



# 10 years Experience with Bariatric Surgery in Treatment of Obesity and Metabolic Syndrome

**Miroslav D. Ilic**

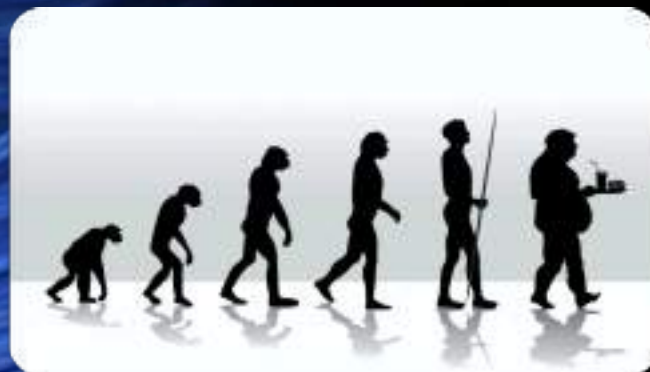
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**CODRA HOSPITAL**

***Podgorica, Montenegro, 25.04.2019.***



# „GLOBESITY”



- ✓ world-wide epidemic
- ✓ prevalence (USA) 36% adult, 17% adolescent
- ✓ 15% adult population in USA = severe obesity (BMI > 35 kg/m<sup>2</sup>)
- ✓ fifth leading risk of death world-wide (WHO)
- ✓ responsible for 80% cases with DMT2, 35% ischemic heart disease, 55% hypertensive disease

*Fried M, Yumuk V, Oppert JM, Scopinaro N, Torres AJ, Weiner R, Yashkov Y, Fruhbk G. Interdisciplinary European Guidelines on Metabolic and Bariatric Surgery. Obes Facts 2013;6:449-468 .*



# Metabolic Syndrome (MS)

A disorder of energy utilization and storage (3 of 5)

- ✓ central obesity (CO)
- ✓ elevated blood pressure (BP)
- ✓ elevated fasting plasma glucose (FPG)
- ✓ high serum triglycerides (TG)
- ✓ low high-density cholesterol (HDL) levels

Other signs

impaired fasting glucose, insulin resistance ("prediabetes")

