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Comparative analysis of sleeve gastrectomy with transit bipartition versus single anastomosis sleeve ileal bypass in morbidly obese patients with type 2 diabetes mellitus: a retrospective cohort study

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Objective – to compare the effectiveness of sleeve gastrectomy (SG) + transit bipartition (TB) and the novel metabolic procedure, sleeve gastrectomy with single anastomosis sleeve ileal bypass (SASI), in the treatment of morbidly obese patients with type 2 diabetes mellitus (T2DM).

Materials and methods. A retrospective cohort study was conducted among morbidly obese patients with T2DM who underwent bariatric surgical procedures, specifically SG+TB and SASI, between September 2013 and December 2024 at the study hospital. Exclusion criteria included a history of previous bariatric surgery, upper laparotomy, severe comorbidities (ASA III–IV), and psychological instability. A total of 33 patients who underwent metabolic surgery for T2DM were divided into two groups: Group I underwent SG+TB, and Group II underwent the SASI operation. The mean age of patients was 42.6 years (range: 26 to 64 years), with a mean preoperative weight of 107.5 kg (range: 92.0–189.5 kg), a mean preoperative body mass index of 43.2 kg/m^2 (range: 36.7–65.0 kg/m^2), and a mean excess weight of 50.8 kg (range: 28–106 kg). The average duration of metabolic disease before surgery was 7.5 years (range: 3–21 years). The mean preoperative glycaemia was 11.8 mmol/L (range: 6.5 to 23 mmol/L), and the mean glycated hemoglobin (HbA1c) was 7.6% (range: 6.5–13.2%). The primary outcomes were the percentage of excess weight loss (%EWL), resolution of diabetes, and improvement of comorbidities. The secondary outcome was postoperative nutritional status.

Results. A cohort of 33 patients had a follow-up period of 12 to 48 months. After the Santoro operation, excess weight loss (EWL) was 72% at 6 months, 88% at 1 year, 92% at 2 years, and 86% at 4 years. After the SASI operation, EWL was 76% at 6 months, 89% at 1 year, 93% at 2 years, and 82% at 4 years. Complete resolution of diabetes occurred in all patients within the first 6 months postoperatively. Mean postoperative glycemic and HbA1c levels normalized at 1 year postoperatively. Disease control was defined as achieving normal HbA1c levels (< 6%). Among insulin-dependent patients, 76% achieved disease control during the 12- to 48-month follow-up. Patients receiving oral treatment reduced HbA1c to < 6% in 100% of cases at 1 year postoperatively and in 89% of cases over the subsequent 5 years. Two years postoperatively, the mean total protein concentration was 7.7 ± 1.7 g/dL in Group I and 7.2 ± 1.5 g/dL in Group II ($p > 0.1$). The mean albumin concentration was 4.1 ± 0.6 g/dL in Group I and 4.0 ± 0.8 g/dL in Group II. The mean daily bowel movement frequency was 1.6 ± 1.8 in both groups.

Conclusions. The novel procedure – single anastomosis sleeve ileal bypass – demonstrates effectiveness as a less invasive surgical treatment for morbid obesity and T2DM. It is expedient to conduct further investigations to evaluate the efficacy of this method and to establish clear indications and contradictions for SASI.

Keywords
sleeve gastrectomy with transit bipartition, Santoro operation, single anastomosis sleeve ileal bypass, SASI, morbidly obese patients, type 2 diabetes mellitus.

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Bariatric procedures, including biliopancreatic diversion (BPD) and duodenal switch, are effective treatments for diabetes mellitus. However, after BPD, many patients experience severe malabsorption symptoms [38, 41]. To address these complications, S. Santoro et al. [36, 37] proposed sleeve gastrectomy (SG) with transit bipartition (TB) as a metabolic intervention for obesity. TB involves creating a gastroileal anastomosis in the antrum after SG, which maintains nutrient transit through the duodenum, prevents the formation of blind loops, and minimizes malabsorption. The stomach retains two outflow pathways, and a lateral entero-enteroanastomosis connects both segments 80 cm proximal to the cecum. After this operation, 86 % patients with type 2 diabetes achieved remission [37]. SG + TB is similar to BPD with duodenal switch (BPD + DS), but the malabsorption component is significantly reduced as the duodenum and jejunum are not excluded [36]. In the past decade, minor operations such as mini gastric bypass and single-anastomosis duodenoileal bypass with sleeve gastrectomy (SADI-S) have gained popularity [2, 5, 34, 35].

