaire

   The personal opinion questionnaire comprises 20 questions and seeks to highlight the skills of the persons included in the study regarding the methods of treatment of obesity and to stress upon their compliance to the UAM technique. The questionnaire was accompanied by a factsheet on bariatric and UAM surgery techniques.

   Survey using the 2 questionnaires was approved by the Ethics Committee; in the survey were included only the persons that gave their written consent based on the information received regarding the purpose and how to fill in this questionnaire.

   The data were centralized in EXCEL and SPSS 11 databases and processed with statistical functions they are suitable to: t-Student test, Anova test, Pearson and Spearman correlation coefficient, Paired Samples Test.
CHAPTER 9  
RESULTS  

9.1. FIRST STAGE OF THE STUDY  

The 30 obese patients studied in the first part of the study were aged between 16 and 56 years (with an average of 39.60 +/- 12.48 years), a BMI between 30.7 kg/m² and 53.6 kg/m² (with an average of 41.36 +/- 8.12 kg/m²) and had no contraindications for UAM technique. 

During surgery, the infiltrated/aspirated solution ratio corresponded to the technical indications of this method, not exceeding a ratio of 1:1 (average value 0.6 +/- 0.11). Thus, the average infiltrated amount was 11.86 +/- 2.50 litres (with a minimum of 8 litres and a maximum of 17 litres). The average amount of lipoaspirated substance was 17.39 +/- 4.88 litres (with a minimum of 9 litres and a maximum of 26.3 litres). The average value was 0.70 +/- 0.11 (a minimum of 0.41 and a maximum of 0.96). The time for the administration of ultrasound in all affected body regions was as an average of 101.53 +/- 25.70 minutes (minimum 56 minutes and maximum 154 minutes). By using ultrasounds, there have been drawn an average of 51.93 +/- 7.14 ml/min (a minimum of 43 ml / min and a maximum of 65 ml / min). The rest of the emulsion fat amount was withdrawn using the traditional liposuction method.  

The infiltrated solution ranged from 8 to 17 litres, with an average of the group of 11.86 litres, correlated significantly with patient’s increased BMI (r=0.449, p=0.013). 

The aspirated amount ranged from 9 to 26.3 litres, with an average of the group of 17.39 litres. In more than 60% of the subjects of this study group, the more BMI increased, the more the aspirated amount was higher (r=0.616; p=0.000).  

The infiltrated/aspirated solution ratio was indirectly correlated with BMI, statistically significant (r=-0.474; p=0.008). 

The total amount of aspirated solution with U.S. ranged from 2.7 to 7.9 litres, with an average of the group of 5.31 litres. In more than 60% of the subjects of this study group, the more BMI increased, the more the aspirated amount was higher (r=0.616; p=0.000).  

Postoperative complication rate was 43.3%: seroma (10 patients), skin necrosis (2 patients), burns (1 patient).  

The aesthetic benefits brought by this method can be seen immediately postoperatively and are maintained as the time goes by.  

In the repeated postoperative controls at 1, 3, 6 months and 1 year postoperatively, patients’ satisfaction level was assessed. 70% were very satisfied, 20% satisfied, 10% quite satisfied. 70% of the patients said they would recommend UAM to others.  

BMI and anthropological parameters fall within the first 6 months and then maintain low values also 1 year postoperatively.  

BMI has values that higher than 35 kg/m² (morbid obesity) in 20 cases (66.6%).  

As compared with the preoperative registered BMI (41.37 kg/m²), are to be noted statistically significant reductions in terms of average values from one stage of the study to another (p=0.000), with average values slightly lower in the first month (38, 23 kg/m²), up to an average value of 38.28 kg/m² after one year from the surgical intervention (Fig.34).
At 6 months postoperatively, the evolution of BMI showed approximately in 53% of the subjects a statistically significant decrease (p=0.02) by more than 10 percentage points, frequency which is maintained even at 1 year postoperatively.

**Depending on age, BMI evolution** showed significant correlations, although BMI values decreased both at six months and one year postoperatively, in over 77% of the subjects of group 1, for older ages stands out a BMI over 40 kg/m$^2$.

As compared with the **lower chest circumference** registered preoperatively (105.47 cm), are to be noted statistically significant decreases in average values at 6 and 12 months postoperatively (p=0.000), reaching an average value of 101.70 cm after one year from the surgical intervention (Fig.38).

At approximately 40% of the subjects in group 1, it is to be noted that for chest circumference, **Spearman correlation** showed in approximately 64% of the subjects in group 1 a significant correlation between lower chest circumference and increased BMI.

As compared to **waist circumference** registered preoperatively (115.40 cm), are to be noted statistically significant decreases in average values at 6 and 12 months postoperatively (p=0.000), reaching an average of 106.70 cm after one year from the surgical intervention (Fig.43).
Fig. 43: Average values of waist circumference in group 1 pre and postoperatively

At 6 months postoperatively, the decrease of waist circumference (by 8.4 + / -2.1 cm) was statistically significant (p=0.000) and was registered with rates ranging from 3.6% to about 10.6%, with an average value of the decrease of 7.31%. After one year from the surgical intervention, the decrease of waist circumference (8.9 + / -2.4 cm) ranged from 3.6% to 10.9%, with an average value of the decrease of 7.56% and was statistically significant (p=0.000).

In over 60% of the subjects in group 1, it is to be noted that large waist circumference was significantly correlated with age.

Spearman correlation showed for 76-79% of the subjects in group 1 significant correlation between waist circumference and increased BMI.

As compared to hip circumference preoperatively registered (126.83 cm), are to be noted statistically significant decreases of the average values at 6 and 12 months postoperatively (p=0.000), reaching an average of 115 cm after one year from the surgical intervention (Fig. 48).

Fig. 48: Average values of hip circumference in group 1 pre and postoperatively

At 6 months postoperatively, the decrease of hip circumference (with 11.3 + / - 3.01 cm) was registered with rates ranging from 5% to 14.7%, with an average value of the decrease of 8.89% and was statistically significant (p=0.000). After one year from the surgical intervention, the decrease of hip circumference ranged from 4.2% to 16.4%, with an average value of the decrease of 9.31%, decrease (by 11, 8 + / - 3.2 cm) that was statistically significant (p=0.000).