**Associated conditions**

**hyperuricemia**

**fatty liver progressing to NAFLD**

**polycystic ovarian syndrome (in women)**

**erectile dysfunction (in men)**

**acanthosis nigricans**





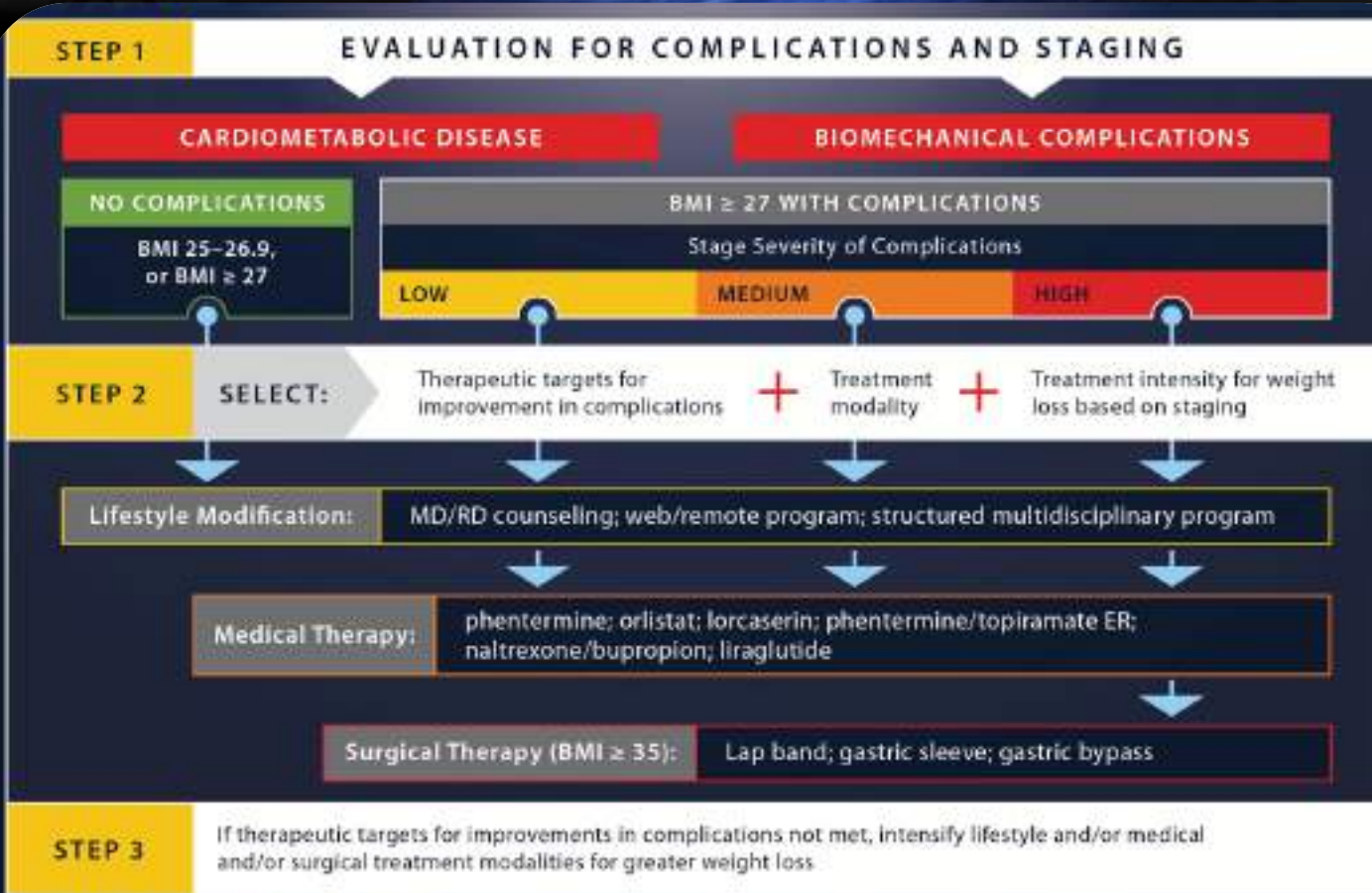


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# Classification of Obesity

## WHO Classification

### BMI

### Classification

- ▶ < 18.5 Underweight
- ▶ 18.5-24.9 Normal weight
- ▶ 25-29.9 Overweight
- ▶ 30-34.9 Obesity Class I
- ▶ 35-39.9 Obesity Class II
- ▶ 40-49.9 Obesity Class III
- ▶ 50 and above Super Obesity