Objective – to compare the effectiveness of sleeve gastrectomy + transit bipartition and the novel metabolic procedure, sleeve gastrectomy with single anastomosis sleeve ileal bypass, in the treatment of morbidly obese patients with type 2 diabetes mellitus.

Materials and methods

A retrospective cohort study was conducted among morbidly obese patients with type 2 diabetes mellitus (T2DM) who underwent bariatric surgical procedures, specifically SG + TB and SASI, between September 2013 and January 2014 at the study hospital. The study protocol received approval from the Odesa National Medical University ethical committee. All patients included in the study were between 25 and 65 years of age.

Exclusion criteria comprised a history of previous bariatric surgery, upper laparotomy, severe comorbidities (ASA III–IV), and psychological instability. Informed consent was obtained from all patients after a detailed explanation of operative and postoperative procedures as well as potential complications. The preoperative evaluation comprised a comprehensive medical history and laboratory investigations, including blood glucose, glycated hemoglobin (HbA1c), lipid profile, and thyroid function tests. In addition, all patients underwent routine gastroscopy and abdominal ultrasound to exclude gallstones and to assess hepatic steatosis.

A total of 33 patients who underwent metabolic surgery for T2DM were divided into two groups: Group I underwent SG + TB, and Group II underwent the SASI operation. The mean age was 42.6 years (range: 26 to 64 years), with 23 women and 10 men. The mean preoperative weight was 107.5 kg (range: 92.0–189.5 kg), the mean preoperative body mass index was 43.2 kg/m^2 (range: 36.7–65.0 kg/m^2), and the mean excess weight was 50.8 kg (range: 28–106 kg). The average duration of metabolic disease before surgery was 7.5 years (range: 3–21 years). In only two patients was the disease controlled with dietary modification, while 14 patients received oral agents and 17 patients received insulin therapy. The mean preoperative glycemia was 11.8 mmol/L (range: 7.2 to 23 mmol/L), and the mean glycated hemoglobin (HbA1c) was 7.6 % (range: 6.5–15.2 %). The mean C-peptide was 2.4 ng/mL (range: 0.8–6.9), and the mean homeostasis model assessment (HOMA) value was 7.6 (range: 3.8–25.2). Hypertriglyceridemia was detected in 20 patients, hypercholesterolemia in 30 patients, obstructive sleep apnea in 22 patients, and hypertension in 25 patients.

Operative techniques for SASI and Santoro procedures

Both operations were performed under general anesthesia. Pneumoperitoneum was established using a Veress needle. The first 10 mm trocar was inserted approximately 15–20 cm below the xiphoid process and 3 cm to the left of the midline. Four additional ports were placed under direct vision at the same sites as for sleeve gastrectomy. The omental bursa was opened, and the greater omentum was sectioned using a Ligasure or ENSEAL device. Dissection proceeded toward the gastroesophageal junction. The left crus was mobilized from its attachments. Posterior attachments connecting the stomach and pancreas were carefully divided. A 36 French bougie was passed into the stomach to facilitate gastric tube placement. The stomach was transected using a linear stapler with a staple height of 4.1 mm, beginning at the greater curvature 4 to 5 cm from the pylorus and extending to the angle of His. In cases of bleeding from the stapling line, additional seromuscular running sutures were placed.

The second stage of the operation was performed with the patient in the Trendelenburg position. The Santoro operation, consisting of sleeve gastrectomy with transit bipartition, was performed. Subsequently, a gastroileal anastomosis was created, followed by a lateral-lateral ileo-ileal anastomosis 100 cm proximal to the ileocecal valve, using a laparoscopic linear stapler with a 45 mm cartridge and a staple height of 4.1 mm. Running sutures were used to close the mesenteric borders to prevent

internal hernias. At the conclusion of the procedure, the segment between both anastomoses was interrupted using a linear stapler with a white cartridge. A closed suction drain was placed after both operations. The SASI operation involves creating a single gastroileal anastomosis. The ileocecal junction was identified, and 250 cm of ileum was measured proximally. The selected loop was ascended after division of the greater omentum and stapled isoperistaltically side-to-side to the anterior wall of the gastric antrum. Gastroileal anastomosis was created using a linear stapler with a 45 mm cartridge and a staple height of 4.1 mm. The anastomosis was tested for watertightness using a methylene blue test. The staple defect was closed with 3/0 V-lock sutures.

