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ЕЖЕМЕСЯЧНЫЙ НАУЧНЫЙ ЖУРНАЛ

Медицинские новости Грузии
საქართველოს სამედიცინო სიახლენი

GEORGIAN MEDICAL NEWS

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GMN: Georgian Medical News is peer-reviewed, published monthly journal committed to promoting the science and art of medicine and the betterment of public health, published by the GMN Editorial Board since 1994. GMN carries original scientific articles on medicine, biology and pharmacy, which are of experimental, theoretical and practical character; publishes original research, reviews, commentaries, editorials, essays, medical news, and correspondence in English and Russian.

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GMN: Медицинские новости Грузии - ежемесячный рецензируемый научный журнал, издаётся Редакционной коллегией с 1994 года на русском и английском языках в целях поддержки медицинской науки и улучшения здравоохранения. В журнале публикуются оригинальные научные статьи в области медицины, биологии и фармации, статьи обзорного характера, научные сообщения, новости медицины и здравоохранения. Журнал индексируется в MEDLINE, отражён в базе данных SCOPUS, PubMed и ВИНТИ РАН. Полнотекстовые статьи журнала доступны через БД EBSCO.

GMN: Georgian Medical News – საქართველოს სამედიცინო სიახლენი – არის ყოველთვიური სამეცნიერო სამედიცინო რეცენზირებადი ჟურნალი, გამოიცემა 1994 წლიდან, წარმოადგენს სარედაქციო კოლეგიისა და აშშ-ის მეცნიერების, განათლების, ინდუსტრიის, ხელოვნებისა და ბუნებისმეტყველების საერთაშორისო აკადემიის ერთობლივ გამოცემას. GMN-ში რუსულ და ინგლისურ ენებზე ქვეყნდება ექსპერიმენტული, თეორიული და პრაქტიკული ხასიათის ორიგინალური სამეცნიერო სტატიები მედიცინის, ბიოლოგიისა და ფარმაციის სფეროში, მიმოხილვითი ხასიათის სტატიები.

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WEBSITE

www.geomednews.com

К СВЕДЕНИЮ АВТОРОВ!

При направлении статьи в редакцию необходимо соблюдать следующие правила:

1. Статья должна быть представлена в двух экземплярах, на русском или английском языках, напечатанная через **полтора интервала на одной стороне стандартного листа с шириной левого поля в три сантиметра**. Используемый компьютерный шрифт для текста на русском и английском языках - **Times New Roman (Кириллица)**, для текста на грузинском языке следует использовать **AcadNusx**. Размер шрифта - **12**. К рукописи, напечатанной на компьютере, должен быть приложен CD со статьей.

2. Размер статьи должен быть не менее десяти и не более двадцати страниц машинописи, включая указатель литературы и резюме на английском, русском и грузинском языках.

3. В статье должны быть освещены актуальность данного материала, методы и результаты исследования и их обсуждение.

При представлении в печать научных экспериментальных работ авторы должны указывать вид и количество экспериментальных животных, применявшиеся методы обезболивания и усыпления (в ходе острых опытов).

4. К статье должны быть приложены краткое (на полстраницы) резюме на английском, русском и грузинском языках (включающее следующие разделы: цель исследования, материал и методы, результаты и заключение) и список ключевых слов (key words).

5. Таблицы необходимо представлять в печатной форме. Фотокопии не принимаются. **Все цифровые, итоговые и процентные данные в таблицах должны соответствовать таковым в тексте статьи**. Таблицы и графики должны быть озаглавлены.

6. Фотографии должны быть контрастными, фотокопии с рентгенограмм - в позитивном изображении. Рисунки, чертежи и диаграммы следует озаглавить, пронумеровать и вставить в соответствующее место текста **в tiff формате**.

В подписях к микрофотографиям следует указывать степень увеличения через окуляр или объектив и метод окраски или импрегнации срезов.

7. Фамилии отечественных авторов приводятся в оригинальной транскрипции.