## Edmonton Obesity Staging System (EOSS)



Sharma AM & Kushner RF. Int J Obes 2008

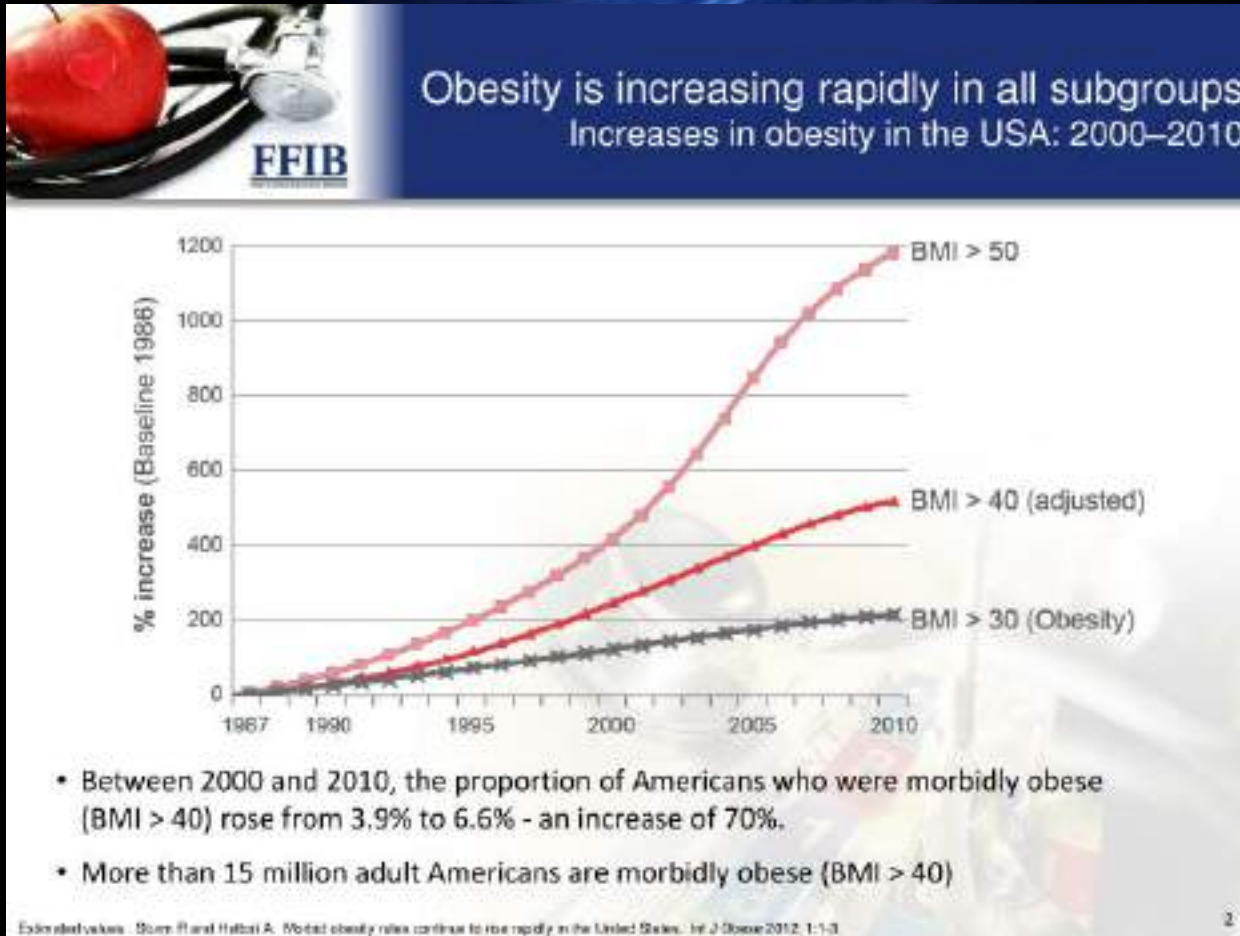
	BMI
Underweight	<18.5 kg/m <sup>2</sup>
Normal or acceptable weight	18.5-24.9 kg/m <sup>2</sup>
Overweight	25-29.9 kg/m <sup>2</sup>
Obese	≥30 kg/m <sup>2</sup>
Grade 1	30-34.9 kg/m <sup>2</sup>
Grade 2	35.0-39.9 kg/m <sup>2</sup>
Grade 3	≥40 kg/m <sup>2</sup> (severe, extreme or morbid obesity)
Grade 4	≥50 kg/m <sup>2</sup>
Grade 5	≥60 kg/m <sup>2</sup>
Abdominal obesity in Caucasians	Waist girth
Men	≥94 cm
Women	≥80 cm

Table 1 The Modified King's Obesity Staging systems. CPAP: continuous positive airway pressure; PCOS: polycystic ovarian syndrome; QoL: Quality of life

