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Trends and safety of bariatric revisional surgery in Italy: multicenter, prospective, observational study

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Abstract

Background: Revisional bariatric surgery (RBS) represents a further solution for patients who experience inadequate weight loss (IWL) following primary bariatric surgery (BS) or significant weight regain (WR) following initial satisfactory response. RBS guidelines are lacking; however, an increased trend in further BS offerings has been reported recently.

Objective: Analyze trend, mortality, complication, readmission, and reoperation rates for any reason at 30 days after RBS in Italy.

Setting: Ten Italian high-volume BS centers (university hospitals and private centers).

Methods: Prospective, observational, multicenter study enrolling patients undergoing RBS between October 1, 2021, and March 31, 2022, registering reasons for RBS, technique, mortality, intraoperative and perioperative complications, readmissions, and reinterventions for any reason. Patients undergoing RBS during the same calendar interval in 2016–2020 were considered control patients.

Results: A total of 220 patients were enrolled and compared with 560 control-group patients. Mortality was .45% versus .35% (n.s), with an overall mortality of .25%, while open surgery or conversion to open surgery was registered in 1%. No difference was found for mortality, morbidity, complications, readmission (1.3%), and reoperation rates (2.2%). IWL/WR was the most frequent cause,

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followed by gastroesophageal reflux disease; Roux-en-Y gastric bypass was the most used revisional procedure (56%). Sleeve gastrectomy was the most revised procedure in the study group, while gastric banding was the most revised in the control group. RBS represents up to 9% of the total BS in the Italian participating centers.

Conclusions: Laparoscopy represents the standard approach for RBS, which appears safe. Current Italian trends show a shift toward sleeve gastrectomy being the most revised procedure and Roux-en-Y gastric bypass being the most frequent revisional procedure. (Surg Obes Relat Dis 2023;19:1270–1280.)

Keywords: Revisional bariatric surgery; Trends; Conversion; Perioperative morbidity and mortality; Readmission; Reoperation

Revisional bariatric surgery (RBS) is an option for patients who have inadequate weight loss (IWL) after bariatric surgery (BS) and improvement/resolution of co-morbidities, or significant weight regain (WR) following a satisfactory response, even with relapse of co-morbidities [1,2]. All bariatric procedures show WR, in different proportions, based on BS type, mechanism of action, and the patients' compliance. Recent studies suggest that revision rates for sleeve gastrectomy, which is the most performed BS in the world since 2014 [3], can be as high as 10% when patients are followed for more than 3 years and as high as 22% after 10 years [4]. This represents a challenge for the bariatric surgeon community and the multidisciplinary teams involved.

The commonly accepted definition of successful weight loss (WL) after BS is the loss of 50% or more of excess weight, which is defined as the preoperative weight minus the ideal weight. As such, patients with significant WL may regain weight and still be considered successful. WR is commonly defined as regaining weight as to achieve a body mass index >35 kg/m^2, but there is a need for further clarity in defining WR [5]. An increase of at least 10 kg from nadir weight is another definition, while percent excess weight loss (%EWL), or total weight change, may be more clinically meaningful and useful in guiding the choice of revisional procedure [6].

Approximately 14% of patients cannot maintain WL after BS, and WR is associated with the deterioration of the quality of life and the reappearance or worsening of obesity-related co-morbidities, like type 2 diabetes (T2D) or hypertension, which necessitate close monitoring and appropriate management. Additionally, WR can have devastating psychological effects, which lead to frustration, anger, and even depression [7]. Significant WR defined as $\geq$25% weight gain from nadir could be experienced by 36.9% of patients after an average span of 6.9 years after surgery. This can raise up to 50.2% of patients that regained $\geq$15% of weight at 5 years after reaching their nadir weight, utilizing a different threshold for significant weight regain [8]. The true prevalence of significant WR remains unknown as the data vary widely due to the lack of consensus on how to calculate and define significant WR. Real-world data on the percentage of patients with WR seeking RBS are lacking.

Dietary, behavioral, and exercise interventions have not demonstrated efficacy yet in reversing WR after BS [9]. Published studies of antiobesity pharmacotherapy (AOP) for WR have been mostly retrospective reviews, with a dire need for demonstration of efficacy in randomized controlled trials for cost-effective pharmacotherapy combined with lifestyle modification [9,10]. Many of these drugs are currently being investigated to treat obesity, nonalcoholic steatohepatitis, diabetes, and other co-morbidities associated with obesity. The efficacy of glucagon-like peptide-1 receptor agonists (GLP1-RAs) for treatment of T2D and obesity is well established, but their role in the treatment of IWL or WR after BS remains to be defined [10]; mostly GLP1-RAs are limited to liraglutide in observational studies or case reports, even if GLP1-RAs are increasingly utilized as adjuvant therapy after BS [10]. The GRAVITAS trial randomized patients with persistent or recurrent T2D following BS to receive liraglutide or placebo. Although the primary outcome was change in HbA1C, the results showed a difference in mean WL of 4.2 kg in the liraglutide versus placebo group after 26 weeks of treatment [11]. Also new are multigeneration agonists, which act on GLP-1 receptors and other receptors, such as glucagon, GIP and PYY, but GLP1-RA–based weight loss therapies were found to be more effective for treating post-bariatric weight regain than non–GLP1-RA, regardless of surgery type [12]. AOP is severely underutilized for treating primary obesity and only marginally less underutilized in treating recurrent obesity following BS [13]. The available information, mainly obtained from observational studies and small trials, support the use of AOP for the treatment of weight regain after BS, with call for attentive selection of appropriate agents for each individual patient, and emphasize the need for randomized clinical studies to confirm these results [9–14].