Postoperative care

Ambulation and administration of clear liquids commenced 12 to 24 hours postoperatively. Thromboprophylaxis with enoxaparin 40 mg once daily was initiated on the first postoperative day and continued for up to 3 weeks. A proton pump inhibitor was administered for 2 months postoperatively. A low-calorie, protein-rich liquid diet was maintained during the first month. Patients were encouraged to begin physical activity in the first postoperative week. Outpatient follow-up was conducted monthly. A complete blood count was ordered every 3 to 6 months, and gastroscopy was scheduled every 6 to 12 months.

Assessments

The primary outcomes included the percentage of excess weight loss (%EWL), resolution of diabetes, and improvement of comorbidities. The %EWL was calculated as follows:

$$\frac{\text{Preoperative weight} - \text{Follow-up weight}}{\text{Preoperative excess weight}} \times 100\%.$$

Resolution of diabetes was defined as a fasting glucose level < 6.06 mmol/L or an HbA1c level $< 6\%$ without hypoglycemic medication, whereas improvement was defined as a reduction of at least 25% in fasting plasma glucose and at least 1% in HbA1c level. Resolution of comorbidities was defined as disease control without medication. Secondary outcomes included postoperative complications and postoperative nutritional status.

Statistical analysis

Data were analyzed using IBM SPSS v. 21.0. Descriptive and inferential statistics were conducted using both parametric and non-parametric procedures, as appropriate. Comparison of variables was performed using chi-square tests for trend analysis. All tests were two-tailed, and results with $p < 0.05$ were considered statistically significant.

Results

A total of 33 patients underwent metabolic surgery for T2DM during the study period. Sleeve gastrectomy with transit bipartition (Santoro operation) was performed in 12 patients (Group I), and SASI in 21 patients (Group II). No statistically significant differences were observed between the two groups (Table 1).

The duration of operative laparoscopic procedures ranged from 92 to 180 minutes. The mean operative time for the Santoro operation was significantly longer than for SASI (158 ± 28 min vs. 112 ± 16 min, $p < 0.05$). No serious intraoperative complications or mortality occurred in either group. Two cases of postoperative bleeding from the staple line of the stomach were observed (one in each group). One patient was treated conservatively, while another required laparoscopic exploration 12 hours postoperatively and hemostasis by suturing the bleeding points at the staple line. One case of pulmonary embolism was seen in Group II and was managed conservatively. In Group I, one patient developed complete intestinal obstruction due to an internal hernia 3 months postoperatively and underwent successful laparoscopic reoperation.

Table 1. **Clinical characteristics of the two patient groups**

Parameter	Group I (n = 12)	Group II (n = 21)
Mean age, years	42 (26–58)	45 (27–64)
Men/women	4/8	9/12
Preoperative weight, kg	104 (92–158)	108 (96–190)
Preoperative body mass index, kg/m^2	42 (37–58)	43 (38–65)
Preoperative excess weight, kg	49 (28–99)	53 (32–106)
Preoperative glycaemia, mmol/L	10 (7–21)	14 (10–23)
Preoperative HbA1C, %	7.2 (6.5–11.6)	7.9 (7.0–12.2)
Hypertriglyceridemia	7	19
Sleep apnea	8	14
Hypertension	9	18
Preoperative treatment		
Diet control	1	1
Oral Antidiabetic	6	8
Insulin therapy	6	11

Note. Quantitative indicators are presented as mean (min–max). All $p > 0.05$.