	Stage 0 Normal health	Stage 1 At risk of disease	Stage 2 Established disease	Stage 3 Advanced disease
Airways	Normal	Snoring	CPAP therapy	Cor pulmonale
BMI	<25 kg/m <sup>2</sup>	25-30 kg/m <sup>2</sup>	30-40 kg/m <sup>2</sup>	> 40 kg/m <sup>2</sup>
Cardiovascular	<10% risk	10-20% risk	Heart disease	Heart failure
Diabetes	Normal	Impaired fasting glucose	Type 2 diabetes	Uncontrolled type 2 diabetes
Economic	Normal	Increased expense for clothes and travel	Workplace discrimination	Unemployment due to obesity
Functional	Can walk three flights of stairs	Can walk one or two flights of stairs	Requires mobility aid	Housebound
Gonadal	Normal	PCOS or anovulatory dysfunction	Subfertility	Severe sexual dysfunction
Health Status (perceived)	Normal	Low mood or QoL	Depression of poor QoL	Severe depression
Inegotbody	Normal	Didkoo body	Body image dysphoria	Eating disorder



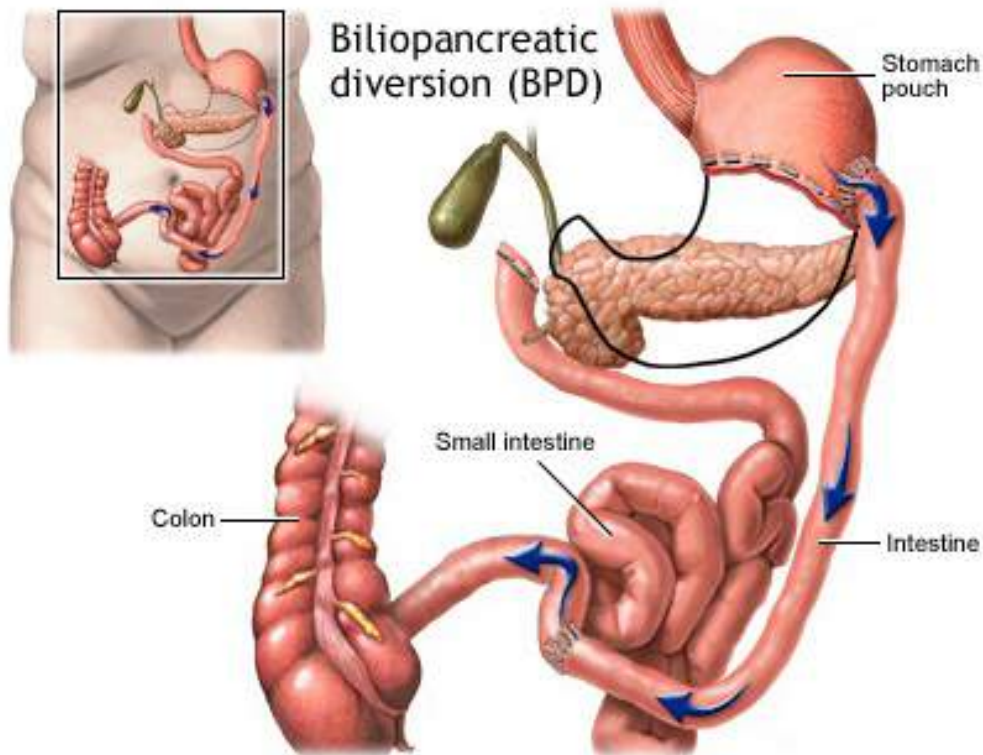
# Increasing trend of super obese patients







# Milestone of Metabolic Surgery



Scopinaro  
(1986)



# **Resolution of Metabolic Disorders →**

## **1990 - 2003 Metabolic Surgery**

22 094 patients

Mean % EWL = 61,2

	Completely resolved	Improved
Diabetes (DMT2)	76,8%	86%
Hyperlipidemia		70%
Hypertension	61,7%	78,5%
Obstructive sleep apnea	85,7%	83,6%

*Buchwald H, Avidor Y, Braunwald E et al. Bariatric Surgery: A Systematic Review and Meta-analysis. JAMA. 2004; 292 (14): 1724-1737.*





***Sleeve gastrectomy*** is a surgical **METABOLIC** procedure in which the stomach is reduced to about 20-25% of its original size, by surgical removal along the greater curvature.