8. При оформлении и направлении статей в журнал МНГ просим авторов соблюдать правила, изложенные в «Единых требованиях к рукописям, представляемым в биомедицинские журналы», принятых Международным комитетом редакторов медицинских журналов - <http://www.spinesurgery.ru/files/publish.pdf> и http://www.nlm.nih.gov/bsd/uniform_requirements.html В конце каждой оригинальной статьи приводится библиографический список. В список литературы включаются все материалы, на которые имеются ссылки в тексте. Список составляется в алфавитном порядке и нумеруется. Литературный источник приводится на языке оригинала. В списке литературы сначала приводятся работы, написанные знаками грузинского алфавита, затем кириллицей и латиницей. Ссылки на цитируемые работы в тексте статьи даются в квадратных скобках в виде номера, соответствующего номеру данной работы в списке литературы. Большинство цитированных источников должны быть за последние 5-7 лет.

9. Для получения права на публикацию статья должна иметь от руководителя работы или учреждения визу и сопроводительное отношение, написанные или напечатанные на бланке и заверенные подписью и печатью.

10. В конце статьи должны быть подписи всех авторов, полностью приведены их фамилии, имена и отчества, указаны служебный и домашний номера телефонов и адреса или иные координаты. Количество авторов (соавторов) не должно превышать пяти человек.

11. Редакция оставляет за собой право сокращать и исправлять статьи. Корректур авторам не высылаются, вся работа и сверка проводится по авторскому оригиналу.

12. Недопустимо направление в редакцию работ, представленных к печати в иных издательствах или опубликованных в других изданиях.

При нарушении указанных правил статьи не рассматриваются.

REQUIREMENTS

Please note, materials submitted to the Editorial Office Staff are supposed to meet the following requirements:

1. Articles must be provided with a double copy, in English or Russian languages and typed or computer-printed on a single side of standard typing paper, with the left margin of 3 centimeters width, and 1.5 spacing between the lines, typeface - **Times New Roman (Cyrillic)**, print size - 12 (referring to Georgian and Russian materials). With computer-printed texts please enclose a CD carrying the same file titled with Latin symbols.

2. Size of the article, including index and resume in English, Russian and Georgian languages must be at least 10 pages and not exceed the limit of 20 pages of typed or computer-printed text.

3. Submitted material must include a coverage of a topical subject, research methods, results, and review.

Authors of the scientific-research works must indicate the number of experimental biological species drawn in, list the employed methods of anesthetization and soporific means used during acute tests.

4. Articles must have a short (half page) abstract in English, Russian and Georgian (including the following sections: aim of study, material and methods, results and conclusions) and a list of key words.

5. Tables must be presented in an original typed or computer-printed form, instead of a photocopied version. **Numbers, totals, percentile data on the tables must coincide with those in the texts of the articles.** Tables and graphs must be headed.

6. Photographs are required to be contrasted and must be submitted with doubles. Please number each photograph with a pencil on its back, indicate author's name, title of the article (short version), and mark out its top and bottom parts. Drawings must be accurate, drafts and diagrams drawn in Indian ink (or black ink). Photocopies of the X-ray photographs must be presented in a positive image in **tiff format**.

Accurately numbered subtitles for each illustration must be listed on a separate sheet of paper. In the subtitles for the microphotographs please indicate the ocular and objective lens magnification power, method of coloring or impregnation of the microscopic sections (preparations).

7. Please indicate last names, first and middle initials of the native authors, present names and initials of the foreign authors in the transcription of the original language, enclose in parenthesis corresponding number under which the author is listed in the reference materials.

8. Please follow guidance offered to authors by The International Committee of Medical Journal Editors guidance in its Uniform Requirements for Manuscripts Submitted to Biomedical Journals publication available online at: http://www.nlm.nih.gov/bsd/uniform_requirements.html
http://www.icmje.org/urm_full.pdf

In GMN style for each work cited in the text, a bibliographic reference is given, and this is located at the end of the article under the title "References". All references cited in the text must be listed. The list of references should be arranged alphabetically and then numbered. References are numbered in the text [numbers in square brackets] and in the reference list and numbers are repeated throughout the text as needed. The bibliographic description is given in the language of publication (citations in Georgian script are followed by Cyrillic and Latin).

9. To obtain the rights of publication articles must be accompanied by a visa from the project instructor or the establishment, where the work has been performed, and a reference letter, both written or typed on a special signed form, certified by a stamp or a seal.

10. Articles must be signed by all of the authors at the end, and they must be provided with a list of full names, office and home phone numbers and addresses or other non-office locations where the authors could be reached. The number of the authors (co-authors) must not exceed the limit of 5 people.

11. Editorial Staff reserves the rights to cut down in size and correct the articles. Proof-sheets are not sent out to the authors. The entire editorial and collation work is performed according to the author's original text.