Table 2. **Preoperative and postoperative glycemic and lipid profiles in patients after Santoro (Group I) and SASI (Group II) operations**

Parameter	Preoperatively		6 months postoperatively		1 year postoperatively		2 years postoperatively	
	Group I (n = 12)	Group II (n = 21)	Group I (n = 12)	Group II (n = 21)	Group I (n = 12)	Group II (n = 21)	Group I (n = 10)	Group II (n = 18)
HbA1c, %	7.2 ± 1.8	7.9 ± 2.0	5.4 ± 0.8	5.6 ± 1.0	5.6 ± 0.7	5.8 ± 0.8	5.5 ± 0.8	5.6 ± 0.8
HOMA	7.4 ± 1.6	7.8 ± 1.8	1.1 ± 0.6	1.1 ± 0.7	1.2 ± 0.8	1.3 ± 0.7	–	–
Triglycerides, mmol/L	2.7 ± 0.7	2.6 ± 0.9	1.1 ± 0.6	1.2 ± 0.8	1.2 ± 0.7	1.3 ± 0.9	1.2 ± 0.7	1.4 ± 0.8
Cholesterol, mmol/L	6.9 ± 1.8	6.8 ± 2.0	3.9 ± 1.2	4.2 ± 1.4	3.1 ± 1.1	3.6 ± 1.3	3.2 ± 1.4	3.5 ± 1.5

Twelve months after surgery, one patient in Group I (Santoro operation) was diagnosed with a marginal ulcer on gastroscopy, which responded well to medical treatment. The mean hospital stay was 7.2 days (range: 6–9 days) in Group I and 5.6 days (range: 5–8 days) in Group II ($p < 0.05$).

Follow-up in 33 patients ranged from 6 to 48 months. After the Santoro operation, excess weight loss (EWL) was 72 % at 6 months, 88 % at 1 year, 92 % at 2 years, and 86 % at 4 years. After the SASI operation, excess weight loss was 76 % at 6 months, 89 % at 1 year, 93 % at 2 years, and 82 % at 4 years. There were no statistically significant differences in %EWL between the two groups ($p > 0.05$). All patients experienced complete resolution of diabetes within the first 6 months postoperatively.

Mean postoperative glycemic and HbA1c levels normalized in the first postoperative year (Table 2). Disease control was defined as achieving normal HbA1c levels (< 6 %). Among insulin-dependent patients, 79 % achieved disease control during the 12- to 48-month follow-up. Patients on oral therapy reduced HbA1c to < 6 % in 100 % of cases in the first postoperative year and in 89 % of cases over the subsequent 4 years. Of the 17 patients who were insulin-dependent preoperatively, after 12–48 months, six required only oral therapy, and seven discontinued medication entirely. The effectiveness of diabetes control was equivalent between the two operations (see Table 2).

Both patient groups demonstrated significant improvements in lipid profiles. By the end of the first postoperative year, 90 % of patients exhibited normal total cholesterol levels, and 85 % had normal triglyceride levels. Mean follow-up values remained stable (see Table 2). Hypertension resolved in 21 patients, with 6 cases in Group I and 15 cases in Group II. No statistically significant differences were observed in the normalization of comorbidities between the two groups.

Postoperatively, the mean total protein concentration was 8.0 ± 1.1 g/dL in Group I and 7.8 ± 1.2 g/dL in Group II ($p > 0.1$). The mean albumin concentration was 4.1 ± 0.5 g/dL in Group I and 4.0 ± 1.0 g/dL in Group II. Two patients in Group II had symptoms of bile reflux. The mean daily bowel movement frequency was 1.6 ± 1.8 in both groups (Table 3).

Table 3. **Biochemical profiles pre- and postoperatively in patients after Santoro and SASI operations**

Parameter	Preoperatively		6 months postoperatively		12 months postoperatively	
	Group I (n = 12)	Group II (n = 21)	Group I (n = 12)	Group II (n = 21)	Group I (n = 12)	Group II (n = 20)
Albumin, g/dL	3.9 ± 0.7	4.0 ± 0.8	4.3 ± 0.4	4.1 ± 0.9	4.1 ± 0.5	4.0 ± 0.6
Protein, g/dL	7.6 ± 1.4	7.2 ± 1.5	8.0 ± 1.7	7.8 ± 1.6	7.9 ± 1.6	7.6 ± 0.9
ALT U/L	69.0 ± 20.4	72.0 ± 18.6	36.0 ± 12.5	38.0 ± 15.0	34.0 ± 0.9	33.0 ± 1.1
Gamma-GT, U/L	34.0 ± 12.5	32.0 ± 15.0	24.0 ± 10.5	25.0 ± 12.2	22.0 ± 15.2	26.0 ± 18.2
Iron, μmol/L	15.0 ± 3.6	14.0 ± 13.9	23.0 ± 11.2	21.0 ± 12.8	24.0 ± 12.5	23.0 ± 15.0
Hemoglobin, g/dL	12.5 ± 1.4	11.2 ± 1.6	12.9 ± 1.6	12.2 ± 1.8	12.8 ± 0.9	12.6 ± 1.2
Platelet count, $\times 10^3/\mu L$	230.0 ± 30.2	246.0 ± 32.2	300.0 ± 30.4	310.0 ± 36.2	320.0 ± 25.7	300.0 ± 24.6