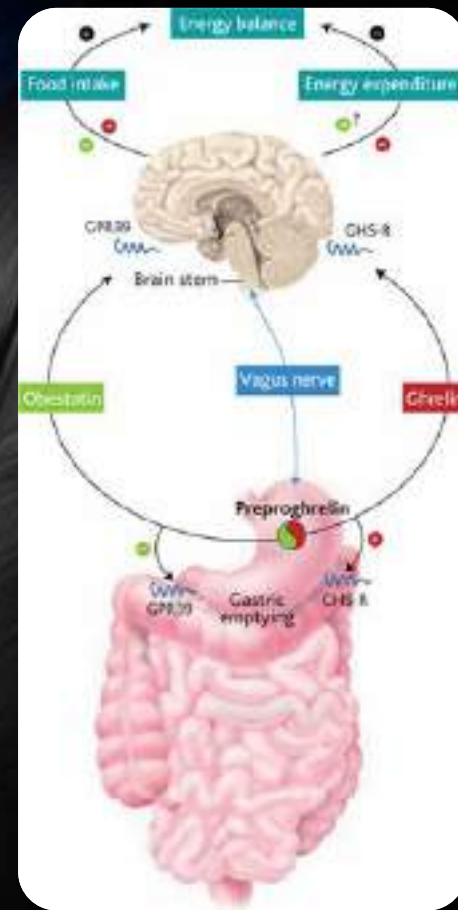
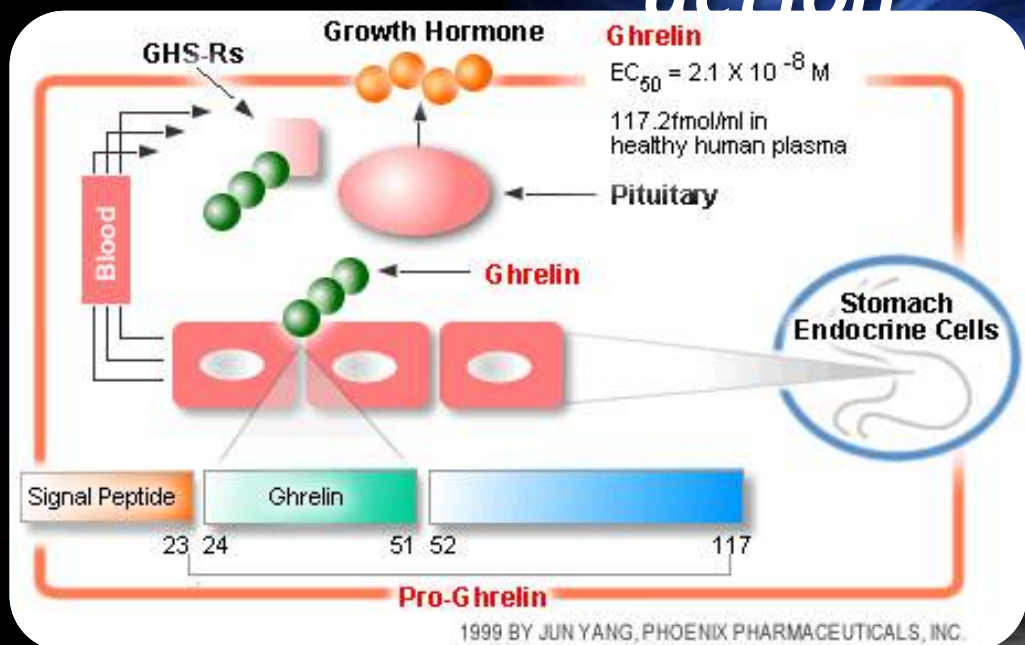
The result is a "sleeve" or tube like structure.

The procedure permanently reduces the size of the stomach, although there could be some dilatation of the stomach later on in life.