At 46-48% of the subjects in group 1, it is to be noted that higher hip circumference was significantly correlated with age.

Spearman correlation showed in 60-63% of the subjects in group 1 significant correlation between hip circumference and with increased BMI.
As compared with **thigh circumference** preoperatively registered (75.33 cm), are to be noted statistically significant decreases of the average values at 6 and 12 months postoperatively (p=0.000), reaching an average of about 67 cm after one year from the surgical intervention (Fig. 53).

![Fig. 53: Average values of thigh circumference in group 1](image)

**Fig. 53: Average values of thigh circumference in group 1**

At 6 months postoperatively, the decrease of the thigh circumference (by 8.1 +/-3.3 cm) was registered with rates ranging from 1% to about 20%, with an average decrease of 10.80% and was significantly (p=0.000). After one year from the surgical intervention, the decrease of the thigh circumference (by 8.3 +/-3.3 cm) ranged from 0% to 21.7%, with an average value of the decrease of 11.07% and was statistically significant (p=0.000).

In approximately 49% of subjects of group 1, it is to be noted that greater thigh circumference was significantly correlated with age.

**Spearman correlation** showed in over 60% of the subjects in group 1 significant correlation between thigh circumference and increased BMI.

As compared to **average weight** preoperatively registered (105.55 kg), stand out statistically significant reductions of the average values from one stage of the study to another (p=0.000), with average values slightly lower in the first month (98 kg) up to an average of 95.13 kg after one year from the surgical intervention (Fig.58).

![Fig. 58: Evolution of the average values of weight in group 1](image)

**Fig. 58: Evolution of the average values of weight in group 1**

At 6 months postoperatively, approximately in 47% of the subjects in group 1 was registered a statistically significant decrease (p=0.000) in weight by more than 10 percentage points, frequency that is maintained at 1 year postoperatively.

Between age and weight were registered direct correlation of moderate intensity, both at six months and one year postoperatively; in over 60% of the subjects, the older the patients, the higher the body weight.
As compared with the average values of leptin registered preoperatively (27.39 ng / ml) at 1 day after surgery, there is a statistically insignificant increase of approximately 6 ng / ml, followed by a statistically significant decrease in average values in the first month, reaching an average value of 20.88 ng / ml, average values that are slightly decreasing, statistically significant, until the end of the study (20.57 ng / ml) (p=0.008) (Fig.62).

Fig. 62: Average values of leptin in group 1

T test, applied to the value series pairs of leptin depending on the moment of the study compared to the ones recorded preoperatively show significant correlations (p = 0.000), demonstrating that 1 day after surgery individual leptin values increased in all patients whereupon these values decreased significantly in all the group.

On the first postoperative day, the percentage differences of leptin ranged from 5.79% to 52.50% with an average percentage of 28.74%, then from the 3-day on the leptin individual values dropped with 25% to 48% registering an average percentage decrease of about 30% which becomes stable 6 months after surgery.

Individual values of leptin were higher in the elderly, direct correlations, both pre and postoperatively were statistically significant.

Individual values of leptin were significantly correlated with BMI, the increased leptin values being associated with increased BMI values, both preoperatively and postoperatively.

The correlation between waist circumference with leptin was direct, statistically significant (p = 0.000), in 70-80% of the patients the increased levels of leptin were associated with increased waist circumference values, both pre-and postoperatively.

The correlation between thigh circumference and leptin was direct, statistically significant (p = 0.000), in approximately 63% of the patients the increased leptin values were associated with increased thigh circumference values, both pre-and postoperatively.

Hip circumference with leptin presented a direct, statistically significant correlation (p = 0.000). Preoperatively in 64% of the patients with increased leptin values increased hip circumference values were present, while postoperatively the percentage was of approximately 60% both 6 months and 1 year after surgery.

The correlation between lower chest circumference with leptin was direct, statistically significant (p = 0.000), in approximately 63-65% of patients the increased leptin values were associated with increased chest circumference values, both pre-and postoperatively.

Postoperatively, in approximately 56-60% of the 1st group subjects, it appears that individual leptin values were correlated directly, statistically significantly (p = 0.000), with U.S total aspirate. Postoperatively, in approximately 57-62% of the 1st group subjects, we determined that individual leptin values correlated directly statistically significant (p = 0.000) with the amount of aspirated
solution. We determined that postoperatively individual leptin values were correlated directly and statistically significant \((p = 0.012, p = 0.033, p = 0.032, p = 0.031, p = 0.027)\) with the amount of infiltrated solution; in about 40-45% of the subjects with increased infiltrated solution were found associations with increased leptin values.

Postoperatively, it appears that individual leptin values were indirectly correlated statistically significant with the ratio infiltrated solution / aspirated solution; in approximately 44-49% of the subjects associations of low leptin values were reported.

9.2 SECOND PART OF THE STUDY (GROUP 2)

In the second part of the study a group of 30 people, 10 men and 20 women, aged between 16 and 60 years \((36.7 + / - 13.9)\) having a BMI between 30.1 and 55.1 kg/m² \((38.6 + / - 6.3)\) was studied, the answers to two questionnaires being assessed.

