

# Efficacy and safety of sleeve gastrectomy after adjustable gastric band failure

General Surgery

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**ABSTRACT**

**Background:** High numbers of reoperations after failure of gastric banding were found in the last decade. To remove the band and switch to another weight loss operation, such as a gastric bypass or stomach sleeve, is the traditional procedure.

**Aim of the work:** To assess safety and efficacy of sleeve gastrectomy after failure of adjustable gastric band.

**Patients and methods:** A randomized prospective clinical study which conducted from January 2017 to December 2021. The participants were categorized into two groups. Group 1 (Cases) 20cases underwent sleeve gastrectomy after adjustable gastric band, and group 2 (controls) 20 cases underwent sleeve gastrectomy with no previous history of bariatric surgery.

**Results:** In both groups, there were no deaths, although 10% and 5% of the patients had bleeding and 5% of the patients had leakage. In terms of postoperative complications, there was no statistically considerable variation between the two groups. According to postoperative weight, BMI and EWL, no statistically considerable variation was found in either group.

**Conclusion:** Results supported the efficacy and safety of sleeve gastrectomy after adjustable gastric band.

**Keywords:** Bariatric surgery; Sleeve gastrectomy; safety; Efficacy; adjustable gastric band failure; conversion.

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## INTRODUCTION

Obesity has become a major public health issue in recent decades because to the health-related problems it causes, including diabetes, obstructive sleep apnea, stroke, coronary heart disease (CHD), hypertension (HTN), gastroesophageal reflux disease (GERD), and cancer.<sup>1</sup>

Bariatric surgery's efficacy and safety, particularly in individuals with severe obesity, have been well proven in terms of weight loss, obesity-associated comorbidities, and quality of life. Bariatric surgery has also been found in recent research to improve long-term survival over non-surgical therapies. Laparoscopic adjustable gastric band (LAGB) and sleeve gastrectomy (SG) are the most prevalent bariatric surgical methods<sup>2</sup>

For morbid obesity, laparoscopic adjustable gastric banding (LAGB) has become standard surgical technique due to its reduced invasiveness and the fact that it is not a permanent procedure<sup>3</sup>

Because to late-onset problems and inadequate long-term weight reduction, LAGB is no longer as often performed. A small minority of people have gastric bands that may necessitate a second procedure, nevertheless.<sup>4</sup>

The last several years have seen an increase in the number of reoperations following gastric banding failure. Removing the band and then undergoing a different weight loss treatment, such as a gastric bypass or sleeve gastrectomy, is the most usual strategy. Controversy persists about the safety of those techniques.<sup>5</sup>

The objective was to assess safety and efficacy of sleeve gastrectomy after failure of adjustable gastric band

## PATIENTS AND METHODS

A randomized prospective clinical study which conducted from January 2017 to December 2021. After approval of the Ethical Committee of faculty of medicine in Cairo Al-Azhar university(sons), an informed written consent was taken from all cases. The participants were categorized into two groups. Group 1 (Cases) 20cases underwent sleeve gastrectomy after adjustable gastric band, and group 2 (controls) 20cases underwent sleeve gastrectomy with no previous history of bariatric surgery.

**Study subjects:**

**Inclusion criteria:**

18 to 60 years.

Failure of previous attempts for weight loss in both genders.

Good motivation for surgery.

BMI of 35 kg/m<sup>2</sup>.

Cases who previously had adjustable gastric band (Cases).

Cases with no previous bariatric surgery history (Controls)

#### Exclusion criteria:

Previous gastric surgery except adjustable gastric band

Females during pregnancy

Age lower than 18 years and higher than 60 years

#### Sample Size Calculation:

It was determined that 20 cases were needed for each group to have 80 percent power and a p-value of 0.05. It was determined that the multiple comparison techniques would require a sample size large enough to provide appropriate statistical power.

#### Study tools:

Complete history taking and clinical examination, obesity-related morbidities, obesity causes, weight/BMI, and exclusions related to surgical risk was obtained from all cases.

**Perioperative management:** Preoperative anticoagulant were administered to the cases 12 hours before the procedure, then continue for two weeks after the surgery. Prophylactic antibiotic (cefotaxime 2 gm.) was given immediately before the surgery, then continue for three days after the surgery. Also, analgesics (NSAIDS) will be administered according to body weight postoperatively.

**Intraoperative data:** including blood loss, mean operative time.

Hospital stay following surgical procedure is between 2 to 3 days. Cases remain on a low-sugar clear liquid meal program for 7 days, then 7 days turbid fluids, 7 days suttee and puree food, 7 days meat and chunks then retain to normal dietary habits.

**Outcomes:** The percentage of excess weight loss (percent EWL) or the percentage of excess BMI lost was utilized to calculate weight loss.