12. Sending in the works that have already been assigned to the press by other Editorial Staffs or have been printed by other publishers is not permissible.

**Articles that Fail to Meet the Aforementioned
Requirements are not Assigned to be Reviewed.**

ავტორთა საქურაღებოლ!

რედაქციაში სტატიის წარმოდგენისას საჭიროა დაიცვათ შემდეგი წესები:

1. სტატია უნდა წარმოადგინოთ 2 ცალად, რუსულ ან ინგლისურ ენებზე დაბეჭდილი სტანდარტული ფურცლის 1 გვერდზე, 3 სმ სიგანის მარცხენა ველისა და სტრიქონებს შორის 1,5 ინტერვალის დაცვით. გამოყენებული კომპიუტერული შრიფტი რუსულ და ინგლისურენოვან ტექსტებში - **Times New Roman (Кириллица)**, ხოლო ქართულენოვან ტექსტში საჭიროა გამოვიყენოთ **AcadNusx**. შრიფტის ზომა – 12. სტატიას თან უნდა ახლდეს CD სტატიით.

2. სტატიის მოცულობა არ უნდა შეადგენდეს 10 გვერდზე ნაკლებს და 20 გვერდზე მეტს ლიტერატურის სიის და რეზიუმეების (ინგლისურ, რუსულ და ქართულ ენებზე) ჩათვლით.

3. სტატიაში საჭიროა გაშუქდეს: საკითხის აქტუალობა; კვლევის მიზანი; საკვლევი მასალა და გამოყენებული მეთოდები; მიღებული შედეგები და მათი განსჯა. ექსპერიმენტული ხასიათის სტატიების წარმოდგენისას ავტორებმა უნდა მიუთითონ საექსპერიმენტო ცხოველების სახეობა და რაოდენობა; გაუტკივარებისა და დაძინების მეთოდები (მწვავე ცდების პირობებში).

4. სტატიას თან უნდა ახლდეს რეზიუმე ინგლისურ, რუსულ და ქართულ ენებზე არანაკლებ ნახევარი გვერდის მოცულობისა (სათაურის, ავტორების, დაწესებულების მითითებით და უნდა შეიცავდეს შემდეგ განყოფილებებს: მიზანი, მასალა და მეთოდები, შედეგები და დასკვნები; ტექსტუალური ნაწილი არ უნდა იყოს 15 სტრიქონზე ნაკლები) და საკვანძო სიტყვების ჩამონათვალი (key words).

5. ცხრილები საჭიროა წარმოადგინოთ ნაბეჭდი სახით. ყველა ციფრული, შემაჯამებელი და პროცენტული მონაცემები უნდა შეესაბამებოდეს ტექსტში მოყვანილს.

6. ფოტოსურათები უნდა იყოს კონტრასტული; სურათები, ნახაზები, დიაგრამები - დასათაურებული, დანომრილი და სათანადო ადგილას ჩასმული. რენტგენოგრამების ფოტოასლები წარმოადგინეთ პოზიტიური გამოსახულებით **tiff** ფორმატში. მიკროფოტოსურათების წარწერებში საჭიროა მიუთითოთ ოკულარის ან ობიექტივის საშუალებით გადიდების ხარისხი, ანათალების შედეგის ან იმპრეგნაციის მეთოდი და აღნიშნოთ სურათის ზედა და ქვედა ნაწილები.

7. სამამულო ავტორების გვარები სტატიაში აღინიშნება ინიციალების თანდართვით, უცხოურისა – უცხოური ტრანსკრიპციით.

8. სტატიას თან უნდა ახლდეს ავტორის მიერ გამოყენებული სამამულო და უცხოური შრომების ბიბლიოგრაფიული სია (ბოლო 5-8 წლის სიღრმით). ანბანური წყობით წარმოდგენილ ბიბლიოგრაფიულ სიაში მიუთითეთ ჯერ სამამულო, შემდეგ უცხოელი ავტორები (გვარი, ინიციალები, სტატიის სათაური, ჟურნალის დასახელება, გამოცემის ადგილი, წელი, ჟურნალის №, პირველი და ბოლო გვერდები). მონოგრაფიის შემთხვევაში მიუთითეთ გამოცემის წელი, ადგილი და გვერდების საერთო რაოდენობა. ტექსტში კვადრატულ ფხიხლებში უნდა მიუთითოთ ავტორის შესაბამისი N ლიტერატურის სიის მიხედვით. მიზანშეწონილია, რომ ციტირებული წყაროების უმეტესი ნაწილი იყოს 5-6 წლის სიღრმის.