9.2.1. PERSONAL OPINION QUESTIONNAIRE

The answers of this group to the personal opinion questionnaire led to the following findings:

- 18 people (60%) (5 men and 13 women) suffered from morbid obesity.
- at the time of the study 40% of the people with 1st and 2nd degree obesity without comorbidities only 20% received a medical treatment and of those only 10% received a complete treatment (minimum 1 year) which proved efficient. In 30% of the cases the medical treatment to be instituted or continued, may prove effective or not. If after one year the treatment proves ineffective and patients have no contraindications, they become candidates for UAM, bariatric surgery not proceeding in this case.
- of the 60% people suffering from morbid obesity, potential candidates for surgical techniques only 9 (30%) had indications for bariatric surgery and 5 (16.6%) for UAM technique.
- Should the medical treatment prove inefficient in 30% of the patients without morbid obesity, 46.6% of the patients will be recommended alternative treatments, including UAM.
- The information held by the 30 people on the surgical treatment techniques of obesity was poor and their source was rarely a physician (16.6%).
- Given this situation, the people´s compliance with this technique was very low (16.6).
- The Case Information Sheet attached to the questionnaire was decisive, leading to a significant increase in the people´s compliance (3.6 times).
- All patients have shown an interest in being included in a therapeutic program dedicated to obese patients, including: diet, sports, psychotherapy, bariatric surgery, UAM and other body shaping techniques.
- As regards the information held by the 30 people regarding the surgical treatment of obesity, only 11 patients (36.6%), aged between 16 and 29 years had brief information on bariatric surgery techniques and only 4 aged between 25 and 36 years (13.3%) had information on UAM technique. The information source in 5 cases (16.6%) was the attending physician and in 10 cases (33.3%) was the Internet. Given this situation, the assessed compliance of individuals with regard to this technique was very low (16.6%), only 5 of 30 patients accepting such a technique. After reading the information sheet attached to the questionnaire considered, a significant increase of the persons
´assessed compliance (3.6 times), was established, 18 (60%) of them taking into account such an alternative.

Despite the scarce information on obesity treatment methods, all patients appeared interested in being included in a treatment program for obese patients, including: diet, sports, psychotherapy, bariatric surgery, ultrasound mega-liposuction and other body shaping techniques.

9.2.2. QUALITY OF LIFE QUESTIONNAIRE DUKE HEALTH PROFILE

The higher scores of Duke Health Profile indicate a worse quality of life. For the physical, mental, social and general health, self-esteem and perceived health, 100 points indicate the best health condition and 0 indicates the worst health condition. For anxiety, depression, anxiety-depression, pain and disability, 100 points indicates the worst health condition and 0 indicates the best health condition.

The assessment of the questionnaire results (Annex 3) stressed again that obesity is an often neglected disorder due to the lack of pain (pain score 38.3 +/- 33.9) but a very severe one due to the morbid complications associated with it (Score disability 60 +/- 33.2).

The scores interpretation at the level of the 10 scales of the questionnaire revealed a significant impairment of the quality of life both on the physical (43.3 +/- 24.4), mental (55.3 +/- 40.1) and socio-professional level (51.6 +/- 30.5). Most patients have a real perception (45 +/- 37.9) of their general, poor health condition (50.06 +/- 25.6). That is why we noticed a decrease in the score indicating esteem (53.3 +/- 35.7) and an increase in the one indicating the installation of depression and anxiety (Duke-Ad Score 44.4 +/- 32.05).

We noticed in both sexes, the fact that the younger the person is, the more pronounced and often not consistent with reality the mental perception of the disease is. Therefore, although these people have a less severe degree of obesity and a better physical condition than older people with a higher BMI’s, they present a more pronounced impairment of the life quality on the psychological and socio-professional level. Anxiety and depression is much more present in this group of young people.

CHAPTER 10
DISCUSSIONS

Obesity is a serious medical condition. Obesity-related comorbidities (2nd type diabetes type, hypertension, severe respiratory deficiencies, sleep apnea, metabolic syndrome, hormonal disorders, etc.) are responsible for the life expectancy decrease with 9 years in women and with 12 years in men. 2.5 million deaths per year are attributed to obesity-related conditions (319).

The results obtained in this research were similar to those obtained in 2008 by Luca Busetto, the research taking place in the same Plastic Surgery Clinic and under the guidance of the same professor, being actually a continuation and a completion of the previous study which aims to demonstrate the reliability of the previous results on a larger group of patients (double) and a longer follow-up (1 year).

In the 1st group there was a direct correlation between the age and the preoperative weight of the patients investigated (r = 0.633, p <0.001) and an indirect correlation between the age and height of the investigated patients (r = -0.627, p <0.001). There is a very wide variance of height values series ranging from 1.49 to 1.78 m. There was a significant association of the increased weight values with more reduced height values (r = -0.361, p = 0.05), suggesting obesity for the casuistry of the 1st group. The strong correlation between preoperative BMI and age (r = 0.779, p <0.001) reveal the presence of higher degree of obesity in older ages. This may indicate either a lack of proper
treatment of obesity in these patients or a lack of compliance of the patients to the treatment recommended by the physician.

These patients were subject to the UAM technique, after signing the informed consent. The amount of infiltrated solution ranged from 8 to 17 liters, with a group average of 11.86 liters and the amount of lipoaspirate ranged from 9 to 26.3 liters, with a group average of 17.39 liters. Both the amount to be infiltrated ($r = 0.449$, $p = 0.013$) and the one to be lipoaspirated ($r = 0.616$, $p = 0.000$) were significantly correlated with the patient’s increased BMI, while the infiltrate/aspirate ratio was indirectly, statistically significant correlated with the BMI ($r = -0.474$, $p = 0.008$). In the subjects of this group, the higher the degree of obesity, the higher the amount of infiltrate and lipoaspirate was but the amount of lipoaspirate exceeded that of the infiltrated solution. The total amount of U.S. aspirate ranged from 2.7 to 7.9 liters, with a group average of 5.31 liters. Over 60% of the study group patients the higher the BMI, the higher the amount of total aspirate with U.S. ($r = 0.601$, $p = 0.000$) was, in order to facilitate subsequently the traditional liposuction time.

It is worth mentioning that there were no systemic complications and the local complications were minor: seroma (10 patients), skin necrosis (2 patients), burns (1 patient). These were resolved favorably. There was no association between the number of complications and the body region, age, sex, or BMI. The 2 cases of skin necrosis occurred in patients who failed to comply with the recommendation to stop smoking at least 2 weeks before surgery. The burning complication was an operatory technique incident due to the U.S. probe being too superficial. Burns of contact between probe and skin at the insertion sites of the probe were avoided by using some cooling and protection covers. Fortunately, according to the latest studies the incidence of these complications decreases significantly with experience. Thus, Roustaei N et. al (338) reported in 609 UAM surgeries a complication rate of 1.36%. UAM complication rate is lower than for bariatric surgery. In addition, the nature of these complications is more aesthetic and less medical, major complications being very rare (257). These complications occur most often during the technique learning curve which is long enough (340). Zukowski ML et. al (341), after a study performed in 1997 on 84 patients who underwent UAM within the Naval Medical Center, Portsmouth, VA, says that the procedure has a steep learning curve, which involves a minimum of 30 patients and requires great attention to detail in terms of infiltrated solution volume and ultrasonic extraction time.