Comorbidity changes will be assessed either resolution or improvement. Complications in the form of leakage/anastomoses rate which defined as one of: presence of drain for more than a month, surgical site infection of organ space, 30-day readmission, reoperation or intervention due to leak<sup>3</sup>, bleeding which defined as a: 30-day readmission due to bleed, or requirement of blood transfusion with 3 days after the operation, and mortality.

Follow-up occurs at approximate intervals of 2 weeks, 4 weeks, 12 weeks, 24 weeks, 36 weeks, and then 84 weeks. The follow up parameters will be submitted for weight, BMI, expected weight loss (EWL).

#### Postoperative maintenance:

Taking multivitamins and minerals on a regular basis prevented and treated nutritional problems following sleeve gastrectomy. The recommended daily protein intake is 60 grammes each day.

#### Statistical analysis:

The acquired data was entered into the SPSS (Statistical Package for Social Science) version 26 computer software and analyzed using the SPSS program. The Shapiro Walk test was utilized to determine if the data was normal. Frequencies and relative percentages were utilized to depict qualitative data. The chi square test ( $\chi^2$ ) was performed to determine the variation between qualitative variables as specified. Mean and standard deviation were utilized to convey quantitative data. A paired t test is utilized to compare quantitative data from before and after surgery in the same group. Comparing quantitative variables across the three sets of parametric and non-parametric variables was done using the student t test. The lower the P-value, the more considerable the variation, whereas the higher the P-value, the less considerable the variation.

## RESULTS

A total sample of 40 cases were categorized into two groups. cases included in the study. The participants were categorized into two groups. Group 1 (Cases) 20cases underwent sleeve gastrectomy after adjustable gastric band, and group 2 (controls) 20cases underwent sleeve gastrectomy with no previous history of bariatric surgery.

In table 1 the mean age is 37.4± 15.7 and 35.7± 9.5 years among group (1) and (2). There were 30% males and 70% females among group 1 while among group 2 there were 40% males and 60% females. There were 25% and 20% smokers among group (1) and (2). According to co morbidities there were 25% and 30% had diabetes mellitus among group (1) and (2). As regards age, gender, smoking and comorbidities, there was no considerable variation between both groups.

Items	Group 1 n= 20	Group 2 n= 20	P value
Age (years) Mean± SD	37.4± 15.7	35.7± 9.5	0. 681
Gender			
Male n (%)	6 (30)	8 (40)	0.507
Female n (%)	14 (70)	12 (60)	

<b>Smokers n (%)</b>	5 (25)	4 (20)	0.705
<b>Comorbidities</b>			
<b>Diabetes mellitus n (%)</b>	5 (25)	6 (30)	0.970
<b>Hypertension n (%)</b>	4 (20)	4 (20)	
<b>Hyperlipidemia n (%)</b>	4 (20)	3 (15)	
<b>Cardiovascular diseases n (%)</b>	3 (15)	3 (15)	
<b>Renal diseases n (%)</b>	2 (10)	1 (5)	

1 Student t test

2 Chi square test

\*P is considerable at <0.05

**Table 1:** Sociodemographic data among the two studied groups.

According to table 2 the mean weight 120.0± 22.5 Kg and 125.9± 23.8 Kg among group (1) and (2). The mean height was 161.6± 5.5 cm and 160.5± 6.2 cm among group (1) and (2). While the mean BMI was 45.7± 5.3 and 46.6± 6.7 among group (1) and (2). The mean cholesterol level was 215.5± 22.2 and 223.1± 23.3 among group (1) and (2). The mean triglyceride was 176.1± 16.3 and 173.3± 21.0 among group (1) and (2). As regard the preoperative data, no considerable variation was found between both groups.

<b>Diagnosis</b>	<b>Group 1 Mean ± SD</b>	<b>Group 2 Mean ± SD</b>	<b>P value</b>
<b>Weight/kg</b>	120.0± 22.5	125.9± 23.8	0.426
<b>Height /cm</b>	161.6± 5.5	160.5± 6.2	0.556
<b>BMI</b>	45.7± 5.3	46.6± 6.7	0.64
<b>Cholesterol</b>	215.5± 22.2	223.1± 23.3	0.298
<b>Triglyceride</b>	176.1± 16.3	173.3± 21.0	0.640

Student t test; Mann Whitney U test

\*P is considerable at <0.05

**Table 2:** Preoperative anthropometric measures among the two studied groups.

Table 3 showing the mean time of surgery was 90.5 ± 17.6 min and 60.3 ± 19.4 minutes among group (1) and (2). The duration of staying at hospital was one day among 50% and 62.5%, two days among 25% and 27.5% and three days among 25% and 10% in group (1) and (2). There was high statistically considerable variation between both groups regarding time of surgery. As regard Hospital stay, no considerable variation was found between both groups.