9. სტატიას თან უნდა ახლდეს: ა) დაწესებულების ან სამეცნიერო ხელმძღვანელის წარდგინება, დამოწმებული ხელმოწერითა და ბეჭდით; ბ) დარგის სპეციალისტის დამოწმებული რეცენზია, რომელშიც მითითებული იქნება საკითხის აქტუალობა, მასალის საკმაობა, მეთოდის სანდოობა, შედეგების სამეცნიერო-პრაქტიკული მნიშვნელობა.

10. სტატიის ბოლოს საჭიროა ყველა ავტორის ხელმოწერა, რომელთა რაოდენობა არ უნდა აღემატებოდეს 5-ს.

11. რედაქცია იტოვებს უფლებას შეასწოროს სტატია. ტექსტზე მუშაობა და შეჯერება ხდება საავტორო ორიგინალის მიხედვით.

12. დაუშვებელია რედაქციაში ისეთი სტატიის წარდგენა, რომელიც დასაბეჭდად წარდგენილი იყო სხვა რედაქციაში ან გამოქვეყნებული იყო სხვა გამოცემებში.

აღნიშნული წესების დარღვევის შემთხვევაში სტატიები არ განიხილება.

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EVALUATION OF SOME LABORATORY PARAMETERS IN PATIENTS WITH MORBID OBESITY AFTER BARIATRIC SURGERY

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Abstract.

Goal: Obesity is a global challenge of the 21st century, both in terms of morbidity and mortality worldwide. In this article, we studied the effect of surgical treatment on glycemic indicators within morbid obesity patients, therefore assessing the glucose and glycosylated hemoglobin in blood serum. Also, we evaluated the hormonal background associated with Obesity - by measuring the insulin level in patients.

Material and methods: This study included 40 patients who underwent bariatric surgery in the period 2017-2021; the above laboratory parameters were assessed before and after surgery. The control group consisted of 40 patients with morbid Obesity planning bariatric surgery in the future. Thus, we investigated three groups: I - control group - 40 patients with morbid Obesity who planning bariatric surgery in the future, Group II - 40 patients with morbid Obesity immediately before bariatric surgery and group III - the same 40 patients as in the second group, but after bariatric surgery performed between 2017 and 2021.

Results: It should be noted that the glucose level is ~1.4 times higher in patients immediately before bariatric surgery (group II) compared to the control group (group I) and ~1.19 times lower in the postoperative period (group III) according to compared with the control group. The insulin level is ~1.4 times higher in patients immediately before bariatric surgery (group II) compared to the control group ($p=0.0066$) and ~2.5 times lower in the postoperative period (group III) compared to the control group ($p=0.0001$). According to the results, the insulin level after surgery decreases by ~3.7 times compared to the preoperative group ($p=0.0001$). The glycated hemoglobin level in bariatric patients is lower (slightly) than in the control group (~1.01 times), which is explained by the preoperative preparation of the patient at least several months before surgery. In postoperative patients, it decreased by ~1.06 times compared to preoperative patients. **Conclusion:** Thus, today, bariatric surgery is undoubtedly a very effective method of radical treatment of morbid Obesity, which we can consider to be one of the most essential parts of the holistic model of obesity treatment.

Key words. Morbid obesity, bariatric surgery, insulin, glucose, glycosylated hemoglobin.

Introduction.

Obesity (as a chronic metabolic disease) is a global challenge of the 21st century, both in terms of morbidity and mortality worldwide [1-3]. It should be noted that Obesity affects four out of ten Americans [4]. Obesity is associated with numerous diseases, including cardiovascular disease, diabetes, neurological disease, etc. [5-7]. In particular, the prevalence of obesity and diabetes mellitus has been consistently increasing

worldwide. Moreover, Obesity significantly increases the risk of diabetes [8]. This increase is related to the widespread prevalence of constitutional-alimentary Obesity, which, in addition to a significant deterioration in social activity and quality of life, also leads to even greater physical inactivity, thus creating a vicious circle [9,10].

