

## REOPERATIONS IN BARIATRIC SURGERY – INDICATIONS AND INITIAL EVALUATION OF POSTOPERATIVE COMPLICATIONS

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Obesity, at present, seems to be a very serious health problem all over the world. The surgery is said to be the most successful treatment of obesity. With the increase in the quantity of conducted bariatric procedures, the number of revision treatments increases as well.

**The aim of the study** was to analyze the indications, results and complications after repeated bariatric surgeries.

**Material and methods.** The repeated bariatric procedures performed in 2009-2015 have been retrospectively analyzed. The endpoint of the study was the evaluation of early surgical treatment results-up to 30<sup>th</sup> day after repeated surgery.

**Results.** Overall, amongs 103 obese patients with a BMI over 35 kg / m<sup>2</sup>, qualified for bariatric treatment 7 revision surgeries were conducted (6.8%). Two operations were carried out by laporotomy, other by laparoscopy. In the study group, neither any deaths were noted in perioperative period nor life-threatening complications. The frequency of complications- Surgical site infection and bleeding from the staple lines of stapler in the study group appeared to be 28.6%.

**Conclusions.** Qualification for repeated bariatric surgeries should be based on a thorough analysis of the condition of the patient, previous outcome of the bariatric treatment: evaluation of weight loss as well as possible complications of the original surgery.

**Key words:** bariatric surgery; re-operations; surgical complications

Obesity is a major health problem in the twenty-first century. According to the World Health Organisation (WHO) obesity is the excessive or pathological accumulation of adipose tissue, leading towards unfavorable health complications (1). Worldwide, the number of obese patients (BMI>30) has more than doubled since 1980. In 2014, 39% of the world population was overweight, and 13% were obese (1). In the United States of America more than one third of the adult population (78.6 million people), and 17% of patients under the age of 18 years are diagnosed with obesity (2,

3). Results of the WOBASZ study showed that obesity was diagnosed in 20.2% of the female and 20.6% of the male Polish population. Significant obesity (BMI>40) was diagnosed in 2.2% of the female, and 0.6% of the male population (4). Together with the increased body mass index (BMI) one may observe increased incidence of diabetes mellitus type 2, arterial hypertension, neoplastic diseases (endometrium, breast, and colorectal cancer), as well as disorders of the musculoskeletal system (2, 3). Treatment of obesity consists in a proper diet, physical exercise, psychological

support, and pharmacological management. In case of morbid obesity such management is ineffective. Surgical treatment of obesity has developed secondary to the lack of effect following conservative therapy. In March, 1991, during a conference on the treatment of obesity under the auspices of the National Health Institute, the following was established:

- 1) surgical treatment of obesity is the only method leading to effective and sustainable weight loss in patients with morbid obesity,
- 2) such management is recommended in case of patients with the BMI exceeding 40, and in patients with the BMI ranging between 35 and 40, and diagnosed with such complications as arterial hypertension, diabetes mellitus, sleep apnea, and others (5).

The meta-analysis of 11 investigations comparing surgical and non-surgical treatment results (behaviour therapy, diet, increased physical activity, and pharmacology) showed benefits associated with surgical management. Patients subjected to bariatric surgery lost an average of 26 kg more, developing more likely, diabetes and metabolic syndrome remission, their quality of life significantly increasing, as compared to patients subjected to conservative therapy (6).

In view of the proven efficacy of bariatric surgery, it is not surprising that in the past decade the number of bariatric procedures has significantly increased, including repeated and revision procedures. According to Robert et al. (7) failure within five years amounted to 50% (unsatisfactory weight loss, complications associated with the gastric band).

The aim of the study was to analyse indications, results, and complications after repeated bariatric surgery.

## MATERIAL AND METHODS

The retrospective analysis considered repeated bariatric operations performed between January, 2009 and August 2015, at the Department of General, Oncological and Endocrine Surgery, Regional Hospital in Kielce, with particular emphasis placed on indications, type of surgical procedure, and postoperative course. Initially, 103 patients were qualified for bariatric surgery.

Repeated bariatric surgery was performed in seven female patients, including five from the Department of General, Oncological and Endocrine Surgery, and two from another center (one laparoscopic plication and one sleeve gastrectomy). Laparoscopy was performed in five cases, in two cases conversion to laparotomy was required.

All patients, in order to determine the surgical anatomy were subject to upper gastrointestinal endoscopy, chest X-ray or CT. Additionally, as a standard in our center we assessed the patients' general condition, including the physical examination, evaluation of basic laboratory parameters (glucose, urea, creatinine, ions, lipidogram, coagulogram, and CK, CKMB). In addition, we also determined the morphology, TSH, FT3 and FT4 levels. Basic examinations also include transthoracic echocardiography, spirometry, and lower extremity ultrasound. Patients with concomitant diseases, such as ischemic heart disease, sleep apnea, diabetes mellitus, were additionally subjected to cardiological and diabetological consultations. An important element is the psychological evaluation of the patient undergoing bariatric surgery. During the qualification process the patient undergoes an interview with a qualified psychologist (8). The end-point of the investigation was the evaluation of early surgical treatment results-up to 30 days after repeated bariatric surgery.