Repeated postoperative controls at 1, 3, 6 months and 1 year after surgery revealed that liposuction through its aesthetic benefits, gave back satisfaction and self-esteem to the vast majority of patients (90%). These results can be explained by the fact that patients understand how important is to change their lifestyle and comply with it while also demonstrating that the selection of patients accepted for such operation was careful and correct. Such a selection would not have been possible without the existence of a mixed team: nutritionist, general surgeon, plastic surgeon, psychologist, psychiatrist.

The surgeon must understand exactly what the patient’s expectations are. Some expectations are unrealistic and exaggerated, so that some patients are not fully satisfied with the result in the end. Hence, a detailed explanation of the liposuction procedure limits, risks and complications becomes a necessity. The patient should understand that a on an average surgery interventions do not have perfect results and minor adjustments may be needed later to optimize the result. Patients with dysmorphic personality should be avoided, if the patient does not have a significant problem, but perceives it as a serious problem. The surgeon cannot satisfy this type of patient.

70% of the patients said they would recommend UAM to other people. The patients who did not gain weight after the UAM procedure, the patients who were satisfied with their body appearance, the patients whose clothing size decreased after UAM and the patients who trust their bodies showed a higher degree of satisfaction.

Anthropological parameters of patients decreased statistically significantly 6 months after the surgery and remained low one year after the surgery.
Compared with the BMI recorded before surgery (41.37 kg/m²), we notice a significant decrease in the average values from one stage to another of the study (p = 0.000), with average values slightly lower in the first month (38.23 kg / m²) to an average of 38.28 kg/m² one year after surgery. 6 months after surgery, the BMI evolution showed a decrease of more than 10 percentage points in approximately 53% of the subjects such frequency being maintained for 1 year postoperatively. In over 77% of the 1st group subjects a BMI of over 40 kg/m² (morbid obesity) is noticed in older age people.

**Body weight preoperative values** vary from 90 kg to 137.2 kg and exceeded the ideal weights by 44.6 + / - 19.17 kg (with variations of 19 kg and 78 kg in addition). 33.3% of the patients suffered from 1st degree obesity, 6.66% of 2nd degree and 60% of 3rd degree. All patients with 2nd and 3rd type obesity had morbid obesity. Compared to the average preoperative weight (105.55 kg), significant decreases in the average values are noticed from one stage to another of the study (p = 0.000), with average values slightly lower in the first month (98 kg) to an average of 95.13 kg one year after the surgery, the values decreasing as postoperative edema decreases. 6 months after surgery, approximately 47% of the subjects in group 1 registered a decrease in weight by more than 10 percentage points; this frequency being also maintained 1 year after the surgery. In over 60% of the subjects high body weights were registered at older ages.

Compared to the lower chest circumference recorded preoperatively (105.47 cm), significant decreases in the average values were noticed 6 and 12 months after the surgery (p = 0.000), reaching an average of 101.70 cm one year after surgery. 6 months after surgery, the average chest circumference decrease value was of 3.25% (3.5 + / - 3.5 cm) at 6 months and 3.39% (3.7 + / - 3.5 cm) at 1 year. We noticed that in approximately 40% of the subjects in group 1 the older they are the more increased the chest circumference is. For approximately 64% of the subjects in group 1 the lower chest circumference is even larger as the BMI is higher, which means that we deal with a higher obesity. Such decreases appear to be statistically insignificant (p> 0.05) compared with other anthropological parameters decreases. This may be due to the fact that liposuction is very effective in the thighs, hips and lower abdomen as the fat accumulated in these regions cannot be generally removed by diet and exercise. Nevertheless at the level of the lower chest, fatty deposits are not as important as in other regions and besides this liposuction is more difficult to practice at this level, having certain limitations. Liposuction in the coastal region requires applying pressure with the non-dominant hand to the costal margin to avoid perforation of the thoracic cannula. Severe chest pain, especially with shortness of breath may indicate such a perforation and the installation of pneumothorax. The chest X-ray helps us make a diagnosis. The drainage of the pneumothorax is necessary to improve pain and dyspnea (251). This is why an experienced surgeon will never insist on the region and thus the amount of liposaspirate will always be lower than in other body regions.

Compared with the waist circumference recorded preoperatively (115.40 cm), significant decreases are noticed in the average values 6 and 12 months after surgery (p = 0.000), reaching an average value of 106.70 cm one year after the surgery. The average decrease in the waist circumference was of 7.31% (8.4 + / - 2.1 cm) at 6 months and 7.56% (8.9 + / - 2.4 cm) at 1 year. In over 60% of the 1st group subjects it is noticed that large waist circumference was significantly correlated with age. In 76-79% of the subjects in group 1 waist circumference was even larger as the BMI increased; this means a higher degree of obesity. Many studies have confirmed the association between BMI and waist circumference, with obesity and fat content. BMI is strongly correlated with fat mass measurements, but does not distinguish fat mass from muscle mass (342). On the other hand, the waist circumference provides a clinically acceptable measurement unit for the evaluation of the patient's abdominal fat content (343). Given the WHO recommendations (345) regarding waist circumference and the fact it is a predictive factor for abdominal obesity-related diseases (hypertension, coronary artery disease, 2nd type diabetes, strokes), all female patients studied in this paper present a substantially increased risk (waist circumference ≥ 88 cm in women) having the waist values ranging from 100 to 147 waist inches (115.40 + / - 12.84). Although waist
circumference is reduced by 8.9 + 2.4 cm 1 year after surgery compared to preoperative values, it cannot be reduced to values below 88 cm (average value of 106.50 + 12.73). It is important to consider the high values of this circumference, knowing the scientifically proven link between the value of waist circumference and the risk of cardiovascular disease or 2nd type diabetes, especially if we also consider the younger patients (342). BMI and waist circumference correlate well with the concentration of leptin in the group of patients studied. This is due to the close relationship between BMI, waist circumference and body fat content besides the responsibility of visceral and subcutaneous tissue to produce leptin (346). This study revealed that there is a positive relationship between BMI and waist circumference, which means that any increase in BMI will be followed by the waist circumference increase and leptin concentrations. This study showed a linear trend of BMI, waist circumference and leptin.