As a disease, Obesity is a multifactorial/complex disease caused by numerous factors [11]. Among the causative factors are the following: environmental, metabolic, genetic/epigenetic, physiologic, etc. It is suggested that the interactions among risk alleles, as the epigenetic factors, significantly affect Obesity. Moreover, the heritable factors increase Obesity's predisposition and development [12,13].

Dietary imbalance/overeating affects the increased cases of diseases [14]. The leading cause of Obesity is a significant imbalance in food intake and energy expenditure from body tissues. In the modern world, overeating is usually associated with using foods with a high glycemic index. In particular, fast food, during which the principal amount of food is delivered to the body in the evening, a few hours before sleep [15,16]. Besides mentioned, a sedentary lifestyle with minimal physical activity primarily facilitates the increase in weight and adipose tissue volume. Metabolic changes in adipocytes are controlled by central regulatory mechanisms, resulting in the emergence and fixation of new eating habits and behavioural responses [17]. Among the pathogenesis aspects of this condition are hypothalamic dysfunctions with excessive activation of the appetite centre and suppression of the activity of the satiety centre—characteristic periods of latent hypoglycemia against the background of chronic hyperinsulinemia.

It has been proven that the only effective method of treating morbid Obesity is complex treatment with a low-calorie diet, pharmacological support, and a particular physical activity regimen. Surgical treatment has a special place in the complex approach, without which, according to most authors, it is impossible to achieve the required level of energy expenditure, taking into account the energy value of food [18]. The critical outcome of Bariatric surgery is significant weight loss and notable health improvement; moreover, it cures related comorbidities, including numerous diseases (CVD, diabetes, respiratory disease, etc.). Overall, this surgical intervention decreases the mortality rate [14]. Based on the meta-analysis, it is suggested that bariatric surgery is correlated with a significant decrease in cardiovascular disease incidence and mortality [19]. Therefore, studying the aspects related to the development/progression/treatment of morbid Obesity is significant for adequately managing the disease. In this article, we aimed to investigate some laboratory Parameters within Patients with Morbid Obesity after Bariatric Surgery. In particular, we

studied the effect of surgical treatment on glycemic indicators of morbidly obese patients, therefore assessing the glucose and glycosylated hemoglobin in blood serum. Also, we evaluated the hormonal background associated with Obesity - by measuring the insulin level in patients.

Materials and Methods.

We have studied the effect of surgical treatment of morbid (extreme degree) Obesity on metabolic indicators. In particular, we investigated blood glucose, Insulin, and glycosylated hemoglobin in Patients with Morbid Obesity after Bariatric Surgery. The selection criterion of patients was morbid Obesity in the preoperative period. A fully automated DIALAB, Roche COBAS-411 analyzer and a HumaMeter A1c glycohemoglobin device were used for laboratory parameters evaluation based on laboratory "Medical World". Blood samples were examined with the mentioned devices to determine selected laboratory parameters. This study included 40 patients who underwent bariatric surgery using the same method in the past (JDSF97), during approximately the same period (2017-2021).

The above laboratory parameters were assessed both before and after surgery. The control group consisted of 40 patients with morbid Obesity planning bariatric surgery in the future. Thus, we divided the presented results into three groups: I - the control group - 40 patients with morbid Obesity planning bariatric surgery in the future, Group II - 40 patients with morbid Obesity immediately before bariatric surgery and group III - the same 40 patients as in the second group, but after bariatric surgery performed between 2017 and 2021. Inclusion criteria: 1) the patient must have had bariatric surgery before; 2) The operation have been performed laparoscopically. Exclusion criteria: 1) repeated bariatric surgery; 2) surgery performed by a method other than laparoscopic. Statistical analysis of experimental data was processed using GraphPad Prisma (Version 9.0). P-value < 0.05 was considered statistically significant.

Results.

From the laboratory indicators, the changes in the glucose, Insulin, and glycosylated hemoglobin, before and after the operation, are clearly marked. It should be noted that in the background of morbid Obesity, an insulin-resistant condition develops, which, in turn, subsequently leads to the development of non-insulin-dependent diabetes. As already well known, determining glucose in the blood is a decisive and necessary indicator for diagnosing diabetes. Also, the Insulin's levels increase parallel to glucose and in direct proportion with the progression of the disease. It is well known that the glyated hemoglobin test, which shows the sum of the glucose content in the blood for the last three months, is used to monitor the disease. Therefore, we can unequivocally say that to evaluate the main expected result of the radical treatment of Obesity, it is essential to assess the mentioned three laboratory indicators with special attention and routinely. It should be noted that despite the incomplete and poor postoperative monitoring, in 100% of the patients included in the study, there is a decrease in the plasma glucose level after the operation, which in turn significantly reduces the risk of expected complications of diabetes in the future (Figure 1).

