

Short term changes in des-acyl ghrelin following bariatric surgery

Guna Bīlande^{1, 2, 6}, **Maksims Mukāns**^{1, 3}, Igors Troickis^{1, 2}, Oļegs Kozlovskis⁴, Egons Liepiņš², Juris Žarinovs⁴, Valdis Pīrāgs^{5, 6}

¹*Aiwa Clinic, Riga, Latvia*

²*Jūrmala Hospital, Jūrmala, Latvia*

³*Riga Stradiņš University, Statistics Unit, Riga, Latvia*

⁴*Sigulda Hospital, Sigulda, Latvia*

⁵*Pauls Stradiņš Clinical University Hospital, Department of Endocrinology, Riga, Latvia*

⁶*University of Latvia, Faculty of Medicine, Riga, Latvia*

Email: guna.bilande@gmail.com



CONFLICT OF INTEREST DISCLOSURE

I have no potential conflict of interest to report



BACKGROUND

Bariatric surgery is the only permanent, long-term treatment for multiple metabolic diseases, including type 2 diabetes, fatty liver disease, and sleep apnea and other chronic diseases. (1,2)

The mechanisms underlying beneficial outcomes of bariatric surgery in humans are still being uncovered (3,4,5,6), but it clearly goes beyond caloric restriction and malabsorption.

One aspect of the weight regulatory system that is affected after bariatric surgery is the secretion of des-acyl ghrelin (DAG), (4,7) also known as unacylated ghrelin, for a long time was considered to be a by-product of acylated (or acyl) ghrelin.

Emerging evidence has shown that DAG has independent biological activity, which may antagonize the orexigenic effects of acyl ghrelin in some instances, even though receptors and mechanisms remain undefined.(8)



METHODS

- **Multicentre prospective cohort study**
- **Run in 3 hospitals in Latvia**
- **Fasting blood samples for assaying unacylated ghrelin were collected:**
 - **one day prior to bariatric surgery**
 - **two days after bariatric surgery**
 - **three months after bariatric surgery**
- **Anthropometric examination was performed at the same time**

RESULTS

- A total of 62 patients were included in the study
- 64.5% (n = 40) underwent Roux-en-Y-gastric bypass (RYGB)
- 35.5% (n = 22) underwent sleeve gastrectomy (SG)
- 67.7% of all patients were females
- Median body weight was 129 kg (IQR 106-150kg)
- Median BMI 45.1 kg/m².

