ORIGINAL PAPER Bariatric surgery

Conversion to Roux-en-Y gastric bypass after sleeve gastrectomy: outcomes from a Middle Eastern cohort

Ashraf Maghrabi[1], Moaz W. Abulfaraj[1], Wisam Jamal[2], Suha Kaaki[3], Murad Aljiffry[1]

1 Department of Surgery, Faculty of Medicine, King Abdulaziz University, Jeddah, Saudi Arabia
2 Department of Surgery, University of Jeddah, Jeddah, Saudi Arabia
3 Division of Thoracic Surgery, Department of Surgery, College of Medicine, King Saud University, Riyadh, Saudi Arabia

KEY WORDS

bariatric surgery, gastroesophageal reflux disease, reoperation, Roux-en-Y gastric bypass, sleeve gastrectomy

ABSTRACT

INTRODUCTION Conversion from sleeve gastrectomy (SG) to Roux-en-Y gastric bypass (RYGB) is increasingly performed for refractory gastroesophageal reflux disease (GERD), recurrent weight gain, and anatomical complications, although outcome data from Middle Eastern centers remain limited.

AIM This study evaluated the effectiveness of conversion from SG to RYGB in a Middle Eastern cohort.

MATERIALS AND METHODS A retrospective review including 55 patients who underwent conversion from SG to RYGB at a tertiary center in Saudi Arabia between 2016 and 2024 was conducted. Indications for conversion included GERD, recurrent weight gain, suboptimal response to SG, strictures, and leaks. The assessed 1-year outcomes comprised body mass index (BMI), percentage of excess weight loss (%EWL), percentage of total weight loss, GERD symptom improvement, improvement in comorbidities, and postoperative complications. Laparoscopic (n = 40) and robotic (n = 15) approaches were descriptively compared.

RESULTS The cohort included 32 women at a mean (SD) age of 46 (8) years. Mean (SD) pre-SG BMI in the study population was 42 (7.2) kg/m^2. According to the main indications for conversion, at 1 year, mean (SD) BMI decreased to 24 (1.9) kg/m^2 (GERD), 28 (3.3) kg/m^2 (recurrent weight gain), and 27 (2.8) kg/m^2 (GERD + recurrent weight gain; P <0.001). Mean (SD) %EWL was 82%, 65%, and 67%, respectively. GERD symptoms improved in 85% of the patients. Type 2 diabetes remission occurred in 58%, hypertension improved in 72%, and complications occurred in 9.1% of the study cohort. Descriptive comparison of laparoscopic and robotic approaches showed similar outcomes, but should be interpreted with caution given the noncontemporaneous treatment periods.

CONCLUSIONS Conversion to RYGB after SG is effective for weight reduction and GERD symptom improvement, with acceptable morbidity rates.

Correspondence to:
Moaz W. Abulfaraj, MD, FRCSC, FACS, Department of Surgery, Faculty of Medicine, King Abdulaziz University, PO Box 80215, 21589 Jeddah, Saudi Arabia, phone: +966 12 640 0000, email: mabolafaraj@kau.edu.sa
Received: May 5, 2026.
Revision accepted: May 27, 2026.
Published online: June 24, 2026.
Wideochir Inne Tech Maloinwazyjne. 2026; 21 (2): 178-183
doi:10.20452/wiitm.2026.18036

INTRODUCTION Sleeve gastrectomy (SG), which accounts for more than half of the metabolic and bariatric surgery procedures worldwide,[1] is effective for weight reduction and contributes to improvement in comorbidities. However, a substantial proportion of patients experience weight regain or suboptimal clinical response over time, with weight regain rates reportedly ranging from 5.7% at 2 years to 75.6% at 6 years across systematic reviews, reflecting heterogeneity in the definitions used to identify weight regain and follow-up duration.[2,3] A conversion to Roux-en-Y gastric bypass (RYGB) is often required for the management of complications, including gastroesophageal reflux disease (GERD), recurrent weight gain, strictures, or leaks.[4,5] RYGB is recommended by the American Society for Metabolic and Bariatric Surgery (ASMBS) and the International Federation for the Surgery of Obesity and Metabolic Disorders (IFSO) for managing GERD and weight-related suboptimal clinical response after SG.[6,7]