## RESULTS

During the analysed period between 2009 and 2015, 103 obese patients were subjected to bariatric surgery (BMI>35). Considering the above-mentioned group 7 reoperations were performed (female patients), which comprised 6.8% of all procedures. Mean patient age amounted to 42 years (minimal – 26 years, maximal – 59 years); average initial BMI amounted to 39.75 (min – 38.1, max – 41.2); average BMI value before reoperation amounted to 38.8 (ranging between 36.5-41.2).

Indications for reoperation included unsatisfactory weight loss, port infection, gastric band translocation, gastric band constriction, due to infection leading towards esophageal occlusion. In the remaining cases indications for reoperation were associated with unsatisfactory weight loss after the initial bariatric

surgery. As mentioned above, examinations performed before the reoperation, determining the surgical anatomy, had no influence on the lack of surgical radicalism considering patients initially subjected to laparoscopic sleeve resections.

In four cases reoperation consisted in the removal of the adjustable gastric band.

1. Thirty-two year old female patient initially subjected to LAGB was reoperated after 3 months. She was previously admitted to the Department several times, due to abdominal pain, vomiting, regurgitation, and nausea, which regressed after conservative treatment. Laboratory examinations showed no pathology. During the last hospitalization the patient was qualified for reoperation, due to the appearance of a murky content near the gastric port, and gastroscopy revealed cardiac stenosis. Laparoscopy was performed, but due to the large number of postoperative adhesions and gastric band infiltration conversion to laparotomy was required showing a large peri-band infiltration. The reoperation was complicated by local inflammation (purulent content). The patient had a history of scleroderma, which did not require additional management in case of both operations.

2. Fifty-nine year old female patient required the removal of the gastric band, due to

lack of weight reduction one year after surgery. Initial laparoscopy proved ineffective, due to previous classical cholecystectomy, hysterectomy, and appendectomy. Conversion was required with gastric band removal.

3. Fifty-one year old female patient was subjected to laparoscopic gastric band removal two years after the initial bariatric surgery. The patient lost 20 kg, with the BMI reduced from 40.9 to 33.46. The patient was hospitalized several times, due to dysphagia and odynophagia. Physiological saline was removed twice from the gastric port, symptoms usually regressed after conservative treatment. During the last hospitalization the patient additionally complained of vomiting. Gastroscopy showed gastritis, while abdominal CT showed translocation of the gastric band. Due to significant inflammatory lesions observed during gastroscopy revision bariatric surgery was abandoned and the gastric band was removed by means of laparoscopy. Surgery and the perioperative period proved uneventful.

4. Twenty-six year old female patient underwent gastric band removal three months after initial bariatric surgery, due to poor psychological and dietary tolerance leading to reduced quality of life. Significant weight loss was not observed. The laparoscopic procedure and hospitalization proved uneventful.

Table 1. Patient characteristics subjected to reoperation

Variable	Number of pts
Initial bariatric surgery:	
LAGB	4
LSG	2
Laparoscopic greater curvature plication	1
Concomitant diseases:	
arterial hypertension	2
diabetes mellitus	2
ischemic heart disease	0
connective tissue disease	1
Mean observation period (months)	
after LAGB	10,5
after LSG	9
after laparoscopic plication	30
Reoperation after initial bariatric surgery	
after LAGB	3/31 (12,9%)
after LSG	1/38 (2,63%)
Complications after reoperation:	
after LAGB-superficial wound inflammation	1/4 (25%)
after LSG-anemia not requiring blood transfusions	1/2 (50%)
Total	2/7 (28,6%)

LAGB – laparoscopic adjustable gastric banding, LSG – laparoscopic sleeve gastrectomy, BMI – body mass index  
Age and BMI were presented as mean values

5. Forty-three year old female patient seven months after sleeve gastrectomy with weight loss amounting to 34 kg, observed a 5 kg weight increase. The LRYGB procedure was performed. Three days after the procedure we observed anemization (Hgb – 12.5 g% to 8.7 g%), which did not require blood transfusions. The patient was discharged from the hospital on the 7-th day after surgery.

6. Forty-two year old female patient subjected to initial sleeve gastrectomy, reoperation consisting in the LRYGB procedure. Indications for reoperation included unsatisfactory weight loss after 11 months. The procedure and postoperative period proved uneventful.

7. Forty-two year old female patient after laparoscopic greater curvature plication. 2.5 years after the operation, due to lack of sufficient weight loss the patient was qualified for sleeve gastrectomy. The laparoscopic procedure posed numerous problems with infiltration and adhesion of the different layers subject to plication. The difficulty consisted in the separation of the layers, obtaining the initial stomach anatomy, followed by the selection of a safe procedure under observed conditions (infiltration and gastric wall thickening). LSG was performed reinforcing the stapler suture by means of Lambert's suture. The procedure and perioperative period proved uneventful.