Discussion

Contemporary human diets are typically high in calories, low in fiber, and extensively processed through cooking and refining, resulting in rapid food absorption. This absorption often occurs in the proximal bowel, thereby reducing the functional workload of the distal bowel and diminishing the secretion of glucagon-like peptide-1 (GLP-1) and peptide YY (PYY). Consequently, diabetic and obese patients exhibit reduced GLP-1 production [16, 23, 31].

Specific bariatric procedures involve excision of segments of the digestive tract, which can lead to mucosal atrophy and subsequent bacterial proliferation. This process may facilitate bacterial translocation to the portal system, increasing the risk of hepatic failure [3, 7, 13]. Such complications can exacerbate preexisting hepatic conditions, particularly in patients with nonalcoholic fatty liver disease [1].

The SASI operation is a novel bariatric operation that combines the principles of sleeve gastrectomy with transit bipartition (SG + TB) [19].

The modification of SG + TB aimed to simplify the surgical procedure and decrease the potential complication rate. Reducing the number of intestinal anastomoses is expected to lower the risk of postoperative leaks and anastomotic strictures. Moreover, preserving the mesentery's integrity minimizes the likelihood of postoperative obstructions.

Intestinal obstruction was observed in one patient after the Santoro operation. In contrast, no cases of intestinal obstruction were reported in Group II after the SASI operation.

After sleeve gastrectomy, ghrelin secretion decreases because the hormone is primarily produced by cells in the gastric fundus [26], which is removed during the surgical procedure.

GLP-1 is a more potent incretin than GIP in both diabetic and obese individuals and in healthy individuals. GLP-1 more effectively suppresses glucagon secretion [17] and sustains a robust late phase of insulin release. Furthermore, the secretion of GLP-1 and PYY, which signals the ingestion of substantial amounts of food, promotes satiety, slows gastric emptying, and contributes to meal termination [9, 19, 22].

Nowadays, food absorption primarily occurs in the proximal bowel. Enhanced glucose-dependent insulinotropic polypeptide (GIP) secretion directly associates overnutrition with both general obesity [24] and, specifically, with visceral obesity [28]. Anti-GIP antibodies and GIP-receptor blockers have demonstrated efficacy in treating obesity [10, 25]. GLP-1 analogues, but not blockers, can help treat both obesity and diabetes [11, 32, 33].

Evidence indicates that restriction and malabsorption are not the primary factors responsible for the positive outcome of modern bariatric procedures. Instead, neurohormonal changes induced by these procedures play a significant role in their success [2].

Large meta-analyses have demonstrated that bariatric procedures resulting in substantial weight loss and metabolic improvement are those that reduce foregut exposure to food and enhance food transit to the hindgut [30]. If a small segment of the proximal bowel is excluded, as in the Roux-en-Y gastric bypass, successful outcomes depend on gastric volume restriction [12]. In contrast, if a large proximal segment is excluded, as in the BPD, restriction is unnecessary for metabolic benefits and weight loss, but malabsorption becomes a significant concern [8].

S. Santoro et al. [37] proposed a new procedure that avoids ileal exclusion and uses a minor surgical technique. SG + TB amplifies the nutritive stimulation of the distal gut while simultaneously diminishing the exposure of the proximal bowel to nutrients, without completely deactivating the duodenum and jejunum. The food transit to the ileum is preferential, as shown by S. Santoro et al. [36, 37].