In Saudi Arabia, where the prevalence of obesity exceeds 34%,[8] the demand for effective revisional bariatric surgery is substantial; however,

regional data on SG-to-RYGB conversion remain limited to a few Middle Eastern studies on SG-to-RYGB conversion (including randomized controlled trials)[9-11] and a large global database analysis.[12] The present study, with 55 participants, contributes additional regional evidence from the Middle East.

AIM This study primarily aimed to evaluate the efficacy of conversion from SG to RYGB in achieving weight reduction and improving obesity-related comorbidities. Secondary objectives included assessing surgical indications, complication rates, GERD symptom improvement, improvement in type 2 diabetes mellitus (T2DM) and hypertension, and comparison of outcomes between laparoscopic and robotic approaches.

MATERIALS AND METHODS **Study design and population** We conducted a retrospective review of 55 patients who underwent conversion from SG to RYGB at a tertiary care center (King Abdulaziz University Hospital) in Saudi Arabia between January 2016 and December 2024. Eligible patients had undergone SG and were subsequently converted to RYGB for indications consistent with the ASMBS and IFSO guidelines, including GERD, recurrent weight gain (>10% from nadir), suboptimal clinical response (<20% total weight loss at 18 mo), strictures, or leaks.[13] The analysis included adults (≥18 y) with a history of SG (performed at our institution or elsewhere) undergoing conversion to RYGB for an approved indication, with a minimum of 12 months of postoperative follow-up. The exclusion criteria comprised: age below 18 years, conversion to procedures other than RYGB (eg, one-anastomosis gastric bypass [OAGB] or re-SG), active malignancy, and incomplete demographic or perioperative records. Out of the 61 patients who were identified during the study period, 6 were excluded (3 were lost to follow-up before 12 months, 2 were converted to other procedures, and 1 had incomplete records), yielding a final cohort of 55 participants. A multidisciplinary team of surgeons, gastroenterologists, nutritionists, and psychologists, who assessed symptom severity, imaging findings, and lifestyle adherence, confirmed the need for conversion. Preoperative evaluation included structured assessment of GERD-related symptoms (heartburn, regurgitation, dysphagia, retrosternal chest pain, and chronic cough), nutritional status, and metabolic profile. All patients underwent routine esophagogastroduodenoscopy (EGD) for the evaluation of erosive esophagitis, hiatal hernia, and anatomical status of the previous sleeve. Cross-sectional imaging (contrast-enhanced computed tomography) was performed when leaks were suspected. Lifestyle adherence (dietary compliance and physical activity) was reviewed by a nutrition team. Erosive esophagitis severity was graded using the Los Angeles (LA) classification during EGD, ranging from grade A (mild) to D (severe), or reported as absent. The selection of surgical approach was primarily chronological, reflecting institutional adoption of technology. Surgical procedures were performed either laparoscopically (n = 40; 2016–2021) or robotically (n = 15; 2022–2024) using the da Vinci Xi Surgical System (Intuitive Surgical Inc., Sunnyvale, California, United States).

Surgical technique Laparoscopic and robotic RYGB procedures followed standardized protocols. The gastric pouch was created over a 40Fr bougie using a linear stapler, measuring approximately 4–6 cm from the gastroesophageal junction, with preservation of the left gastric artery to maintain vascular supply. Laparoscopic RYGB was performed using Endo GIA linear cutting staplers (Medtronic, Minneapolis, Minnesota, United States) to construct the gastrojejunostomy, whereas robotic RYGB employed a hand-sewn gastrojejunostomy using 3–0 absorbable sutures with the da Vinci Xi Surgical System. Roux limb and biliopancreatic limb lengths were both standardized to 75–100 cm and tailored to body mass index (BMI) and metabolic requirements, with shorter limbs used in the patients with a preoperative BMI below 30 kg/m^2.[13] No laparoscopic-to-open surgery conversions were required. Hiatal hernias identified intraoperatively (n = 12) were repaired with primary closure using nonabsorbable sutures to restore normal anatomy and mitigate GERD symptoms.