Compared to the hip circumference (126.83 cm) recorded preoperatively, we noticed a significant decrease in the average values 6 and 12 months after surgery (p = 0.000), reaching an average of 115 inches one year after the surgery. The average decrease in hip circumference was of 8.89% (11.3 + 3.01 cm) at 6 months and of 9.31% (11.8 + 3.2 cm) at 1 year. In 46-48% of the 1st group subjects we noticed that higher hip circumference was significantly correlated with older ages. In 60-63% of the 1st group subjects we noticed a significant correlation between hip circumference and increased BMI. Moreover, 90% of the female patients had a WHR > 0.85 before surgery, which shows a significant abdominal obesity with a higher degree of risk than gynecoid obesity. Although the values of waist circumference and lower hip decrease statistically significant at 6 months and remain unchanged at 1 year, the WHR values are still over 0.85, demonstrating that physical distribution has not changed and the abdominal fat distribution remains predominant. This is also justified by the fact that, although waist circumference is reduced by 8.9 + 2.4 cm at 1 year in comparison with preoperative values, it cannot be reduced below 88 cm. It was noticed, however, that the average value of WHR increased at 6 months and one year (28.09) compared to the preoperative value (27.59). This may suggest that a higher amount of fat was aspirated from the hips area.

Compared with the thigh circumference (75.33 cm) registered before surgery, we noticed a significant decrease in the average values at 6 and 12 months after surgery (p = 0.000), reaching an average value of about 67 cm one year after surgery. The average decrease in hip circumference was of 10.80% (8.1 + 3.3 cm) at 6 months and of 11.07% (8.3 + 3.3 cm) at 1 year. In approximately 49% of the 1st group subjects we noticed that the large thigh circumference was significantly correlated with older ages. Over 60% of the 1st group subjects the significant correlation with BMI thigh circumference increased. Preoperatively 56.6% of the female patients had a WHT > 1.50, demonstrating once again the prevalence of abdominal obesity within the group. This report remains also predominantly increased 1 year after. The average value of WHT increases at 6 months and one year (48.09 and 47.98 respectively) compared with the preoperative one (46.28). This may suggest that a higher amount of fat was aspirated from the thighs, the body android distribution persisting.

Considering that the results obtained 1 year after the surgery are similar to those obtained at 6 months, we conclude that the female patients were motivated enough to continue the program started preoperatively in order to maintain a constant weight and to change lifestyle: exercise, lifestyle change, including eating habits, diet, drug therapy when needed.

Leptin is a hormone involved in the regulation of protein lipid metabolism and energy consumption.

Preoperative serum leptin level had an average value of 27.39 ng / ml, with a minimum of 11.6 ng / ml and a maximum of 61.6 ng / ml. The minimum value was recorded in the youngest patient in group 1 (16), with the lowest BMI (30.7 kg/m2). The maximum value was recorded in the oldest patient under study (56 years), with the highest BMI (53.6 kg/m2). The patients with mild obesity whereon the leptin values were within the normal limits were not included in the study. These results demonstrate that the severity of obesity causes the leptin concentrations (346,360).
Compared with **average values of leptin** recorded preoperatively (27.39 ng / ml) 1 day after surgery there is a transient increase statistically insignificant, of about 6 ng / ml, followed by a significant decrease in the average value in the first month, reaching an average value of 20.88 ng / ml, average values which decrease slightly until the end of the study (20.57 ng / ml) (p = 0.008) and stabilize at lower levels than the basic values.

**In early preoperative stage (1 - 3 days)** a large increase in the levels of leptin compared to the preoperative period was noticed. The leptin percentage differences ranged from 5.79% to 52.50% with an average of 28.74% in the 1st day, then from the 3rd day on recorded decreases of 25% to 48% in the leptin individual values, with an average percentage decrease of about 30% which becomes stable 6 months after the surgery. Individual values of leptin were more increased in the older ages, direct correlations, both pre and postoperatively were statistically significant. This increase in blood leptin was very quick and short (this increase disappears on the 3rd day). Since most circulating leptin is produced by the white adipose tissue we may speculate that these increases in the levels of leptin are due to their fat origin (361). The methodology used does not allow us to distinguish whether this increase is due to the increased levels of leptin of the general circulation due to adipocytes rupture or is the result of active synthesis. Similar results were published also by Bussetto and his team (221). The only difference noticed is that, although the average increase in serum leptin concentration is similar to the first postoperative day (6 mg / ml), Bussetto found this value to be statistically significant (p <0.01) while in our study this increase was not statistically significant (p = 0.07). We can account for this difference if we consider that all patients had an acute inflammatory reaction of similar intensity despite their varying ages. Therefore, we conclude that younger patients had a low immune system due to associated pathologies (of psychiatric type or not). Extrapolating to other results obtained by Bussetto in his study, the level of adiponectin, the most abundant protein specifically expressed and secreted by the adipose tissue (362), is reduced immediately during the preoperative stage (1-3 days). The synthesis of adiponectin in the adipose tissue was inhibited by IL-6 (363) and by the various elements involved in the acute response to injury, such as α-adrenergic activators (364) and glucorticoids (365). Thus, the pro-inflammatory factors increase (TNF-α, IL-6, resistin) in parallel with the decrease of the anti-inflammatory factors (adiponectin) suggests rather the existence of a coordinate inflammatory reaction than a passive mechanical release of the fatty products in blood. The increase of the leptin levels in the context of the acute response to stress stage has been described in the early postoperative stage after the major surgery (366). When inflammation is present the serum leptin value increases significantly 12 hours after surgery and after 24 hours decreases and remains at relatively constant levels in the next 32-96 hours (368). The increase of the leptin values in the immediate postoperative period suggests the leptin behavior similar to those of the acute stage proteins. Leptin synthesis during the postoperative period has mainly extra-adipocitary source at the level of the inflammatory cells or the adipocyte can be stimulated and can increase inflammation should leptin synthesis inflammation occur. Leptin in patients who are in early postoperative period after a major surgery, with systemic inflammatory response syndrome is a pro-inflammatory mediator with adipocitary and mainly extra-adipocitary source with early dynamics which intervenes in regulating the immune response by acting at the level of the CNS. Thus, leptin may be a useful biomarker for the early diagnosis of inflammation together with IL-6, TNF-α, IL-1β (370) and PCR (371).

