

## Preliminary Results of Bariatric Surgery in Azerbaijan Population

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**Bariatric surgery results in severe obese patients have been reviewed in the Azerbaijani population. The study involved results of the research performed with 119 severely obese patients [average age 40±19; average body mass index (BMI) 59.95±20.25 kg/m<sup>2</sup>] who undergone bariatric surgery, compared post-operative complications by different technical modification, and observed fatty liver disease dynamics by examining BMI, diabetes, hypertension before operation and 1, 3, 6 and 12 months after operation. During the first 6 months, 109 (92.6%) patients who undergone laparoscopic sleeve gastrectomy (LSG) achieved average weight loss of 39.5±11.5 kg. In 10 (8.4%) patients who undergone gastric bypass surgery [2 (1.68%) patients - Ru Y gastric bypass, 6 (5.0%) patients - mini gastric bypass, 1 (0.84%) patient - sleeve + Ru Y gastric bypass and 1 (0.84%) patient - sleeve+mini gastric bypass], this indicator was 46±14 kg, and during the second 6 months effective weight loss was observed as in previous months, which equaled to 33.5±8.5 kg. Annual weight loss indicator was 71.5±23.5 kg for all surgeries. According to our study it can be concluded that unlike other methods, satisfactory weight loss in severely obese patients and consequently, improvement in comorbidities observed after laparoscopic sleeve gastrectomy (LSG) make this method more reliable.**

**Keywords:** Severe obesity, sleeve gastrectomy, gastric bypass

### INTRODUCTION

Obesity is a chronic, multisystem disease which causes a number of problems in the human body. This pathology is one of the increasing serious health problems in developed countries. To begin with Type II diabetes and hypertension, as well as impaired venous circulation, hypercoagulopathies, non-alcoholic fatty liver disease, reproductive system disorders are the main complications of this pathology (Sedov et al., 2012). This list can be expanded with orthopaedic complications, arthritis, increase in colon, breast and liver cancer. It has been proved that after surgical correction of this pathology, insulin resistance decreases, and fatty liver disease, hypertension and respiratory pathologies are eliminated by 90% (Yashkov and Ershova, 2011).

Surgical treatment of obesity came up with application and variety of several surgical procedures. Though initial historical information on such operations date back in 1950s, more efficient surgical procedures have begun to be formed since 1979 (Angrisan et al., 2016). However, last breaking point of bariatric-metabolic surgery began in 1992 with adoption of concept on correction of such operations only in surgical way with permanent effects by World Health Organization. Since then, obesity was included in the book of surgical diseases throughout the world, and considered as a surgical pathology. However, it was proposed to use

unique measuring unit, which we now call 'body mass index' (BMI). During the assessment, if BMI is more than 35, surgical treatment, if less, conservation treatment should be applied (Bariatric Today, 2012).

Due to frequent failures, low permanent effects and patients' returning to their previous weight during the treatment of obesity with medicines and dietary methods, the surgical methods have been proven as more efficient procedures. Selection of the best operation type for patient depends on his/her assessed condition on admission and severity of comorbidities (Buchwald and Oien, 2013).

Fundamental concept of bariatric or weight loss surgery, the most efficient treatment of obesity, is to reduce appetite or food absorption from gastrointestinal system, which is implemented by one or both of two key methods: reduce absorption from intestine (malabsorptive procedures) and stomach resection (restrictive procedures).

Obesity surgery is targeted at ideal weight loss of patients, along with helping in treatment of comorbidities. Comorbidities are successfully treated in majority of patients who have undergone surgical procedures against obesity.

Obesity related operations are technically divided into three groups (Felsenreich et al., 2016):

- Operations only restricting nutrient intake (Restrictive methods)
- Operations for low absorption (Malabsorptive methods)

- Operations both for malabsorption and restricting nutrient intake

Our most preferred bariatric surgery method is sleeve gastrectomy.

Laparoscopic sleeve gastrectomy (LSG) or stomach reduction is relatively new surgical method. Average stomach size is reduced by 100-120 ml. Though the key weight loss mechanism of the operation is the reduction of stomach size, Ghrelin hormone produced from the bottom of stomach is not produced after operation, which plays an important role in weight loss and solving metabolic disorders. During the operation, after the bottom of stomach is resected along the major curve by the straight line up to gastro-esophageal junction, this hormone cannot be secreted, which strongly reduces the desire to eat, and consequently, leads to efficient and healthy weight loss. Currently, LSG is the most common type of surgery (Himpens et al., 2010; Hirth et al., 2015).

In laparoscopic Ru-Y gastric bypass, stomach is resected by proximal staple and pouch of approximately 20mm is formed. Jejunum is resected at 50-70 cm distal from ligament of Treitz and connected to stomach pouch with 1cm anastomosis. Proximal part of small intestine is anastomosed to 75-150cm distal part depending on obesity level of patient (Mechanick et al., 2013; Sammour et al., 2010).