Data collection The collected data included: 1) patient demographics; 2) preoperative BMI before SG and before RYGB; 3) percentage of excess weight loss (%EWL), calculated as [pre-RYGB weight – 1-year post-RYGB weight]/[pre-RYGB weight – ideal weight] × 100, with ideal weight defined as BMI of 25 kg/m^2; 4) percentage of total weight loss (%TWL), calculated as [pre-RYGB weight – 1-year post-RYGB weight]/[pre-RYGB weight] × 100; 5) surgical indications; 6) comorbidities (T2DM, hypertension, and GERD); 7) interval between procedures; 8) 1-year post-RYGB BMI; 9) perioperative complications (leaks, bleeding, hernias, and strictures); 10) operative time; and 11) length of hospital stay (LOS). Symptomatic GERD improvement was defined as sustained relief of reflux symptoms and discontinuation of proton pump inhibitor use. Objective endoscopic findings were available only in a subset of patients (n = 5). Follow-up data were collected during routinely scheduled postoperative clinic visits at 1, 3, 6, and 12 months postsurgery as part of our institutional bariatric protocol, as well as telephone contact and electronic medical record review when patients could not attend in person. Our cohort represents individuals who were managed within an established multidisciplinary bariatric pathway, with a strong commitment to long-term follow-up, and the patients who were lost to follow-up before 12 months were excluded a priori, which accounts for the 100% follow-up

TABLE 1 Patient characteristics and indications for conversion (n = 55)

Characteristic		Value
Women		32 (58.2)
Age, y		46 (8)
Pre-SG BMI, kg/m^2		42 (7.2)
Interval between SG to RYGB, y		4.2 (2.1)
Comorbidities	T2DM	26 (47.3)
	Hypertension	18 (32.7)
	GERD	39 (70.9)
Preoperative LA grade esophagitis	A	15 (38.5)
	B	12 (30.8)
	C	8 (20.5)
	D	4 (10.3)
Indications for conversion	GERD	18 (32.7)
	Recurrent weight gain	21 (38.2)
	GERD + weight gain	12 (21.8)
	Stricture	2 (3.6)
	Leak	1 (1.8)

Data are presented as number (percentage) or mean (SD).

Abbreviations: BMI, body mass index; GERD, gastroesophageal reflux disease; LA, Los Angeles; RYGB, Roux-en-Y gastric bypass; SG, sleeve gastrectomy; T2DM, type 2 diabetes mellitus

rate in the analyzed cohort. The outcomes for comorbidities were defined as the glycated hemoglobin (HbA_{1c}) level below 6.5%, without antidiabetic medication for complete T2DM remission, and a reduction in antihypertensive medication use for hypertension improvement.

Statistical analysis Descriptive statistics are expressed as mean (SD) and ranges. The normality of continuous variables was assessed using the Shapiro–Wilk test, and the homogeneity of variance was assessed using the Levene test. BMI, %EWL, %TWL, operative time, and LOS met the assumptions of approximate normality and equal variance within indication subgroups, supporting the use of parametric testing. Within-group BMI changes were assessed using the paired *t* test. One-way analysis of variance (ANOVA) with the Tukey post hoc tests were used to compare 1-year BMI and %EWL across the indication groups. Comparisons of continuous outcomes between the laparoscopic and robotic groups were performed using the independent-samples *t* test. Categorical outcomes were analyzed using the χ^2 test or the Fisher exact test, as appropriate. Significance was set at a *P* value below 0.05. All statistical analyses were performed using SPSS software (version 26; IBM Corp., Armonk, New York, United States).