<b>Variables</b>	<b>Group 1</b>	<b>Group 2</b>	<b>P value</b>
<b>Time of surgery Mean ± SD</b>	90.5 ± 17.6	60.3 ± 19.4	0.0001
<b>Hospital stay</b>			
<b>One day</b>	10 (50)	13 (65)	0.432
<b>Two days</b>	5 (25)	5 (25)	
<b>Three days</b>	5 (25)	2 (10)	

1 Mann Whitney U test

2 Fisher Exact test

\*P is considerable at <0.05

Table 3 Intraoperative data of the two studied groups.

There was no death among both groups, there were bleeding among 10%, and 5%, there was leakage among 5% and 0% group (1) and (2). As regard postoperative complications, no considerable variation was found between both groups.

<b>Complications</b>	<b>Group 1</b>	<b>Group 2</b>	<b>P value</b>
<b>Death</b>	0 (0)	0 (0)	0.709
<b>Bleeding</b>	2 (10%)	1 (5%)	
<b>Leakage</b>	1 (5%)	0 (0%)	
<b>Overall complications</b>	3 (15%)	1(5%)	

Fisher Exact test; \*p is considerable at <0.05

**Table 4:** Postoperative complications among the two studied groups.

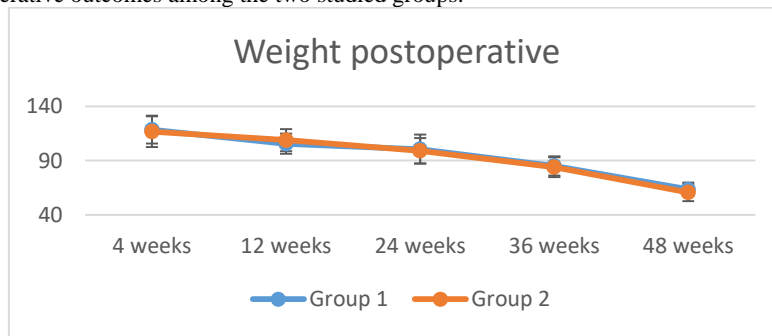
As regard weight postoperative, BMI postoperative, and EWL postoperative, no considerable variation was found between both groups as shown in table 5.

Variables	Group 1	Group 2	P value
Weight after 4 weeks	118.6± 14.5	116.8± 12.2	0.673
Weight after 12 weeks	105.6± 11.2	109.0± 11.3	0.345
Weight after 24 weeks	100.6± 11.7	99.1± 13.5	0.709
Weight after 36 weeks	85.1± 9.1	84.0± 8.9	0.701
Weight after 48 weeks	63.5± 7.9	60.6± 6.2	0.204
BMI after 4 weeks	45.9± 1.2	45.4± 1.1	0.178
BMI after 12 weeks	45.2± 1.1	44.9± 0.9	0.351
BMI after 24 weeks	43.5± 1.2	43.6± 1.1	0.785
BMI after 36 weeks	38.3± 0.8	37.9± 0.7	0.101
BMI after 48 weeks	27.4± 1.0	25.8± 3.6	0.063
EWL after 4 weeks (%)	17.0± 1.3	16.3± 1.5	0.123
EWL after 12 weeks (%)	21.5± 1.6	20.8± 1.8	0.202
EWL after 24weeks (%)	27.1± 3.3	28.5± 3.4	0.194
EWL after 36 weeks (%)	46.1± 4.5	48.1± 4.6	0.173
EWL after 48 weeks (%)	69.5± 12.3	72.9± 7.6	0.300
Cholesterol after 48 weeks	162.5± 16.6	158.1± 14.7	0.380
Triglyceride after 48 weeks	142± 15.5	136± 16.9	0.250

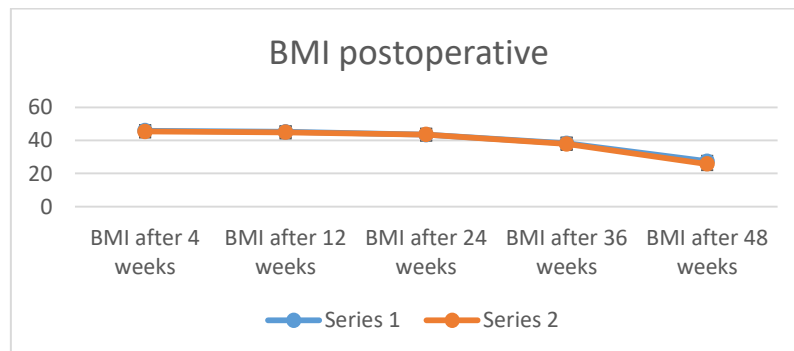
Student t test; Mann Whitney U test

\*P is considerable at <0.05

**Table 5:** Postoperative outcomes among the two studied groups.



**Fig. 1:** Weight post operative among the two studied groups.



**Fig. 2:** BMI post operative among the two studied groups.

## DISCUSSION

At 10-year follow-up, bariatric surgery is the most successful therapy for extreme obesity, resulting in more than 50% excess weight reduction. As many as 80% to 90% of individuals who undergo bariatric surgery found that diabetes mellitus type II and hypertension have improved or diminished as a result of their weight loss.<sup>6</sup>