Simultaneously, a smaller portion of the meal passes through the duodenum, which decreases but does not eliminate nutritive overstimulation of the proximal bowel.

The incomplete exclusion of the proximal bowel reduces the risk of malabsorption-related complications. Unlike BPD, the Santoro operation does not result in hypoalbuminemia [36].

SG + TB significantly reduces meal size and overeating, thereby leading to a substantial decrease in fat consumption by changing taste preferences [39]. Notably, TB is highly effective in treating both obesity and metabolic syndrome.

After the SASI operation, patients do not overeat due to an early sensation of gastric fullness and a hypothalamic-generated satiety response triggered by nutrient absorption primarily in the distal bowel [19].

Intense stimulation of the distal bowel further decreases the proximal bowel activity. Additionally, distal gut hormones are steatogenic and slow gastric emptying [18].

Both SG + TB and SASI procedures resulted in adequate initial weight loss. The restrictive component in both operations is sleeve gastrectomy, while the gastro-ileal bypass induces neuroendocrine modulation.

Excess weight loss after the Santoro operation was 72 % at 6 months, 88 % at 1 year, and 92 % at 2 years. Comparable results were observed after SASI: EWL of 76 % at 6 months, 89 % at 1 year,

and 93 % at 2 years. No significant differences in weight loss were found between the two groups ($p > 0.1$). S. Santoro et al. [36, 37] reported similar outcomes: after 6 months, 72.2 ± 17.3 %; after 1 year, 91 ± 19.6 %; and after 2 years, 94.1 ± 21 %.

Another potential mechanism contributing to the observed metabolic improvement after SG + TB is an increased stimulation of distal gut endocrine cells by bile acids, as bile acids are known to stimulate GLP-1 and PYY secretion [29, 32].

SG + TB and a BPD + DS share significant anatomical similarities. However, BPD + DS is designed to induce malabsorption, while SG + TB aims to avoid malabsorption and maintain neuroendocrine effects [36]. The SASI operation in this study operates via the exact mechanism as the Santoro operation.

The treatment of T2DM after the Santoro operation demonstrated high effectiveness. Extended follow-up showed complete remission of T2DM in 86 % of patients [36, 37].

Both bariatric operations demonstrated effectiveness in treating T2DM in this study.

HbA1c normalization was comparable between the two patient groups (see Table 1). No significant differences in HbA1c levels were observed between patients after the Santoro operation and SASI during follow-up from 6 months to 2 years.

Biochemical tests showed that both operations were equally effective in resolving T2DM (see Table 2). Comorbidity resolution was also comparable between the two patient groups. Respiratory problems, including sleep apnea, improved substantially within the first 3 months. All eight patients in Group I and 12 of the 14 patients in Group II experienced resolution of respiratory issues. Hypertension no longer required medication in 6 patients from Group I and in 12 of the 18 patients from Group II.

Both surgical procedures were equally effective in treating comorbidities. No incidents of diarrhea or flatulence were reported in patients after either the Santoro surgery or SASI. Bile reflux symptoms were observed in two patients after SASI, which were managed successfully with conservative treatment.

In summary, the Santoro and SASI procedures demonstrate comparable effects on excessive weight, metabolic disturbances, and complication frequency. However, SASI is notably simpler, requires less operative time, minimizes the risk of bowel obstruction, and can be performed with a single anastomosis.

There is a current trend in bariatric and metabolic surgery toward less invasive surgical procedures, such as mini-gastric bypass and sleeve gastrectomy with single anastomosis duodenoileal bypass (SADI-S) [2, 34, 35]. Both the immediate and long-term outcomes of these procedures are considered acceptable.

Based on this approach and supporting clinical results, SASI can be introduced into surgical practice as a minor and effective procedure.

Conclusions

The novel procedure – single anastomosis sleeve ileal bypass – demonstrates effectiveness as a less invasive surgical treatment for morbid obesity and T2DM.

It is expedient to conduct further investigations to evaluate the efficacy of this method and to establish clear indications and contradictions for SASI.

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Declaration of interests

The authors declare no conflicts of interest relevant to this manuscript.

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Ethics approval and written informed consent statements

This study was conducted in accordance with the Declaration of Helsinki and was approved by the ethics committee of Odessa National Medical University. Written informed consent was obtained from all patients prior to their participation in the study.