Ethics The study was approved by the Institutional Review Board of King Abdulaziz University Hospital (HA-25-1-0082). All procedures involving human participants were conducted in accordance with the ethical standards of the institutional and/or national research committee and the 1964 Declaration of Helsinki and its subsequent amendments or comparable ethical standards. For this retrospective study, formal informed consent was not required; all data were obtained from archived medical records, and patient confidentiality was maintained throughout.

RESULTS **Patient characteristics** The cohort included 55 patients (32 women and 23 men) at a mean (SD) age of 46 (8) years (range, 34–71 y), with mean (SD) pre-SG BMI of 42 (7.2) kg/m^2. Indications for conversion to RYGB included GERD (n = 18), recurrent weight gain or suboptimal clinical response (n = 21), GERD and recurrent weight gain combined (n = 12), strictures (n = 2), and leaks (n = 1). Mean (SD) interval between SG and RYGB was 4.2 (2.1) years (range, 0.08–9 y). Comorbidities included T2DM (n = 26), hypertension (n = 18), and GERD (n = 39). Preoperative EGD identified erosive esophagitis severity as follows: LA grades A (n = 15), B (n = 12), C (n = 8), and D (n = 4). All 55 patients completed at least 12 months of follow-up. Patient characteristics are summarized in **TABLE 1**.

Weight reduction outcomes At 1 year, BMI reductions were observed in all indication groups (all $P < 0.001$). Mean (SD) BMI decreased from 29 (2.2) to 24 (1.9) kg/m^2 in the GERD group, from 44 (3.8) to 28 (3.3) kg/m^2 in the recurrent weight gain group, and from 43 (3.5) to 27 (2.8) kg/m^2 in the combined group. Mean (SD) %EWL was 82% (15%) in the GERD group, 65% (12%) in the recurrent weight gain group, and 67% (14%) in the combined cohort. Mean (SD) %TWL was 17% (5%) in the GERD group, 36% (8%) in the recurrent weight gain cohort, and 37% (7%) in the combined group. One-way ANOVA with Tukey post hoc tests demonstrated differences in 1-year BMI among the indication groups: the GERD group differed from the recurrent weight gain and combined groups (all post hoc $P < 0.001$). However, no significant difference was observed between the recurrent weight gain and combined cohorts. BMI and weight loss outcomes are detailed in **TABLES 2** and **3**, respectively.

Resolution of comorbidities Symptomatic GERD improvement was reported in 85% of the patients. Postoperative EGD was performed in a subset of participants (n = 5) and showed reduced erosive esophagitis severity, with 3 patients showing no esophagitis (previous LA grades A–C) and 2 with persistent grade A esophagitis (previous LA grades B–D). Therefore, the findings should be interpreted as symptom-based improvement rather than objective endoscopic resolution at the cohort level. Of the 26 patients with T2DM, 15 (58%) achieved complete remission (HbA_{1c} <6.5%, off antidiabetic medications), and hypertension improved in 72%.

Complications Five patients (9.1%) experienced complications: 2 leaks (3.6%), 1 gastrointestinal

TABLE 2 Body mass index outcomes by indication for conversion

Indication	Pre-RYGB BMI, kg/m²	BMI at 1 year post-RYGB, kg/m²	*P* value
GERD (n = 18)	29 (2.2)	24 (1.9)	<0.001
Recurrent weight gain (n = 21)	44 (3.8)	28 (3.3)	<0.001
GERD + weight gain (n = 12)	43 (3.5)	27 (2.8)	<0.001
Stricture (n = 2)	24 (3)	26 (2)	N/A
Leak (n = 1)	51	31	N/A

Data are presented as mean (SD).