Despite the fact that bariatric surgery is both safe and effective, revision surgery, particularly after a laparoscopic adjustable gastric band, is becoming more common. Numerous researches have looked into the possibility of converting LAGB to Roux-en-Y bypass (RYGB) or sleeve gastrectomy. The number of conversion procedures is likely to increase as the demand for bariatric surgery grows.<sup>7</sup>

Out of the 449,753 bariatric surgeries, 28,720 (6.3 percent) required reoperations, 19,970 (69.5 percent) were corrective and 8750 (30.5 percent) were conversions, according to data from the Bariatric Outcomes Longitudinal Database released in 2015.<sup>6</sup>

In addition to rising evidence favoring the use of LAGB, there is also growing evidence that there are failures and consequences that necessitate a different treatment strategy.<sup>8</sup>

The safety and efficacy of laparoscopic sleeve gastrectomy make it a popular main bariatric operation. It's also being looked at as a possible treatment for people who've had unsuccessful results with LAGB. Weight gain, unbearable symptoms, band slippage, and esophageal dilatation are among the indicators that the LSG has been utilized to treat failed LAGB, according to several reports.<sup>9</sup>

A randomized prospective clinical study which conducted among 40 cases categorized into two groups. Group 1 (Cases) cases underwent sleeve gastrectomy after adjustable gastric band, and group 2 (controls) 1 cases underwent sleeve gastrectomy with no previous history of bariatric surgery. The objective was to assess safety and efficacy of sleeve gastrectomy after failure of adjustable gastric band.

A precise assessment of therapy efficacy is crucial in every sort of treatment. When it comes to weight loss, bariatric surgery's true goal is to improve health and quality of life. It's still up for dispute what constitutes a healthy body weight drop. Among the Western population, a body mass index of 18.5–25 kg/m<sup>2</sup> is considered a reasonable weight loss range for EWL. According to doctors, the success or failure of the treatment is typically determined by EWL. As of 1981, Halverson et al. defined success as a percentage of EWL greater than or equal to 50%.<sup>10</sup>

In the present study the EWL among both groups exceeded 50% as the mean was 69.5± 12.3 among group 1 and 72.9± 7.6 among group 2.

Devadas et al. published research on the effectiveness, safety, and feasibility of conversional surgery in accordance with our findings. At the 12-month follow-up, a satisfactory EWL of 60% (95 percent CI: 56.6–63.4 percent), an EBML of 60.1

percent (95 percent CI: 48.8–71.4 percent), and a TWL of 16 percent were attained.<sup>11</sup>

In the current study, as regard weight postoperative, BMI postoperative, and EWL postoperative, no statistically considerable variation was observed between both groups.

A study goes in line with our results by Danthuluri aimed to assess the safety and efficacy of switching from LAGB to LSG. They demonstrated that conversion was safe and efficacious. Results from the study showed that cases who underwent the conversion lost substantial weight.<sup>12</sup>

According to our results, the mean weight was lower but not considerable among group with sleeve gastrectomy and no previous LAGB than group with sleeve gastrectomy after LAGB.

This goes in line with Senturk.<sup>13</sup> Conversion of LAGB to SG has been proven safe and effective. As with primary sleeve gastrectomy, cases may not lose as much weight as individuals who underwent the procedure.<sup>13</sup>

In the current study, the overall complications among sleeve gastrectomy group after LAGB was 15% in comparison to 5% among control group. There were 885 cases who had LAGB to RYGB and were analyzed by Deburgh et al, who found that single-stage was feasible in 83% of cases with a 30-day complication rate of 5.1%<sup>5</sup>. Another study was published in 2018 demonstrated overall complications among sleeve gastrectomy after adjustable gastric band failure was only 1.1%.<sup>11</sup>

The efficiency of LSG as a revision surgery following poor results after LAGB was assessed by Acholonu. It's possible to employ it as a follow-up operation after LAGB, although it appears to have more difficulties than the initial procedure. Considering its short-term weight-loss potential, it appears to be feasible.<sup>14</sup>

## CONCLUSION

Results supported the efficacy and safety of sleeve gastrectomy after adjustable gastric band. The weight loss in group with sleeve gastrectomy after AGB was not differ from the group with sleeve gastrectomy only.

Conflict of interest : none

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