In mini gastric bypass or one anastomosis gastric bypass, stomach is resected with proximal staple in parallel with minor curve, and pouch of approximately 60-80mm is formed. Jejunal loop is lifted at 200-250cm distal from ligament of Treitz and connected to stomach pouch with 1cm anastomosis (Stroh et al., 2016).

**Objective:** Review of bariatric surgery results in severe obese patients in the Azerbaijani population.

## MATERIALS AND METHODS

The study involved results of 119 severely obese patients [average age 40±19; average body mass index (BMI) 59.95±20.25 kg/m<sup>2</sup>] who undergone open and laparoscopic bariatric surgery during 2013-2016 years.

Surgical instructions are based on 2006 Bariatric Surgery instructions criteria of IFSO (International Federation for the Surgery of Obesity and Metabolic Disorders). Pre-operative weights, BMI and comorbidities of patients were recorded. During the preoperative period, all patients were assessed by gastroscopy for examining upper gastrointestinal system, and by ultrasonography for examining liver, biliary tract pathology. As part of preparation for surgery, all patients passed consul-

tations of pulmonologist, cardiologist, dietician, psychologist and endocrinologist, and an aesthetic risk assessment. Before and after operation heparin fractions were applied, varicose veins socks were dressed up before operation, and dynamical foot masseurs were used. Broad spectrum antibiotic of cephalosporin group was appointed as single dose before operation for prevention, and two doses after operation.

Operations were classified in three groups by their technical modifications. Upon taking standard measures before operation, 109 (92.6%) patients undergone sleeve gastrectomy, 2 (1.68 %) patients - Ru Y gastric bypass, 6 (5.0%) patients - mini gastric bypass, 1 (0.84%) patient - sleeve + Ru Y gastric bypass and 1 (0.84%) patient - sleeve+mini gastric bypass. Operation techniques in all groups complied with international standards. Ru Y gastric bypass and mini gastric bypass were conducted by standard technical methods. However, sleeve gastrectomy was conducted somewhat differently. Though during our review of world literature we observed that 32-42 Fr calibrating tube has no effect on 6-month weight loss, it is advisable to use 32 Fr due to satisfactory long-term results. Moreover, world literature advises to resect at the distance of 4-5cm from pyloric sphincter. During the operations, we complete resection by 32 Fr calibrating tube and 60mm lined staple towards fundus in parallel with minor curve after 2cm distance from pyloric sphincter in antrum. We create smaller stomach as a result of these two methods, and achieve more noticeable and long-term weight loss. In the next stage, methylene blue is injected into stomach, and staple line is controlled. In order to minimize perioperative bleeding and anastomosis leak risk, staple line is sutured (sometimes with omentopexy). In this case, omentopexy is conducted for controlling further gastric torsion, the inner diameter of which is 1cm, and possible leaks from staple line. Drainage is applied to all patients for preventive control of possible staple line leaks. The operation ends with the removal of resected stomach from trocar hole of 15 mm.

Postoperative complications were comparatively investigated in terms of different technical modification, and fatty liver disease dynamics was observed by examining BMI, hypertension before operation and 1, 3, 6 and 12 months after operation.

## RESULTS AND DISCUSSION

Out of 119 severely obese patients [average age 40±19; average body mass index (BMI) 59.95±20.25 kg/m<sup>2</sup>] included in the study, 98 (82.3%) were females and 21 (17.7%) were males.

Type II diabetes was identified in 34 (28.6%) patients, hypertension in 33 (27.7%) patients, sleep apnoea in 19 (16.0%) patients, polycystic ovarian syndrome-related hormonal dysfunction in 17 (14.3%) female patients, lack of sexual activity in 8 (6.7%) male patients, degenerative osteoarthritis in 14 (11.8%) patients, chronic obstructive lung disease in 3 (2.5%) patient, post-coronary stenting condition related to ischemic heart disease in 2 (1.7%) patients, and Grade 4 fatty liver in almost all patients. Surgical operations were open in two (1.7%) patients, and laparoscopic in remaining (98.3%) patients. Average operation period was  $2.5 \pm 0.5$  hours, and average hospital stay was  $2.5 \pm 0.5$  days. No death was observed. One (0.1%) patient undergone re-operation due to anastomosis leak four days after operation, one (0.1%) patient experiences hypotension the next day after operation and treated with fluid transfer and cardiological medicines. Symptoms of dysphagia were observed three days after operation in one (0.1%) patient, and one month after operation in one (0.1%) patient, and both patients were treated with conservative therapy, and no mechanical tightness was observed during endoscopy. These disorders were normalized after three months without any treatment. Eleven (12.5%) patients undergone abdominoplasty 14 months after operation in order to restore normal appearance.