Abbreviations: N/A, not available; others, see **TABLE 1**

TABLE 3 Weight loss outcomes by indication for conversion

Indication	%EWL	%TWL
GERD (n = 18)	82 (15)	17 (5)
Recurrent weight gain (n = 21)	65 (12)	36 (8)
GERD + weight gain (n = 12)	67 (14)	37 (7)
Stricture (n = 2)	N/A	N/A
Leak (n = 1)	N/A	N/A

Data are presented as mean (SD).

Abbreviations: %EWL, percentage of excess weight loss; %TWL, percentage of total weight loss; others, see **TABLES 1** and **2**

bleed (1.8%), 1 port-site hernia (1.8%), and 1 gastrojejunostomy stricture (1.8%). Of the 2 leaks, 1 was managed laparoscopically, whereas the other conservatively. The gastrointestinal bleed was managed laparoscopically, the gastrojejunostomy stricture was treated by endoscopic dilatation, and the port-site hernia was repaired robotically. None of the patients died during the study period. Complication rates did not differ significantly by indication (GERD group, 5.6%; recurrent weight gain group, 9.5%; and combined cohort, 8.3%; $P = 0.86$). Complications are summarized in **TABLE 4**.

Laparoscopic vs robotic approach Across all measured end points (including BMI reduction, %EWL, GERD symptom improvement, and complication rates), the outcomes in the laparoscopic (n = 40) and robotic groups (n = 15) were of similar magnitude. Robotic surgery was associated with longer mean (SD) operative time (172 [28] vs 158 [24] min; $P = 0.04$), with no significant difference in LOS. Because the laparoscopic and robotic procedures were performed in 2 distinct, nonoverlapping time periods (2016–2021 and 2022–2024), this descriptive comparison should not be interpreted as evidence of equivalence between the approaches. The results are summarized in **TABLE 5**.

DISCUSSION This study demonstrates the efficacy of conversion from SG to RYGB, with significant reductions in BMI (24 to 28 kg/m² at 1 year), improvement of GERD symptoms in 85% of the patients, complete remission of T2DM in 58% of the participants, and improvement in hypertension in 72% of the individuals, indicating outcomes consistent with the ASMBS and IFSO guidelines.[6,7] These findings align with those of a recent meta-analysis reporting high GERD resolution rates (up to 99%) following conversion bariatric surgery,[14] and with longitudinal data showing sustained reduction in proton pump inhibitor use after SG-to-RYGB conversion.[15] The high %EWL (82%) reported in the GERD group should be interpreted with caution, as mean pre-RYGB BMI in this subgroup was only 29 kg/m². Therefore, a modest absolute BMI reduction translates into a disproportionately large %EWL value, which may overestimate the true clinical magnitude of weight loss in this group. The corresponding %TWL (17%) is a more informative metric for this subgroup and was deliberately included to mitigate this distortion. The patients converted for recurrent weight gain or combined indications demonstrated greater absolute BMI reductions (16 to 17 kg/m²) and higher %TWL values (36%–37%).[16] The overall complication rate of 9.1% is consistent with international benchmarks (5%–15%),[17] regional data,[8,9] and contemporary series of revisional bariatric procedures specifically performed due to complications.[18] The descriptive comparison between laparoscopic and robotic approaches did not show clinically meaningful differences in the measured outcomes. However, this comparison is susceptible to chronological and learning-curve bias, and should not be interpreted as evidence of equivalence because the 2 groups were treated in nonoverlapping time periods. This interpretation aligns with 2 recent consensus statements that have framed how conversion bariatric procedures should be evaluated. The first international modified-Delphi consensus on revisional bariatric surgery, developed by an expert panel of 22 international opinion leaders,[19] and the more recent 2025 Polish Expert Consensus on Metabolic and Bariatric Surgery[20] emphasize that conversion procedures require standardized multidisciplinary evaluation and adequate long-term follow-up to establish durable outcomes. Our findings are broadly consistent with the literature on revisional bariatric surgery, including high-volume center experience with robotic revisional procedures.[21,22]