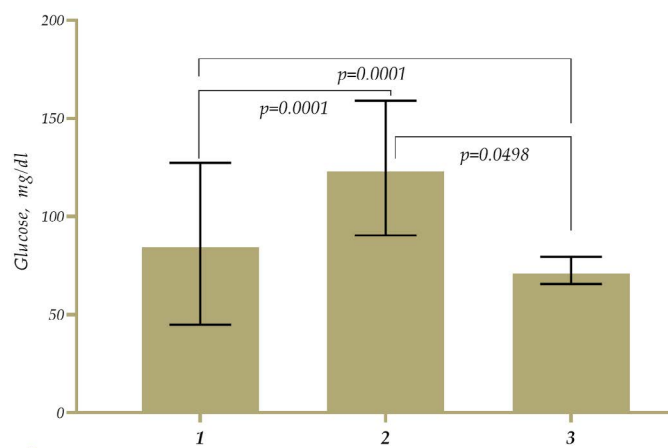


Figure 1. Study of glucose levels in morbidly obese patients. 1. Control group; 2. Before bariatric surgery 3. After bariatric surgery.

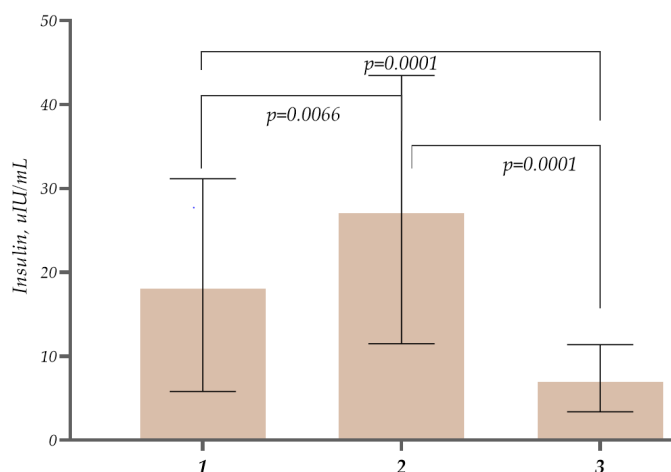


Figure 2. Study of insulin levels in morbidly obese patients. 1. Control group 2. Before bariatric surgery 3. After bariatric surgery.

It should be noted that the glucose level is ~1.4 times higher in patients immediately before bariatric surgery (group II) compared to the control group (group I) and ~1.19 times lower in the postoperative period (group III) according to compared with the control group (Figure 1).

We consider an increase in glucose levels immediately before surgery as a stressful condition in patients already in the hospital awaiting surgery. This explains the higher glucose level compared to the control group, where there were patients who were planning surgery in the future. Whereas in the postoperative period (group III) we see a decrease in glucose level compared to both group I and group II (when comparing postoperative and preoperative groups, the glucose level is reduced by ~1.7 times).

It should be noted that in 90% of cases, the insulin level in the blood is reduced after the operation. Insulin resistance is not observed in patients; the risk of developing diabetes in the future is also low. Insulin level is ~1.4 times higher in patients immediately before bariatric surgery (group II) compared to the control group (p=0.0066) and ~2.5 times lowered in the postoperative period (group III) compared to the control group (p= 0.0001). According to the results, the insulin level after surgery decreased by ~3.7 times compared to the preoperative group (p = 0.0001) (Figure 2).

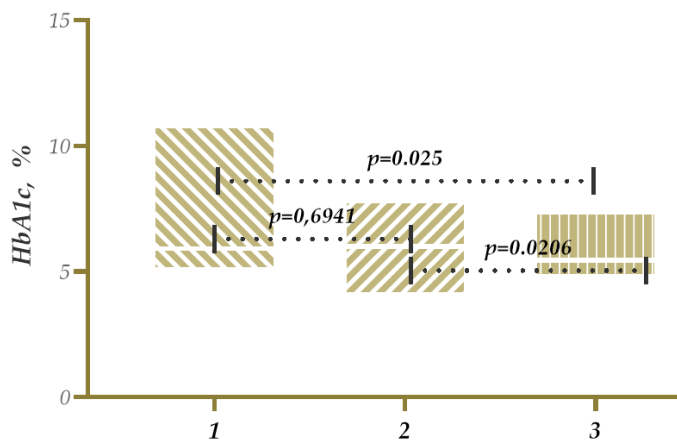


Figure 3. Study of glycated hemoglobin levels in the morbidly obese patients.