# LGS - Mechanism of action



Reduced ghrelin (growth hormone releasing hormone) - „hormone of hunger”.

**Significantly reduced in LGS vs gastric banding.**

Langer FB, Reza Hoda MA, Bohdjalian A, Felberbauer FX, Zacherl J, Wenzl E, Schindler K, Luger A, Ludvik B, Prager G. Sleeve gastrectomy and gastric banding: effects on plasma ghrelin levels. *Obes Surg.* 2005 Aug; 15 (7): 1024-9.



## **Indications (1)**

**In super-super-obese patients (BMI > 60 kg/m), as a bridge or *first stage* of a two-staged definitive procedure (RYGB or BPD-DS).**

**In super-obese (BMI > 50 kg/m) patients, as a *definitive procedure* or as a *first stage* of RYGB or BPD-DS.**

**In patients with BMI > 40 kg/m with *severe medical disease* (cirrhosis, pulmonary hypertension, cardiac failure).**

**In patients with low BMI (35-40 kg/m) with or without a major co-morbidity, as a better alternative than LAGB.**

***The morbidly obese adolescent and elderly.***





## ***Indications (2)***

***An alternative in pts. with inflammatory bowel disease, severe small bowel adhesions or those patients who underwent previous colectomy.***

***In patients who require periodic gastric surveillance (e.g., Helicobacter pylori infection, gastritis, ulcers, neoplasm, and intestinal metaplasia) because the stomach remains accessible via upper endoscopy.***

***In patients with anemia, those requiring anti - inflammatory medications, those who use high doses of steroids (e.g. in severe asthma or organ transplant candidates or recipients), and those who use cardiac or transplant medication.***

***As a measure to allow other procedures to be performed (e.g. joint replacement)***

***As a revisional surgery, complications, inadequate weight loss or poor quality of life after LAGB, RYGB.***



# Technique

 **Journal of Investigative Surgery**

ISSN 0894-1998 (Print) 1521-0553 (Online) Journal homepage: <http://www.sagepub.com/journalsPermissions.nav>

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## Surgical Technique: Laparoscopic Gastric Sleeve Resection in Super-Obese Patients

M. Ilic PhD & S.S. Putnik MD

To cite this article: M. Ilic PhD & S.S. Putnik MD (2017): Surgical Technique: Laparoscopic Gastric Sleeve Resection in Super-Obese Patients, *Journal of Investigative Surgery*, DOI: [10.1080/08941999.2017.1289284](https://doi.org/10.1080/08941999.2017.1289284)

To link to this article: <http://dx.doi.org/10.1080/08941999.2017.1289284>

 Published online: 07 Apr 2017

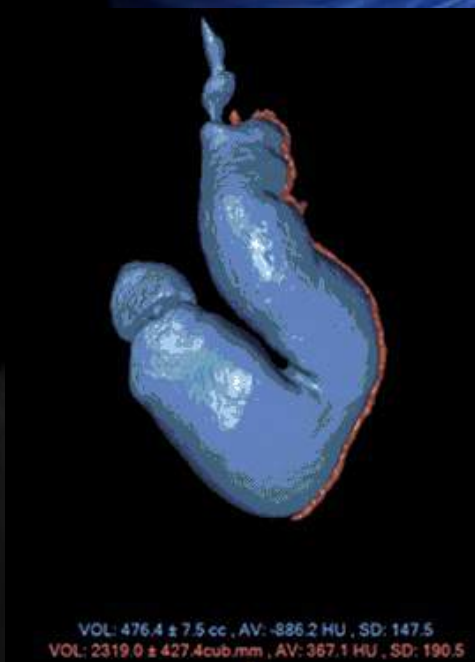




# Mechanisms of action

## Antral resection

3 cm?



8 cm?

Gastric emptying is faster in patients with antrum resection.

Significant improvements in the hyperinsulinaemia in the pts. of the 3 cm group (only DMT2).