Several studies from the Middle East and the broader global literature provide important context for interpreting our findings (**TABLE 6**). Hany et al[10] conducted the largest randomized controlled trial in the Middle East to date, comparing RYGB with OAGB conversion following unsuccessful SG in 160 patients, and demonstrating superior reflux resolution with RYGB. Al-Sabah et al[11] from Kuwait reported that conversion bypass yielded more sustained weight-loss outcomes than re-sleeve procedures. Barajas-Gamboa et al[9] from the United Arab Emirates demonstrated substantial symptom improvement but a higher perioperative risk in complex cases. Beyond the Middle East, Dang et al[12]

TABLE 4 Postoperative complications in the study groups

Complication	Total	GERD	Recurrent weight gain	GERD + weight gain	*P* value
Leaks	2 (3.6)	1 (5.6)	1 (4.8)	0	0.86
Gastrointestinal bleeding	1 (1.8)	0	1 (4.8)	0	
Port-site hernia	1 (1.8)	0	0	1 (8.3)	
Stricture	1 (1.8)	0	0	0	
Total	5 (9.1)	1 (5.6)	2 (9.5)	1 (8.3)	

Data are presented as number (percentage).

Abbreviations: see **TABLE 1**

TABLE 5 Laparoscopic vs robotic surgery outcomes

Characteristic	Laparoscopic surgery (n = 40)	Robotic surgery (n = 15)	*P* value
Operative time, min	158 (24)	172 (28)	0.04
BMI at 1 y postsurgery, kg/m^2	27 (4)	26 (3)	0.45
BMI reduction, kg/m^2	14.8 (3.2)	15.2 (2.9)	0.67
%EWL	70 (14)	72 (13)	0.59
%TWL	30 (8)	32 (7)	0.6
Complication rate	3 (7.5)	2 (13.3)	0.56
Length of hospital stay, d	2.1 (0.6)	1.8 (0.4)	0.12
GERD symptom improvement	27/32 (85)	7/7 (95)	0.31
T2DM complete remission	11/20 (55)	4/6 (67)	0.62

Data are presented as number (percentage) or mean (SD).

Abbreviations: see **TABLES 1** and **3**

TABLE 6 Comparative studies on conversion from sleeve gastrectomy to Roux-en-Y gastric bypass

Study	Country	Study design	Number of participants	Procedure	Key outcomes
Barajas-Gamboa et al[9]	United Arab Emirates	Retrospective	47	RYGB	• GERD improvement, approximately 70%; • Comparable complication rates
Al-Sabah et al[11]	Kuwait	Retrospective	84	Re-sleeve + RYGB	• Bypass yielded more sustained weight loss than re-sleeve
Hany et al[10]	Egypt	RCT	80 (RYGB arm)	RYGB vs OAGB	• Similar %EWL; • Superior reflux resolution in RYGB; • Largest Middle Eastern RCT
Dang et al[12]	United States	Database	7777	RYGB	• GERD and weight loss failure were primary indications; • Low complication rates; • Largest global dataset
Present study	Saudi Arabia	Retrospective	55	RYGB	• 85% GERD symptom improvement; • 9.1% complication rate; • Laparoscopic and robotic subgroups

Abbreviations: OAGB, one-anastomosis gastric bypass; RCT, randomized controlled trial; others, see **TABLE 1**

analyzed 7777 SG-to-RYGB conversions and confirmed the safety profile of the procedure. As compared with previous regional and global series,[6-8,18-20] our study demonstrated similar symptomatic GERD improvement (85% vs approximately 70%) and complete T2DM remission (58% vs 38%–40%).[9,10]