**In the late phase of recovery after UAM (1 month - 1 year)**, acute inflammatory reaction observed in the early postoperative period quickly disappears and most adipocytokine concentrations return to baseline values even at a slightly lower level, according to the study conducted by Bussetto et. al. (221). Similarly to this study, we noted a stabilization of the leptin concentration at statistically significant lower levels than baseline values (from preoperative stage) at 1 month, 6 months, 1 year after the surgery, as the patient lost weight (fat mass loss through liposuction). Thought, weight loss at 1 year is not statistically significant compared to 6 months.
Postoperatively, in approximately 56-60% of the subjects in group 1, it seems that individual leptin values correlated directly, statistically significant (p=0.000), with total US aspirated solution. In approximately 57-62% of the subjects in group 1, it appears that individual Leptin values were directly correlated, statistically significant (p=0.000) with the amount of suction. Postoperatively, it appears that individual leptin values correlate indirectly with the infiltrated / aspirated solution ratio, in approximately 44-49% of subjects with infiltrated / aspirated solution ratio, associations with low leptin values were found. Postoperatively, it appears that individual leptin values were correlated directly with the amount of infiltrated solution, since associations with high leptin values were found in approximately 40-45% of subjects with high values of infiltrate.

These results show that higher values of serum leptin concentration were found in patients with higher amount of lipoaspirated solution (and hence higher amount of infiltrated solution in order to comply with 1:1 / 0.6:1 infiltrated / aspirated solution ratio). This can be explained by the fact that together with the aspiration of a larger quantity of fat, the number of cannula passages through the tissue increases, leading to a stronger inflammatory reaction, and therefore, a higher rate of serum leptin value.

According to other studies involving cohorts of groups with different race and age, our results confirm that serum level of leptin correlates with that of fat deposits (374). When lipid reserves increase, white fat cells accelerate the synthesis of leptin in order to signal the hypothalamus that it should reduce food intake. Instead, when fat reserves diminish, white adipocytes reduce leptin synthesis in order to signal the hypothalamus the need to increase food intake and reduce energy consumption.

There is strong evidence that obesity is associated with leptin resistance, both at central (CNS) and peripheral (muscle) level and that this can lead to insulin resistance and, therefore, to type 2 diabetes mellitus (358). The role of leptin in insulin resistance is controversially discussed today, but that trend is to accept a rather favourable effect of insulin resistance. When fat deposits are reduced by UAM, leptin synthesis will be reduced, which indirectly leads to a decreased insulin resistance and therefore a lower risk of type 2 diabetes mellitus.

This study showed the existence of a direct correlation, statistically significant between leptin serum levels, BMI and anthropological parameters. Maruna et. al. (368) shows that leptin increases compared to normal values and the increase correlates with TNF-α and IL-6, but does not correlate with BMI. Various studies show that in healthy subjects there is a strong correlation between BMI and leptin, a correlation lost in inflammation (376). Several studies have shown that serum leptin levels are strongly correlated with BMI (376,379). Whatever the initial concentration, weight loss due to food restriction proved to be associated with a serum decrease of leptin, both in obese and in normal weight people (381). Furthermore, leptin may serve as an indicator of fat content and its level can be reduced by reducing fat mass, although BMI values remain unchanged (382). Based on the above findings, concentrations of leptin can be considered as a marker of the degree of obesity in humans. Our results are consistent with previously reported data. Thus, it was observed that both in preoperative and late postoperative stage (after overcoming early postoperative inflammatory stage), higher concentrations of leptin are found in obese individuals with a higher BMI, which suggests that the effect of leptin on appetite is diminished or absent. The significant relationship between serum leptin concentration and body fat percentage suggests that adipocytes signal the brain on the size of fat deposits, resulting in decreased appetite and increased energy consumption, which together will result in weight loss. It was observed that people who lack this protein face severe obesity, greatly increased appetite and reduced metabolic rate (383). Moreover, in contrast, most obese people have high circulating levels of leptin that do not induce the expected responses (eg, reduced food intake and increased energy consumption), suggesting the existence of leptin resistance in obese hyperleptinemic subjects (384). Most studies show that almost all obese individuals have higher leptin levels, probably due to increased leptin gene expression and partly due to higher production of leptin due to a higher fat mass (387). Mechanisms leading to leptin resistance in obesity include
limiting the transport of leptin in the blood-brain barrier, altering leptin receptor expression and inhibiting leptin signalling pathways in hypothalamic neurons responsive to leptin. They fail to receive the message of abstinence from food given the high levels of leptin, but are still sensitive to decreased hormone levels. For this reason, when an obese try to lose weight (in our case with UAM), hypothalamus perceives leptin decrease and stimulates appetite. According to a homeostatic model (360), the decrease of leptin concentrations at the same time with the reduction of fat tissue is a signal for the hypothalamic system which stimulates hunger centre and, consequently, increases food intake and helps regaining the prior weight. In addition, an increased food intake may be the cause of psychological factors (388) or changes of intestinal hormones (389). These observations suggest that operative removal of fatty tissue such as weight loss induced by diet, can cause adaptive responses of the body meant to regain weight and should be considered in long-term management of obese patients subject to UAM, suggesting the need for a weight maintenance program.

Long-term exposure (> 2 weeks) to a fat-rich diet or with high levels of leptin seems to induce more defects in the blood-brain transport, receptor expression and melanocortin pathway. The control of leptin biological activity by dietary changes may be a practical strategy for treating obesity (390). Discoveries in recent years have highlighted other new peptides that can control appetite in other ways than leptin and some of which affect leptin (eg. agouti-related peptide, cholecystokinin, Corticotropin-releasing hormone, Galanin, melanocortins, Y neuropeptides and orexins) (392).