Vives M, Molina A, Danús M. Analysis of Gastric Physiology After Laparoscopic Sleeve Gastrectomy (LSG) With or Without Antral Preservation in Relation to Metabolic Response: a Randomised Study. *Obes Surg.* 2017 May 7. doi: 10.1007/s11695-017-2700-z

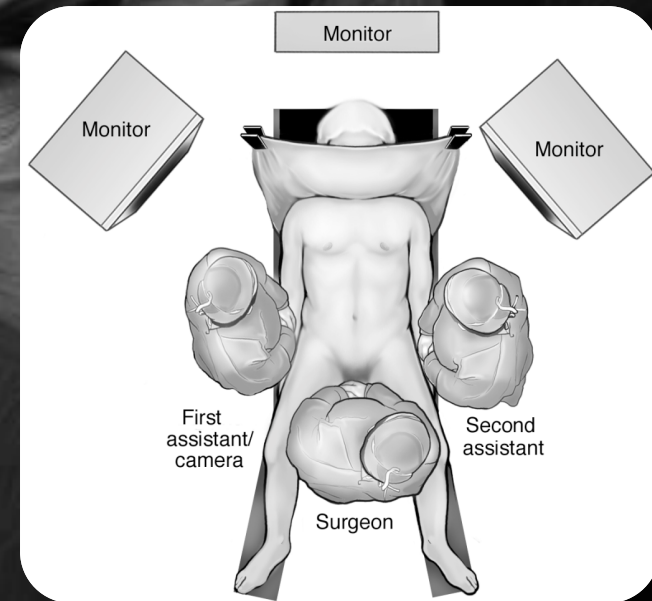




# Results

**Institut (Sremska Kamenica) + CODRA Hospital, Podgorica**

- 2009 - 2019
- 750 LGS, 6 MGB, 12 LAGB
- Overall mean BMI = 51,1 kg/m<sup>2</sup>





## **Complications (1,87%)**

- „Neofundus” 1 pt.
- Deep v. thrombosis 1 pt.
- Acute cholecystitis 1 pt.
- Hernia trocar site 1 pt.
- Infection ts 1 pt.
- Pneumonia 1 pt.
- Thromboembolia pulm. 1 pt.
- Thrombosis a. popliteae 1 pt.
- Postoperative bleeding 4 pts.
- Pancreatic fistula 1 pt.
- Enteral fistula 1 pt.





# Complications

*2 pt. (0,26%) - early leakage solved with T tube, jejunostomy and drainage (open procedure)*







# Long-term outcomes (11+ years)

Isolated LSG provides a long-term %EBMIL od 62,5%.

Conversion to another construction, required in 25% of the cases.

Patient satisfaction score remains good despite unfavorable GERD outcomes.

Arman GA, Himpens J, Dhaenens J. Long-term (11+years) outcomes in weight, patient satisfaction, comorbidities, and gastroesophageal reflux treatment after laparoscopic sleeve gastrectomy. *Surg Obes Relat Dis* 2016;12(10):1770-1781. doi:10.1016/j.soard.2016.04.012. Epub 2016 Jul 12.



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ISSN Online: 2486-0095

Paper Accepted

Case Report / Priznanje izvornosti

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Long-term results of laparoscopic gastric sleeve resection due to morbid obesity and metabolic syndrome

Дугорочни резултат лавароскопске ресекције желуца због озбирене гојавости и метаболичких поремећаја

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Received: April 28, 2017  
Revised: June 5, 2017  
Accepted: June 6, 2017  
Online First: June 13, 2017  
DOI: <https://doi.org/10.24865/ASMD1704251271>

Table 1. Clinical and laboratory characteristics of patient's metabolic syndrome

	Preoperative	11 years after operation
Weight (kg)	214	180
Waist circumference (cm)	186	106
Systolic blood pressure (mmHg)	188	78
Fasting glucose (mmol/L)	6,7	5,7
Fasting insulin (µU/mL)	59,8	10,1
HbA1c (%)	7	5,2
Total cholesterol (mmol/L)	5,4	4,03
LDL-cholesterol (mmol/L)	3,21	2,17
HDL-cholesterol (mmol/L)	1,32	1,8
Triglyceride (mmol/L)	1,96	0,7
LDL/HDL	2,3	1,2
LDL/HDL-C	3,2	1,2
LDL-C/HDL-C	2,3	1,2

WtBMI 28 - [Fasting insulin (µU/mL) x fasting glucose (mmol/L)] 21,7





Figure 1. Before the procedure.