Limitations This study has several limitations. The retrospective design introduces a risk of selection bias. As a single-center study, the findings may not be generalizable to lower-volume settings. The assessment of GERD outcomes was based on subjective symptom relief without the use of standardized questionnaires, and postoperative EGD was performed only in 5 patients. The 1-year follow-up period is inadequate for evaluating long-term durability. In addition, the noncontemporaneous laparoscopic and robotic groups limit the validity of

comparisons between these surgical approaches. Small subgroup sizes (strictures / leaks, n = 3; robotic, n = 15) further restrict generalizability. Future multicenter, ideally prospective, studies with larger cohorts and extended follow-up are warranted.[23,24]

CONCLUSIONS Conversion to RYGB after SG is highly effective, achieving significant short--term weight loss, GERD symptom improvement, T2DM remission, and improvement in hypertension, with a low overall complication rate. Laparoscopic and robotic approaches produced descriptively similar outcomes. However, our data should be treated with caution. Prospective multicenter studies with longer follow-up are warranted to refine patient selection, technical standardization, and durability of outcomes in Middle Eastern populations.

ARTICLE INFORMATION

ACKNOWLEDGMENTS The authors thank the Scientific Endowment and Deanship of Scientific Research, King Abdulaziz University, Jeddah, Saudi Arabia.

FUNDING The project was funded by KAU Endowment (WAQF) at King Abdulaziz University, Jeddah, Saudi Arabia. The authors, therefore, wish to thanks WAQF and the Deanship of Scientific Research for technical and financial support.

CONTRIBUTION STATEMENT AM and MWA: study conception and design. AM: methodological revision and response to reviewers. MWA: original draft and data analysis. WJ, SK, and MA: manuscript revision and editing. All authors participated in data collection, read, and approved the final version of the manuscript.

CONFLICT OF INTEREST None declared.

AI STATEMENT Artificial intelligence was not used in the preparation of this manuscript.

HOW TO CITE Maghrabi A, Abulfaraj MW, Jamal W, et al. Conversion to Roux-en-Y gastric bypass after sleeve gastrectomy: outcomes from a Middle Eastern cohort. Wideochir Inne Tech Maloinwazyjne. 2026; 21: 178-183. doi:10.20452/wiitm.2026.18036

JOURNAL INFORMATION

Videosurgery and Other Miniinvasive Techniques is an official journal of the Videosurgery Foundation.

REFERENCES

1 Ali M, El Chaar M, Ghiassi S, Madura JA; American Society for Metabolic and Bariatric Surgery Clinical Issues Committee. American Society for Metabolic and Bariatric Surgery updated position statement on sleeve gastrectomy as a bariatric procedure. Surg Obes Relat Dis. 2017; 13: 1652-1657.

2 Karmali S, Brar B, Shi X, et al. Weight recidivism post-bariatric surgery: a systematic review. Obes Surg. 2013; 23: 1922-1933.

3 Lauti M, Kularatna M, Hill AG, MacCormick AD. Weight regain following sleeve gastrectomy - a systematic review. Obes Surg. 2016; 26: 1326-1334.

4 Eisenberg D, Shikora SA, Aarts E, et al. 2022 American Society of Metabolic and Bariatric Surgery (ASMBS) and International Federation for the Surgery of Obesity and Metabolic Disorders (IFSO) Indications for Metabolic and Bariatric Surgery. Obes Surg. 2023; 33: 15-16.

5 Welbourn R, Hollyman M, Kinsman R, et al. Bariatric surgery worldwide: baseline demographic description and one-year outcomes from the fourth IFSO Global Registry report 2018. Obes Surg. 2019; 29: 782-795.

6 Clapp B, Wynn M, Martyn C, et al. Long-term (7 or more years) outcomes of the sleeve gastrectomy: a meta-analysis. Surg Obes Relat Dis. 2018; 14: 741-747.

7 Salminen P, Kow L, Aminian A, et al; IFSO Experts Panel. IFSO consensus on definitions and clinical practice guidelines for obesity management - an international Delphi study. Obes Surg. 2024; 34: 30-42.