In 32 patients out of 33 who experienced hypertension before operation, normotensive periods were extended, but in one patient no improvement was observed in hypertension. In 9 patients out of 12 (13.6%) suffering from hypertension, along with fatty liver disease and hyperlipidaemia, these disorders were eliminated within first three months after operation. Despite fasting glucose, disarray in A1C and C-peptide levels during first three months in two patients out of 34 (28.6%) with T2D, fasting blood sugar levels were normalized in the following periods. In one patient, oral dose, as well as combined antidiabetic drug was reduced to a single dose. In majority of male patients (13.6%), deficiency of free plasma testosterone levels and sex hormone-binding globulin levels was identified. These patients demonstrated improvement during six-month control, and by the end of the twelfth month normal ranges were obtained, excluding one patient.

Anastomosis leak from fundal part was observed in one (0.1%) patient five days after LSG. Patient was immediately hospitalized and undergone intensive treatment, as well as drainage of percutaneous liver inferior and left diaphragm inferior. On the next day, fully covered bariatric stent was placed, and the patient was discharged after three days under ambulatory-dynamic control. Fol-

lowing the 5-week dynamic control, the stent was removed, and no complication was observed in subsequent period.

Gastroesophageal reflux was observed in 11 (9.2%) patients two months after operation, dumping syndrome in one (0.1%) patient, who undergone LSG, and diarrhea 5-6 times a day in one (0.1%) patient, who undergone mini gastric bypass. All patients were treated with proton pump inhibitor, acid neutralizers and dietary procedures during the first postoperative 90 days. During the first 6 years, the patients, who undergone standard LSG, achieved weight loss of  $39.5 \pm 11.5$  kg. This figure was  $44 \pm 13$  kg in patients for whom smaller stomach was formed. Weight loss indicator was  $46 \pm 14$  kg in patients who undergone gastric bypass surgery, and during the second 6 months, effective weight loss was observed equaling to  $33.5 \pm 8.5$  kg. However, in patients who undergone standard sleeve gastrectomy, weight loss index decreased in the second 6 months compared to the first 6 months, and equaled to  $22.5 \pm 4.5$  kg. This figure was more efficient and equaled to  $28.5 \pm 6.5$  kg in patients for whom smaller stomach was formed and antrum resection was performed, compared to the standard group. Furthermore, both groups of patients, who were subject to sleeve gastrectomy, did not need any vitamin-mineral support after the first 3 months compared to gastric bypass surgery groups. Patients who had gastric bypass surgery were subject to blood tests once a month, and if needed, received parenteral vitamin-mineral treatment, and were given parenteral vitamin-mineral support under the control of blood tests once in 3 months during 12-month postoperative period. Annual weight loss indicator was  $71.5 \pm 23.5$  kg for all surgeries.

Post-LSG gastroesophageal reflux is worth to be discussed. This issue is caused by loss of cardioesophageal junction during the operation and fast eating without following postoperative diet. We observed this pathology in 11 (12.5%) patients during our study. Some publications of world literature indicated this range as 3-21% (Himpens et al., 2010; Felsenreich et al., 2016). One of the issues reducing the success rate of treatment in obese patients is psychological disorder. Publications investigating the relation between the obesity and psychological disorders cover the symptoms of bipolar disorder in 80% of these patients (Hirth et al., 2015). Although the obesity is not considered as surgical problem, it will be difficult to achieve expected weight loss unless the patients change their old habits of being happy by eating, joy of secret eating and eating too much. Despite that concepts

of successful and unsuccessful bariatric procedure have been recognized until recently, a number of researchers consider 15-50% weight loss resulting from this procedure as successful (Mechanick et al., 2013; Sammour et al., 2010). 42.6% change ratio in excess weight of our patients at the end of twelfth month proves the efficiency of the method. When questioning one patient who lost relatively less weight, we identified regular intake of liquefied chocolate, beer and similar high-calorie drinks during the hunger crisis. This patient returned to normal state after special diet.

Key reason of less weight loss after LSG is insufficient resection. In addition, fistula development, assessment of surgery type, stress and depression, preoperative BMI of more than 80 kg/m<sup>2</sup> are other factors, which make the treatment of comorbidities difficult.

## CONCLUSION

Despite the promising results in short and medium term, long-term results are not sufficient for this method. Unlike other methods, few cases of vitamin deficiency and malabsorption, as well as efficient weight loss ratio after LSG enable wide application of this method. Consequently, LSG is believed to be a reliable method, which ensures sufficient weight loss in the treatment of obesity and super-obesity, as well as improvement in comorbidities.