Previous studies have measured leptin concentrations in small groups of thin and obese subjects (396). However, preliminary data available do not analyze the relationship between serum leptin concentration and anthropological parameters.

The correlation between waist circumference and leptin was direct and statistically significant (p=0.000); in 70-80% of patients increased levels of leptin were associated with elevated values of waist circumference, both pre-and postoperatively.

The correlation between thigh circumference and leptin was direct and statistically significant (p=0.000); approximately 63% of patients with elevated leptin values associated elevated thigh circumference values, both pre-and postoperatively.

Hip circumference with leptin showed a direct correlation; preoperatively in 64% of patients with elevated leptin values, elevated hip circumference values were found, while postoperatively the weight was about 60%, both 6 months and 1 year after surgery.

The correlation between lower chest circumference and leptin was direct and statistically significant (p=0.000); approximately 63-65% of patients with elevated leptin values associated elevated values of lower chest circumference, both pre-and postoperatively.

The results of our research (maintaining body weight, anthropological indicators and serum leptin concentration at levels lower than baseline values at 1 year after the operation) proved that the patients part of the study were properly selected, as they proved motivated enough to continue the complex therapeutic program started in the preoperative period (diet, sports, psychotherapy and, eventually, medication).

In the second part of the research, a poll was conducted in Iasi, Romania and included a group of 30 people, 10 men and 20 women, aged between 16 and 60 years (mean value of the group 36.7 + / - 13.97 years) and a BMI ranged between 30.1 kg/m$^2$ and 55.1 (mean value of the group 38.6 + / - 6.3 kg/m$^2$).

Without statistically significant differences (p=0.411), in group 2 the mean age was slightly lower compared with the mean age in group 1, while the average weight was slightly higher in group 2 (111.23 ± 20.31 kg) compared to that in group 1 (p=0.000). Also, in group 2 there was a direct correlation between age and preoperative weight (r=0.736; p <0.001) and between age and BMI (r=0.814; p <0.001). The average height was significantly higher in group 2 (1.69 ± 0.55 m) compared to that in group 1 (p=0.000). No significant correlations were found between age and height (r=0.028; p=0.885). In group 2, significant correlations were found between weight and height (r=0.436; p=0.016), which characterizes only about 1/2 of the lot as dealing with severe obesity.
Thus, in group 2, mean preoperative BMI was slightly lower compared to that in group 1, although body weight had a higher mean value, which is justified by the higher heights and lower ages of patients. In conclusion, group 2 was not different in terms of mean parameters compared to group 1 and this is useful when conducting a feasibility study.

The responses of this group to the personal questionnaire allow us to state that out of the 60% of people with morbid obesity, possible candidates for operative techniques, only 9 (30%) had indications for bariatric surgery and 5 (16.6%) for UAM technique. In case of inefficiency of the medical treatment in 30% of patients without morbid obesity, 46.6% of patients will show indications for a therapeutic alternative, including UAM.

UAM is useful to treat a sufficiently high proportion of patients with no other therapeutic solutions. Knowing that in Romania, about 30% of the population suffers from obesity and extrapolating data obtained in this survey, we can say that 13.9% of the Romanian population could benefit from a operative treatment based on UAM technique. Although there is a lack of information among the studied group regarding the operative techniques for treating obesity, all patients were interested in being included in a personalized treatment program dedicated to obese patients. We must emphasize the importance the information provided to patients by a trained person has in increasing its compliance. In order to obtain accurate data, it is necessary for this study to become a prospective (revaluating the same patients at 1 year postoperatively) and multicentre one.

Interpreting the score at the level of the 10 scales of life quality questionnaire, Duke Health Profile revealed:

- significant impairment of life quality both physically and mentally, as well as socially and professionally.
- most patients have a real perception of their poor general health state. This is why we noted a decrease of the score indicating self-esteem and an increase of the score indicating occurrence of depression and anxiety.

We noted in both sexes that the younger the person, the more pronounced the mental perception of the disease and often not consistent with reality. Therefore, although these people have a less severe degree of obesity, a physical condition better than older people and a higher BMI, they show a greater impairment of life quality psychologically, socially and professionally. Anxiety and depression is much more present in his group of young people. It is known that overweight and obesity can cause low self-esteem, depression, anxiety, bulimia and anorexia. Obesity is a stigmatizing chronic disease. The general perception is that obese people are lazy and eat more. It is believed that the obese are deprived of will and cannot refrain from heavy meals and are blamed both for this reason and their appearance. In young obese adults, consequences range from lacking integration in the community and at the workplace to forcing the change of residence or occurrence of states of depression and suicide. This is why the presence of a psychologist / psychiatrist in the medical team dedicated to the treatment of obesity is indispensable. A very important role is played by family and society, because their chance of socio-professional integration and maintenance of a normal mental status depends on the information held about this disabling disease and the way these patients are accepted and treated. This is why it is necessary to receive a proper education in this respect, both at home and at school, by introducing special informative programs.

Solving comorbidity and regaining self-esteem would lead to spectacular improvement in the quality of life. This study can be transformed into a prospective study, if the same patients fill in the same questionnaire and after the UAM surgery, subsequent to its introduction in Romania.

There are no publications relating to the application of the UAM technique in Romania, although in Europe and the U.S. it has become one of the basic techniques in the arsenal of body reshaping methods. Although UAM role in the management of obesity is still a highly debated issue, this technique is practiced currently in some facilities (Civil Hospital of Padua) for treating obesity since 2001.
Currently, the public health sector in Romania is going through a difficult time. We cannot say the same about private medical services which are more present than ever. The number of private hospitals increased from 12 in 2006 to 84 in 2012 and can rise up to the expectations necessary for applying UAM in the treatment of obesity. The aim is to make it possible for more and more such centres to exist, where patients with such serious metabolic and morbidity problems should be treated with minimal risk.