8 Al-Raddadi R, Abualat HA, Abdulfattah LY, et al. The prevalence of obesity and overweight, associated demographic and lifestyle factors, and health status in the adult population of Jeddah, Saudi Arabia. Ther Adv Chronic Dis. 2019; 10: 2040622319878997.

9 Barajas-Gamboa JS, Acosta G, Savdie R, et al. Conversion of sleeve gastrectomy to Roux-en-Y gastric bypass for complications: outcomes from a tertiary referral center in the Middle East. Surg Obes Relat Dis. 2019; 15: 1690-1695.

10 Hany M, Zidan A, Elmongui E, Torensma B. Revisional Roux-en-Y gastric bypass versus revisional one-anastomosis gastric bypass after failed sleeve gastrectomy: a randomized controlled trial. Obes Surg. 2022; 32: 3491-3503.

11 Al-Sabah S, Alenezi H, Al-Serri A, et al. Midterm results of revisional bariatric surgery postsleeve gastrectomy: resleeve versus bypass. Surg Obes Relat Dis. 2020; 16: 1747-1756.

12 Dang JT, Switzer NJ, Wu K, et al. Conversion of sleeve gastrectomy to Roux-en-Y Gastric bypass: indications, prevalence, and safety. Obes Surg. 2023; 33: 1486-1493.

13 Kaoukabani G, Labban M, Abou Khalil M, et al. Sleeve to gastric bypass conversion: a multiinstitutional study of 217 patients. Surg Obes Relat Dis. 2025; 21: 1190-1196.

14 Chiappetta S, Lainas P, Kassir R, et al. Gastroesophageal reflux disease as an indication of revisional bariatric surgery—indication and results—a systematic review and meta-analysis. Obes Surg. 2022; 32: 3156-3171.

15 Benamran D, Toso C, Buchs NC, et al. Results of sleeve gastrectomy conversion to Roux-en-Y gastric bypass on gastroesophageal reflux disease symptoms and proton pump inhibitors use evolution over time. J Gastrointest Surg. 2024; 28: 1412-1419.

16 Brethauer SA, Kothari S, Sudan R, et al. Systematic review on reoperative bariatric surgery: American Society for Metabolic and Bariatric Surgery Revision Task Force. Surg Obes Relat Dis. 2014; 10: 952-972.

17 Mann JP, Jakes AD, Hayden JD, Barth JH. Systematic review of definitions of failure in revisional bariatric surgery. Obes Surg. 2015; 25: 571-574.

18 Khalaj A, Barzin M, Ebadinejad A, et al. Revisional bariatric surgery due to complications: indications and outcomes. Obes Surg. 2023; 33: 3463-3471.

19 Mahawar KK, Himpens JM, Shikora SA, et al. The first consensus statement on revisional bariatric surgery using a modified Delphi approach. Surg Endosc. 2020; 34: 1648-1657.

20 Major P, Orłowski M, Małczak P, et al. Polish Expert Consensus on Metabolic and Bariatric Surgery: 2025 update. Wideochir Inne Tech Maloinwazyjne. 2025; 20: 125-143.

21 Dreifuss NH, Schlottmann F, Molena D, Masrur MA. Robotic revisional bariatric surgery: a high-volume center experience. Obes Surg. 2021; 31: 1656-1663.

22 Ataya K, El Bourji H, Bsat A, et al. Robotic versus laparoscopic revisional bariatric surgeries: a systematic review and meta-analysis. J Minim Invasive Surg. 2023; 26: 198-207.

23 Okamoto K, Miyata T, Nagayama T, et al. Current status and future applications of robotic surgery in upper gastrointestinal surgery: a narrative review. Cancers (Basel). 2025; 17: 1933.

24 Gagner M, Deitel M, Erickson AL, Crosby RD. Survey on laparoscopic sleeve gastrectomy (LSG) at the Fourth International Consensus Summit on Sleeve Gastrectomy. Obes Surg. 2013; 23: 2013-2017.