1. Control group; 2. Before bariatric surgery 3. After bariatric surgery.

Assessing the insulin level data, we would like to note that there was only a light difference between groups I and II. In contrast, in the postoperative period (group III), the insulin level was significantly reduced, both in comparison with the data in group II (the same patients immediately before surgery) and in comparison, to group I.

The level of glycated hemoglobin in bariatric patients is lower (slightly) than in the control group (~1.01 times), which is explained by the preoperative preparation of the patient at least several months before surgery. It decreased by ~1.06 times in postoperative patients compared to preoperative patients (Figure 3).

We can consider this result as one of the unconditional and essential benefits of bariatric surgery, especially in patients with non-insulin-dependent diabetes or insulin resistance.

Discussion.

It suggests that the rise in Obesity has accelerated during the last decade. Notable, prevalence is higher in females than males and increases according to age. In general, current studies must focus on Obesity's aspects investigation to prevent the global obesity pandemic [20].

The study revealed that three bariatric surgery procedures' ability to improve insulin resistance within patients with obesity class II [21]. In type 2 diabetes patients (BMI < 35 kg/m²), bariatric surgery improves diabetes remission. In Addition, same study revealed the better blood glucose control compared to nonsurgical treatment [22]. As already confirmed, continuous glucose monitoring could detect complications in glucose homeostasis (including the mechanisms of bariatric surgery, the patient's behaviours, etc.), thus improving the decision-making processes during follow-up [23]. Another study demonstrated that Bariatric surgery has a significant effect on the improvement of type 2 diabetes by decreasing blood sugar and reducing the need for medications [24].

Knowing the fact Breast Cancer (BS) is closely associated with the activation of adipocytes from brown fat tissue and has an effect on metabolism, there is a need to discover in the future some other parameters for the prediction of brown adipose tissue activity, such as microRNAs that regulate almost every process in the human body. Some of them, such as miR-92a, are involved in the regulation of thyroid gland cell differentiation

[25] associated with thyroid cancer [26] related to the disbalance of glucose homeostasis [27] and may have the potential to predict the activity of brown fat tissue, and thus the success of BS [27]. Thus, Cereijo et al. have shown that miR-92a and miR-99b measured from circulation differed among patients with morbid Obesity at baseline and after BS. They have shown that higher miR-92a levels were associated with Obesity, while its levels reduced six months after BS. Lower miR-92a levels were under better metabolic status, while higher levels with worse glucose metabolism Cereijo et al. The above-mentioned shows the significance of introducing novel biomarkers for prediction not only of the disease severity but also for the prediction of success of the therapy from the non-coding RNA world, among other standard parameters, and that answer to the prediction of individual response to therapy might lay in our genetic and/or epigenetic background. There are also miRNAs associated with Obesity, such as miR-221 [28].

Today, bariatric surgery is a radical treatment for morbid (extreme degree) obesity [29]. Moreover, it can be said that there is no alternative method [30,31]. At the same time, we must remember that, despite the great benefits, this treatment method is associated with certain risks. In particular, the successful solution achieved due to surgical intervention may regress over time. To avoid this, we believe that the patient should focus on his responsibility and maintain and improve the achieved results at the expense of consistent medical supervision (routine deductions, endocrinologist consultation) and a healthy lifestyle (correct and balanced diet, physical activity, daily calorie control). Otherwise, it will be inevitable that the volume of the stomach will increase, the low logical increases, and the manifestation of other comorbidities. However, it should be noted here that with our exception, despite the imperfect postoperative management, most patients maintained low levels of insulin resistance and several markers critical to diabetes for several years after surgery, particularly glucose, glycosylated hemoglobin, and Insulin.

Conclusion.

Thus, today, bariatric surgery is undoubtedly a very effective method of radical treatment of morbid Obesity, which we can consider to be one of the most essential parts of the holistic model of obesity treatment. But achieving and maintaining ideal results passes through the patient's awareness of his/her own responsibility.

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