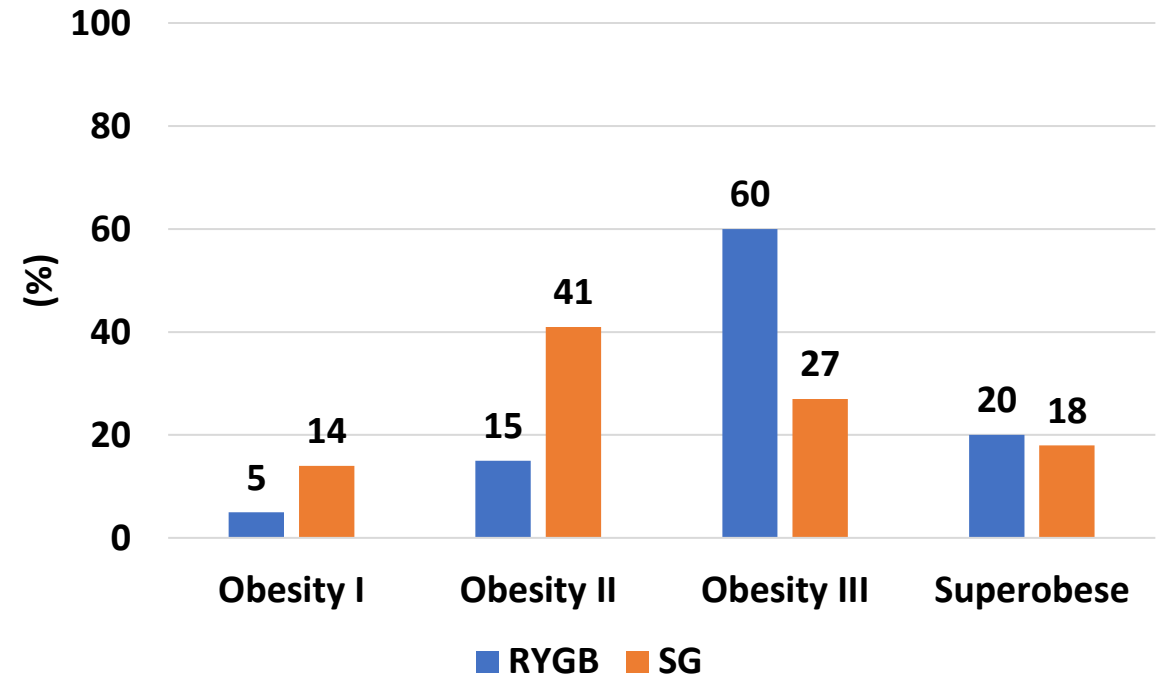


Fig.1. Type of surgery and obesity grade prior to bariatric surgery

MEDIAN BMI CHANGES

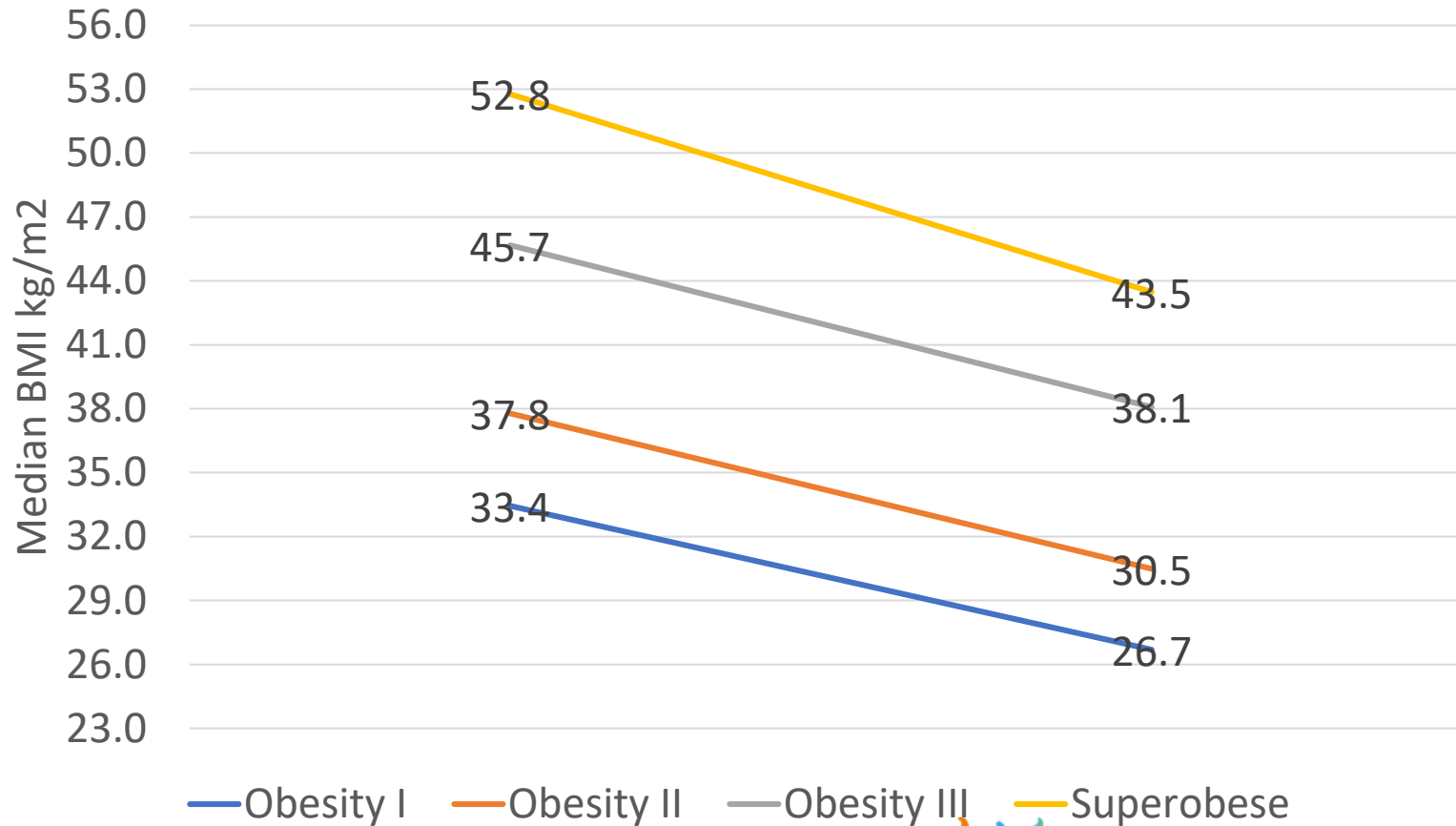


Fig.2. 3-month post-surgery BMI changes for all patients

Median excess weight loss (EWL) for all patients three months after surgery was 40% (IQR 32-54%).