**CHAPTER 11**

**CONCLUSIONS**

1. Obesity is a plague of the modern age, its treatment is a combined, multidisciplinary one. Elective surgery for obesity is important. This study shows excellent results in the treatment of obesity UAM technique (aesthetic, psychological, metabolic).

2. With this technique there were no systemic complications and local complications were minor and were resolved favorably. These complications, more aesthetic and less medical, occur most often during the learning curve of the technique, that is sufficiently long. This shows that the technique is safe when is properly applied to selected cases and when is practiced by a trained surgeon.

3. Repeated postoperative controls at 1, 3, 6 months and 1 year revealed that liposuction, by the aesthetic benefits brought to patients, gave back to most patients (90%) their satisfaction and self-esteem.

4. Anthropometric parameters of patients had a statistically significant decrease at 6 months postoperatively and remained at low values and at 1 year postoperatively.

5. Compared to the average values of leptin registered preoperatively, the values registered in the late postoperative period after overcoming the stage of acute inflammatory response, decreased significantly from the first month and stabilized at levels lower than the baseline values up to 1 year postoperatively.

6. In agreement with other studies involving cohorts with different ethnic and age groups, our results confirm that obesity causes leptin concentrations and hence the weight loss leads to decreased serum leptin. Thus, this study showed that there is a statistically significant direct correlation between serum leptin levels, BMI and anthropological parameters.

7. The results we obtained (maintaining body weight, anthropological indicators and serum leptin concentration at levels lower than baseline values at 1 year postoperatively) proved that patients admitted in this study were properly selected, as they proved motivated enough to continue the complex therapeutic program started in the preoperative period. UAM has important metabolic and morphological effects if patients’ selection is done carefully and if they are carefully controlled postoperatively.

8. The results obtained by assessing the quality of life questionnaire - *Duke Health Profile*, stressed once again the significant alteration in obese patients’ quality of life both physically, mentally and socio-professionally. Resolving comorbidities and regaining self-esteem would lead to a dramatic improvement in the quality of life.

9. Although there is a lack of information among the studied group in what concerns the surgical treatment of obesity, all patients showed an interest in being included in a customized treatment program dedicated to obese patients. It is worth mentioning the role the information given to patients by a trained person has in increasing its compliance.

10. The role of bariatric surgery in the treatment of morbid obesity is undeniable. UAM can be practiced together with bariatric surgery to treat morbid obesity, but it may represent a reliable alternative when patients refuse this type of surgery. In addition, UAM is an attractive alternative for patients under 18 years and for those having the BMI of 30 -
40kg/m² who are not candidates for bariatric surgery and who do not respond to other forms of therapy, but have a surgical recommendation. It should be considered only if there is a team of Plastic Surgeons specialized in weight loss surgery.

C. ORIGINALITY OF THE THESIS

1. The theme proposed is a new for our country medical research and addresses a much debated topic in the literature, with practice current and future implications.
2. UAM presentation technique, the newest surgical technique in the therapeutic arsenal of obesity, commonly practiced technique in the obesity treatment in fewer centers, although it has become in Europe and the U.S. one of the basic techniques in the arsenal of methods for body reshaping.
3. Demonstration of important metabolic and morphologic effects of UAM technique (maintaining body weight, anthropometric indices and serum leptin concentration to values lower than baseline values at 1 year postoperatively) if the carefully selection of patients and and the carefully postoperative controlled is done.
4. Quality of life assessment in obese patients in Romania (Duke Health Profile questionnaire), assessment that provides useful information, given the small number of such evaluations in obese patients in our country.
5. Determination awareness of romanian obese people on the surgical treatment of obesity, determine their adherence to any surgical therapy, including this new technique of treatment of obesity and determining, in the conditions of correct information, the patient preference for a particular type of surgery.

D. FUTURE PERSPECTIVES

Romanian surgeon's experience in laparoscopic treatment is one of the most important experiences in the Balkans. However there are no publications on the application of this method in Romania, although it has become one of the basic techniques in the arsenal of methods used for reshaping body and is part of the complex treatment of obesity in Europe and U.S. The lack of information in contrast to the large amount of information existing in Europe and worldwide shows that in Romania the approaches on this topic are still inchoate, largely due to the lack of information and addressability of obese patients, as the survey conducted in this research also emphasized.

So that UAM technique could become real for the Romanian obese patients and allow their inclusion in a specific therapeutic program, several conditions should be met:

- establish specialized centers properly equipped and where there is an interdisciplinary group involved in the study and treatment of obesity;
- organize training sessions for surgeons to facilitate the familiarization with the UAM technique;
- create a grant program for patients with surgery recommendations;
- organize information programs both for the population and for the family physicians (brochures, radio, TV, internet, conferences, symposia, etc.).

The public health sector in Romania is currently going through difficult times. We cannot say the same about the private medical services that are more present than ever and meet the expectations for the application of UAM in the treatment of obesity. What we wish is to have more such centers where patients with serious problems both in terms of metabolism and morbidity could be treated.
with minimal risk. In order to apply the principles of the European Patients' Rights the Romanian legislation adopted a special law, the Law no. 46/2003 on patient rights (Law no. 46/2003 on patients’ rights, published in the Official Gazette no. 51 from January 29th, 2003) which is dedicated to the patient’s right to top quality medical care. The World Congress of Scientists (Budapest, 1999) concluded: science should serve humanity, dignity and human rights. Thus, the implementation of all new methods used in treating obesity in Romania, as a member state of the European Union, it is not an illusory idea but a reality and should be a matter of national interest and a priority for the Ministry of Health.

In what concerns the active organ role of the adipose tissue, we can say that this role is proven by the involvement of adipose tissue in the endocrine processes. By acting on it we can determine central nervous, cardiovascular and metabolic effects. This why therapeutic interventions show particular attention to the adipose tissue and most certainly future research will lead to the emergence of therapies aiming mainly to influence its secretory constellation.

Moreover, we consider it a must to define in the future some features of the "liposuctioned" fat cells and identify some specific receptors in the lipoaspirated product (e.g., receptors for resistin, leptin, adiponectin) and study their influence on the metabolic effects and future evolution of the patient.

BIBLIOGRAPHY