Authors contributions

V. V. Grubnik: study concept and design, critical revision of the manuscript, supervision; O. V. Medvedev: clinical procedures, patient follow-up, data analysis, manuscript drafting and revision; V. V. Grubnyk: data collection, literature review, manuscript drafting.

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Порівняльний аналіз рукавної резекції шлунка з транзитною біпартицією та одноанастомозного ілеального шунтування після рукавної гастректомії у пацієнтів із морбідним ожирінням і цукровим діабетом 2 типу: ретроспективне когортне дослідження

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Мета — порівняти ефективність рукавної гастректомії (РГ) із транзитною біпартицією (ТБ) та нової метаболічної процедури — рукавної гастректомії з єдиним анастомозом та ілеальним шунтуванням (single anastomosis sleeve ileal bypass (SASI)) для лікування пацієнтів із морбідним ожирінням і цукровим діабетом 2 типу.

Матеріали та методи. Проведено ретроспективне когортне дослідження за участю 33 пацієнтів із морбідним ожирінням і цукровим діабетом 2 типу (ЦД2), яким було виконано баріатричні хірургічні втручання РГ + ТБ або SASI у нашій лікарні в період із вересня 2013 р. до грудня 2024 р. Критерії залучення: наявність в анамнезі баріатричної операції, верхньої лапаротомії, тяжких супутніх захворювань (ASA III—IV) та психічної нестабільності. Пацієнтів розподілили на дві групи залежно від методу лікування: у першій виконано РГ + ТВ, у другій — SASI. Середній вік пацієнтів становив 42,6 року (26—64 роки), середня доопераційна маса тіла — 107,5 кг (92—189,5 кг), середній доопераційний індекс маси тіла — 43,2 кг/м^2 (36,7—65 кг/м^2), середня надлишкова маса — 50,8 кг (28—106 кг). Метаболічне захворювання тривало в середньому 7,5 року до операції (3—21 рік).

Середній рівень доопераційної глікемії становив 11,8 ммоль/л (6,5—23 ммоль/л), глікозильованого гемоглобіну (HbA1c) — 7,6% (6,5—13,2%). Основними кінцевими точками були: відсоток втрати надлишкової маси тіла (%EWL), ремісія цукрового діабету та поліпшення супутніх патологій, вторинною кінцевою точкою — післяопераційний нутритивний статус.

Результати. Тривалість спостереження становила від 12 до 48 міс. Після операції Санторо втрата надлишкової маси тіла (EWL) становила 72% через 6 міс, 88% через рік, 92% через два роки та 86% через чотири роки, після операції SASI — 76, 89, 93 і 82% відповідно. Усі пацієнти мали повну ремісію цукрового діабету протягом перших 6 міс після операції. Середні післяопераційні рівні глікемії та HbA1c нормалізувалися з першого року післяопераційного спостереження. Захворювання вважали контрольованим при досягненні нормального рівня HbA1c (< 6%). Пацієнти, які отримували інсулін, досягли цього контролю в 76% випадків упродовж 12—48 міс спостереження. У пацієнтів, які приймали пероральні цукрознижувальні препарати, вміст HbA1c був нормальним в усіх випадках протягом першого року після операції та у 89% випадків протягом наступних п'яти років. Через два роки після операції середня концентрація загального білка становила (7,7 ± 1,7) г/дл у пацієнтів першої групи та (7,2 ± 1,5) г/дл у пацієнтів другої групи ($p > 0,1$), альбуміну — (4,1 ± 0,6) і (4,0 ± 0,8) г/дл відповідно, середня кількість щоденних актів дефекації — 1,6 ± 1,8 у пацієнтів обох груп.

Висновки. Нова методика — рукавна гастректомія з єдиним анастомозом та ілеальним шунтуванням (SASI) є ефективним і щадним хірургічним методом лікування морбідного ожиріння та ЦД2. Слід провести дослідження ефективності цього методу, а також уточнити показання й протипоказання до виконання SASI.

Ключові слова: рукавна гастректомія з транзитною біпартицією, операція Санторо, одноанастомозне ілеальне шунтування з рукавною гастректомією, пацієнти з морбідним ожирінням, цукровий діабет 2 типу.

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