DES-ACYL GHRELIN CHANGES

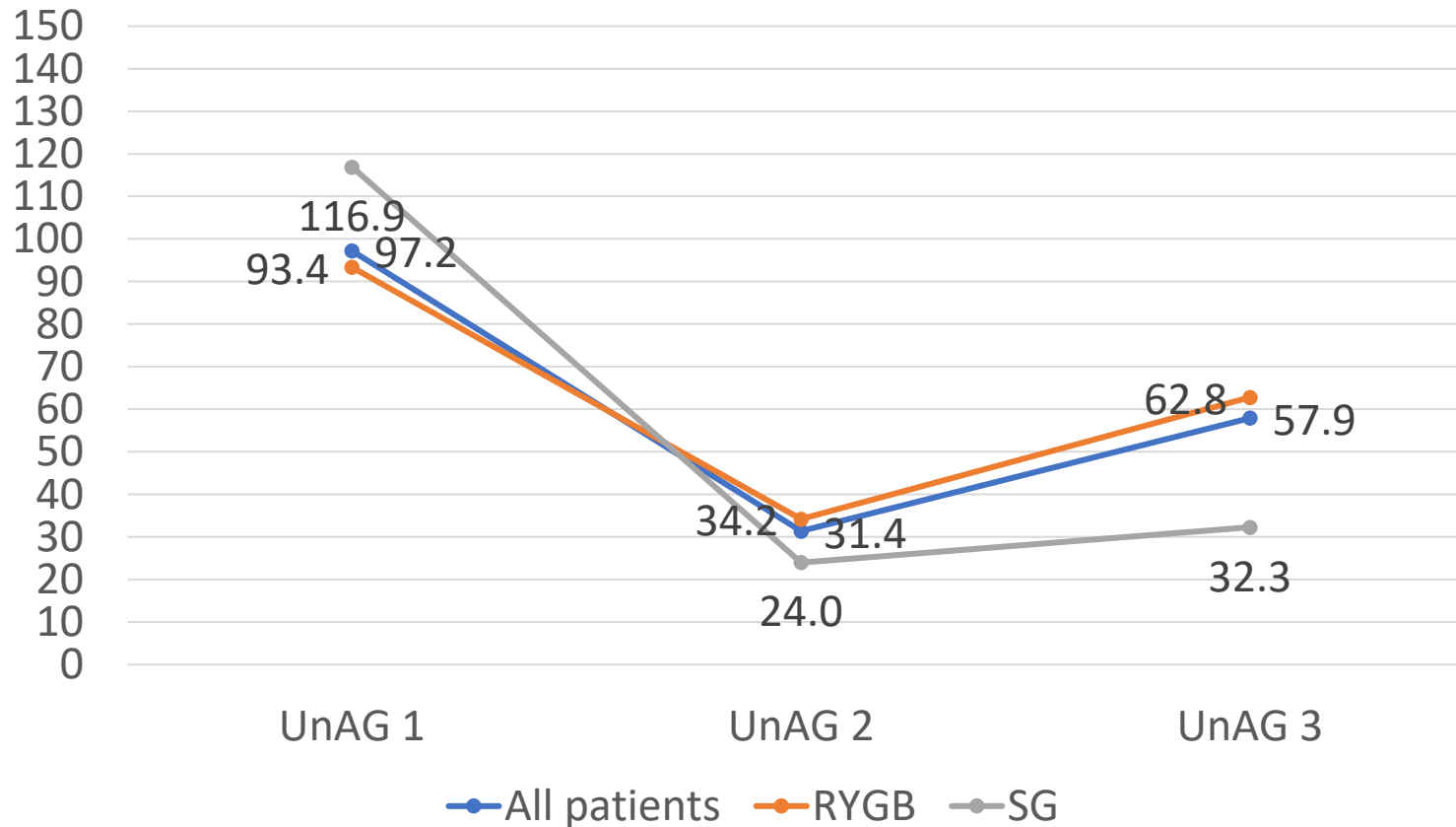


Fig.2. DAG changes after SG and RYGB at each sampling

Initial sharp drop in DAG 2 days after the bariatric surgery with gradual increase throughout the 3 month follow-up period

DAG levels were higher in the blood serum of RYGB surgery patients compared to those who underwent SG

CONCLUSIONS

- **The current study demonstrates that bariatric surgery modifies circulating DAG profile with sharp drop within 2 days after the surgery and slight increase within 3-month period after RYGB and SG.**
- **There was a strong negative correlation between the first DAG samples and BMI 3 months after the bariatric surgery. Specifically, the higher the DAG level in the first sample, the lower the patient's BMI was after 3 months.**
- **DAG is a strong potential candidate to become as a marker of metabolism improvement after bariatric surgery.**

REFERENCES

- 1 - Wolfe BM, Kvach E, Eckel RH. Treatment of Obesity: Weight Loss and Bariatric Surgery. *Circ Res* [Internet]. 2016;118(11):1844–55. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/27230645><http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=PMC4888907>
- 2 - Nguyen NT, Varela JE. Bariatric surgery for obesity and metabolic disorders: State of the art. *Nat Rev Gastroenterol Hepatol* [Internet]. 2017;14(3):160–9. Available from: <http://dx.doi.org/10.1038/nrgastro.2016.170>