Considering the study group the incidence of complications amounted to 28.6%. Thirty days after reoperation procedures we observed no significant, life-threatening complications. One patient complained of wound inflammation, and one developed anemia, which did not require blood transfusions.

## DISCUSSION

Laparoscopic bariatric surgery consists of several procedures requiring a long learning period. Considering a 10-point difficulty scale laparoscopic LRYGB and Scopinaro are at the top of the list. Past experience of many surgical teams demonstrated that the learning period considered the initial 50-150 operations. In comparison to other laparoscopic procedures LRYGB requires a long learning period, in order to reduce the number of complications (9).

An important complication following LRYGB and sleeve gastrectomy is anastomotic leakage, ranging between 1-7%. Other surgical complications might also prove life-threatening. Mortality after bariatric procedures does not exceed 1% (9, 10).

In Sweden, a group of 12,379 patients underwent 14,768 bariatric procedures. The observation period amounted to 10.9 years ( $\pm 6.3$  years). Thirty day, ninety day and one year mortality was 0.2, 0.3, and 0.5%, respectively. Distant mortality amounted to 1.8%. The most common cause of death was myocardial infarction and malignancy (11). Such a threat is also observed in case of patients subjected to revision procedures, and reoperation might increase the risk of possible complications. Thus, the overall diagnostic process and bariatric surgery preparation should consider the possible risk complications, as well as prevention and treatment of the above-mentioned (12, 13, 14).

As initially mentioned the number of bariatric operations is continuously increasing, therefore, it is expected that revision procedures will also increase. Considering our study reoperations constituted 6.8% of bariatric procedures. Literature data mentioned these procedures ranging between 5-15% of all bariatric operations (12, 15).

Gastric band surgery is a relatively safe procedure with the lowest mortality rate amounting to 0.05% (12, 16, 17). However, it is characterized by a significant complication rate amounting to 50%. These patients will require revision or reoperation (gastric band removal) (12). The most common complications include implant intolerance, band translocation, port damage, widening of the upper part of the stomach, and even erosion of the gastric wall with band infiltration into its lumen (18). Considering our study, indications for reoperation included gastric band translocation, peri-band infiltration, and implant intolerance. The incidence of reoperations after gastric band surgery ranges between 20-60% (9, 15, 19-24). In our material the above-mentioned amounted to 12.9%.

It is worth mentioning that patients subjected to band removal did not have the proposition of simultaneous bariatric revision surgery. This is understandable in case of the initially mentioned patient, however, there are no data considering the proposition of a surgi-

cal procedure in case of patients after gastric band removal. There are studies recommending both sleeve gastrectomy and laparoscopic intestinal exclusion (24, 25). The selection of one of the methods should depend on the experience of the surgeon performing the procedure (26). In case the initial procedure was sleeve gastrectomy the method of choice is laparoscopy with intestinal exclusion (24, 27). The major indication is the unsatisfactory weight loss or weight increase after initial reduction, as well as gastroesophageal reflux disease. Literature data mentioned the need to perform Roux-Yoop gastric bypass, since the procedure is relatively safe, GERD symptoms regress, weight loss is observed, and diabetes mellitus is well controlled (27).

An important issue is the selection of the most appropriate method after previous gastric plication surgery. Laparoscopic plication during revision surgery shows a significant gastric wall infiltration and thickening, with difficulties in separating the layers subjected to plication. Due to gastric wall infiltration and thickening, revision surgery should be carefully considered. There is the risk of ineffective stapler suturing (thick tissue, anastomotic leakage). Considering the presented study case we decided to perform sleeve gastrectomy. We used stapler sutures, which were additionally secured by Lambert's sutures (polysorb 2-0-Endo stitch).

It seems that laparoscopic gastric plication is reserved for patients who do not consent to

more „radical procedures” (SG, RYGB), as well as young patients with a low BMI (gastric volume reduction without resection). The above-mentioned method is under investigation presenting a high incidence of complications (32.14%) (28), and increased revision rate. Verdi et al. demonstrated a 60% frequency of reoperation after laparoscopic gastric plication vs 8.8% in case of patients subjected to SG ( $p < 0.0001$ ) (29). Laparoscopic gastric plication surgery as a bariatric operation continues to raise a number of controversies, especially in terms of its effectiveness and difficulty in performing the revision procedure (30).

## CONCLUSIONS

1. Qualifications for repeated and revision bariatric surgery should be based on thorough patient analysis, current bariatric treatment, including weight loss and possible primary procedure complications.
2. The final decision as to the time and type of procedure is undertaken during surgery, determining the local condition. In case of perioperative risk of anastomotic leakage, the revision procedure should be postponed until the regeneration of tissue subjected to primary surgical procedures.
3. Bariatric repeated and revision procedures are technically difficult. Based on our experience we obtained satisfactory results, comparable to other centers.

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