**Conflict of Interest:** The authors declare that they have no conflict of interest.

**Ethical Approval:** All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

**Informed Consent Statement:** Informed consent was obtained from all individual participants included in the study.

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## Azərbaycan Populyasiyasında Bariatrik Cərrahiyyə Əməliyyatlarının İlk Nəticələri

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Azərbaycan populyasiyasında aşırı piylənməsi olan xəstələrdə bariatrik cərrahiyyə əməliyyatlarının nəticələri öyrənilmişdir. Tədqiqatda 119 aşırı piylənməsi olan xəstə əhatə edilmişdir [orta yaş  $40 \pm 19$ ; ortalama bədən çəki indeks (BMI)  $59.95 \pm 20.25$  kq/m<sup>2</sup>]. Bu xəstələrdə bariatrik cərrahiyyə əməliyyatı aparılmış və əməliyyatdan sonrakı ağırlaşmalar müxtəlif üsullarla müqayisə edilmişdir, təqib dövründə əməliyyatdan sonra və 1, 3, 6 və 12 ay sonra BKİ (bədən-kütlə indeksi), diabet, hipertenziya və yağlanmış qara ciyər göstəricilər müvafiq olaraq yoxlanılmışdır. İlk 6 ay ərzində laparoskopik “sleeve” qastroektomiya keçirən 109 (92.6%) xəstədə ortalama çəki itkisi  $39.5 \pm 11.5$  kq təşkil etmişdir. Mədə şuntlama cərrahiyyəsi keçirən 10 (8.4%) xəstədə [2 (1.68%) xəstədə - “Ru Y gastric bypass”, 6 (5.0%) xəstədə - tək anastomozlu mədə şuntlama əməliyyatı, 1 (0.84%) xəstədə - “sleeve” + “Ru Y gastric bypass” və 1 (0.84%) xəstədə - “sleeve” + “mini gastric bypass”], bu göstərici  $46 \pm 14$  kq təşkil etmişdir, əlavə olaraq əməliyyatdan 6 ay sonra da effektiv çəki itkisi əvvəlki aylarda olan sürətlə davam etmişdir, nəticə  $33.5 \pm 8.5$  kq təşkil etmişdir. Bütün cərrahiyyə növlərində illik çəki itkisi  $71.5 \pm 23.5$  kq təşkil etmişdir. Bizim tədqiqatın nəticələrinə görə, laparoskopik “sleeve” qastroektomiyada (LSG) digər üsullarla müqayisədə ciddi piylənməyə məruz qalmış xəstələrdə müvəffəqiyyətli nəticələr əldə edilmişdir və, müvafiq olaraq, yanaşı xəstəliklərin nəticələri göstəricilərinə müsbət effekt təmin edilmişdir. Bununla biz qeyd edə bilərik ki, laparoskopik “sleeve” qastroektomiya (LSG) digər üsullarla müqayisədə daha əlverişli cərrahiyyə üsulu sayıla bilər.

**Açar sözlər:** Ciddi piylənmə, “sleeve” qastroektomiya, mədə şuntlama əməliyyatı

## Первичные Результаты Bariатрической Хирургии В Азербайджанской Популяции

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Изучены результаты бариатрических операций, проведенных у пациентов с тяжелым ожирением в азербайджанской популяции. В исследование было включено 119 пациентов с тяжелым ожирением [средний возраст  $40 \pm 19$ ; средний индекс массы тела (BMI)  $59.95 \pm 20.25$  кг/м<sup>2</sup>], которым была проведена бариатрическая операция. У пациентов пост-операционные осложнения сравнивались различными техническими методами, были изучены показатели жирового гепатоза и показатели ИМТ, диабета, гипертонии в динамике перед операцией и 1, 3, 6 и 12 месяцев после операции. В течение первых 6-и месяцев у 109 (92.6%) пациентов, прошедших лапароскопическую рукавную гастрэктомию (LSG) средняя потеря веса составляла  $39.5 \pm 11.5$  кг. У 10 (8.4%) пациентов с операцией шунтирования желудка [2 (1.68%) пациента – «Ru Y gastric bypass», 6 (5.0%) пациентов - «mini gastric bypass», 1 (0.84%) пациент с – «sleeve + Ru Y gastric bypass» и 1 (0.84%) пациент с «sleeve+mini gastric bypass»], этот параметер составлял  $46 \pm 14$  кг, во время операционного ведения в течение 6-и месяцев эффективная потеря веса происходила с той же скоростью, как и в предыдущие месяцы, составив  $33.5 \pm 8.5$  кг. Среднегодовая потеря веса составила  $71.5 \pm 23.5$  кг для всех видов хирургии. В соответствии с результатами нашего исследования мы можем заключить, что в отличие от других методов, эффективная потеря веса и показатели сопутствующих заболеваний при лапароскопической рукавной гастрэктомии делают его наиболее предпочтительным методом лечения тяжелой степени ожирения.

**Ключевые слова:** Тяжелая степень ожирения, рукавная гастрэктомия, шунтирование желудка