- 3 - Münzberg H, Laque A, Yu S, Rezai-Zadeh K, Berthoud HR. Appetite and body weight regulation after bariatric surgery. *Obes Rev*. 2015;16(S1):77–90.
- 4 - Dardzińska JA, Kaska L, Proczko-Stepaniak M, Szymańska-Gnacińska M, Aleksandrowicz-Wrona E, Małgorzewicz S. Fasting and postprandial acyl and desacyl ghrelin and the acyl/desacyl ratio in obese patients before and after different types of bariatric surgery. *Wideochirurgia I Inne Tech Maloinwazyjne*. 2018;13(3):366–75.
- 5 - Ionut V, Burch M, Youdim A, Bergman RN. Gastrointestinal hormones and bariatric surgery-induced weight loss. *Obesity*. 2013;21(6):1093–103.
- 6 - Dimitriadis GK, Randeve MS, Miras AD. Potential Hormone Mechanisms of Bariatric Surgery. *Curr Obes Rep*. 2017;6(3):253–65.
- 7 - Benso A, Casanueva FF, Ghigo E GA. Des-Acyl Ghrelin: A Metabolically Active Peptide. *Ghrelin Syst Endocr Dev Basel, Karger* [Internet]. 2013;25:112–21. Available from: <https://www.karger.com/Article/Abstract/346059#>
- 8 - Wang Y, Wu Q, Zhou Q, Chen Y, Lei X, Chen Y, et al. Circulating acyl and des-acyl ghrelin levels in obese adults: a systematic review and meta-analysis. *Sci Rep* [Internet]. 2022;12(1):1–17. Available from: <https://doi.org/10.1038/s41598-022-06636-3>



Thank you!
Any questions?