Figure 2. 11 years after the procedure.

including (10) and (11) suggest that the study included patients who met the criteria of metabolic syndrome prior to the procedure in 2005 as presented by Table 1. The procedure was performed on 11.10.2005 at the Clinic for Thoracic Surgery, Institute for Pulmonary Diseases of Vojvodina, Novisad, Katarina Ruzopovic. Laparoscopic gastric sleeve resection was performed using the robot, with Ethicon® Laparo-View™ 40 mm stapler device through a 36 Fr incision, immediately after the surgery the patient was given fluids and recommended a post-operative dietary regime of liquid and ground foods.



# LGS in MO - results (1)

initial BMI=70,2 kg/m<sup>2</sup>

Resolution of comorbidities: all (4/4)  
Long-term result: excellent  
No additional surgeries  
Pt satisfaction: excellent



	2 years after operation	8 years after operation
BMI (kg/m <sup>2</sup> )	28,4	34,3
%EWL	87,5	75
%TWL	59,3	51
%EBMIL	92,4	79,3



# LGS in MO - results (2)

Initial BMI = 87 kg/m<sup>2</sup>



BMI after 2 years: 62 kg/m<sup>2</sup> (bad result)  
Problem: no physical activity, sweet eater  
Planned for subsequent metabolic procedure





# LGS in MO - results (3)

initial BMI=86kg/m<sup>2</sup>



Intraoperative conversion to **OPEN GS**:  
insufficient pneumoperitoneum

BMI after 2 years: 30 kg/m<sup>2</sup> (good short  
term result)

No additional surgery

Resolution of comorbidities: all (2/2)



# LGS in MO - results (4)

Initial BMI=89 kg/m<sup>2</sup>

One month of preoperative intrahospital treatment of comorbidities and diet.

Cardiomyopathia, unregulated hypertension, arrhythmia extrasystolica.

Preoperative weight loss: 17 kg.  
He demand ANY operation.

Intraoperative conversion to OPEN GS due to insufficient pneumoperitoneum.

At the end of operation IMPOSIBLLE to suture abdominal wall. Reapproximation with metal sutures and wound packing.



Prolonged postop care. **Panniculus!**



# LGS in MO - results (4)

Initial BMI=89 kg/m<sup>2</sup>



Indication for  
panniculectomy and  
ventral hernia for a  
one year.  
Expecting further  
weight loss.

One year after SG BMI=49  
kg/m<sup>2</sup> %EWL 58,5  
Resolution of  
comorbidities: Most (4/5)  
Full social rehabilitation.

Wiley Publishing Corporation  
Intergal Research and Practice  
Volume 2013, Number 001, 000000, 00 pages  
http://dx.doi.org/10.1155/2013/000000

*Clinical Study*  
**Panniculectomy Combined with Bariatric  
Surgery by  
Laparotomy: An Analysis of 325 Cases**  
Vincenzo Cobelli, Giancarlo de Bernardinis,  
Matteo Giannini, and Marika Langella

**Synchronous  
panniculectomy  
with open SG?**





**NO  
MORTALITY**



# Conclusion

- 1. Bariatric and metabolic surgery come in the twenty century and rapidly grew after laparoscopic surgical access.*
- 2. Obesity and related metabolic syndrome is global health problem with significant impact on morbidity and mortality.*
- 3. Bariatric and metabolic surgery if performed under adequate technical conditions and surgical skills is safe surgery.*
- 4. Obesity and metabolic syndrome could be treated with excellent results.*