Endoscopic revisions of BS procedures have been developed to maximize patients' outcomes and have different

purposes according to the type of previously performed surgical procedure. Different endobariatric techniques are currently performed after both Roux-en-Y gastric bypass (RYGB) and sleeve gastrectomy (SG) to modulate post-surgical anatomy, aimed to have a restrictive effect, suturing full-thickness procedures being the most performed after both RYGB and SG [15]. Nowadays, revisional endoscopic bariatric therapy could be a valid alternative for patients with WR unwilling to undergo surgical treatment again [16], even if is reported only as limited experiences. Endoscopic revisions that reduce gastric pouch size and diameter of the gastrojejunal anastomosis may offer an effective, safe, less invasive, and even reproducible treatment that could be a reasonable option offering a more favorable risk profile in selected patients [16]. A recent review revealed that despite minimal complications, least invasiveness, no need to intraperitoneal manipulation, and outpatient setting, endoscopic revisions provide the lowest weight loss after RYGB failure among all the different procedures available, after 1-year follow-up [17]. Future studies could optimize a tailored approach for WR after BS that includes endoscopy in combination with other therapeutic modalities like AOP [9–17].

RBS represents a constantly growing set of procedures [18–21]. There is a lack of high-quality studies and an almost total lack of randomized data on various aspects of RBS [19]. These factors disturb the individual bariatric surgeons when choosing the right RBS procedures for their patients [18–20]. As defined by the American Society for Metabolic and Bariatric Surgery (ASMBS) Revision Task Force, RBS includes conversion procedures that change from one initial procedure to a different type (e.g., converting one initial to another operation by enhancing its effects), correction (procedures that address complications), and reversal (procedures that restore the original anatomy if possible) [22].

Accepting severe obesity as a chronic disease recognizes the need for its long-term management as a multimodal therapy that could include RBS to achieve optimal outcomes [23], especially in individuals with IWL or resistant to treatment (BS). The complexity of RBS is higher than primary BS, and is associated with increased hospital length of stay and higher rates of complications [5,19,24]. Nonetheless, RBS produces further WL and improves outcomes of obesity-related co-morbidities, with acceptable complication and low mortality rates [23] in selected patients and should be considered in those with persistent metabolic diseases after primary BS [25–28]. The literature reports an increasing trend in the percentage of "conversion" intent RBS for IWL or WR, based on self-referencing surgical center choices, in the absence of robust outcome data [3].

The rationale for this study is a lack of national data documenting the recent trend of RBS (percentage of interventions for high-volume centers), including indications, types of RBS and, above all, data on mortality and perioperative complications that are essential information for informed patient consent. Our aim is to analyze the trend in RBS utilization, mortality, complications, readmission, and reoperation rates for any reason within 30 postoperative days (PODs).

Methods

This was a prospective, observational, multicenter study carried out in 10 high-volume bariatric centers, representing all Italian regions (Table 1). The study was conducted in accordance with the principles of good clinical practice, as well as with the study's protocol registered at www.ClinicalTrials.gov (NCT05194943; Unique Protocol ID: RBST2021). The study was approved by the ethical committee of the coordinating center (Lazio 2 Rome, Protocol no. 0243678/15.12.202) as well as by the local boards and ethical committees of each participating center. The protocol respects the STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) statement and checklist [29] and did not change during the study's period: October 1, 2021, to March 31, 2022.

Candidates were enrolled according to the following inclusion criteria: previous BS; aged between 18 and 65 years; no concomitant procedure (excluding hiatal hernia repair); and laparoscopic RBS procedures endorsed by the Italian Society

Table 1
Participating centers of the revisional bariatric surgery study and their regional locations in Italy

General Surgery Division and Bariatric Center of Excellence IFSO-EC, Department of Medical Surgical Sciences and Biotechnologies and Department of Medical Surgical Sciences and Translational Medicine, University "La Sapienza" of Rome	Central Italy
General Surgery, Department of Surgical Sciences, University of Turin	North Italy
Department of General and Oncological Surgery, Center of Bariatric Surgery, Policlinico San Marco di Zingonia, Bergamo	North Italy
Bariatric Unit, Humanitas Clinical and Research Hospital, IRCCS Rozzano, Milan	
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Department of General Surgery, Villa d'Agri Hospital, Potenza	South Italy

for Obesity Surgery (SICOB) [30], European Association for Endoscopic Surgery (EAES) [9], and International Federation for Obesity Surgery (IFSO) [20], including RYGB, SG or repeated SG, biliopancreatic diversion, duodenal switch (DS), one-anastomosis gastric bypass (OAGB), and single-anastomosis duodeno-ileal bypass (SADI). SICOB's informed consent for RBS was given, including COVID-19 and participation to the study addendums. All the participating centers followed the same protocols, as previously published [31], for the preoperative work-up, surgical indication, informed consent, preparation for surgery, and in-hospital, operating room, and post-discharge procedures, including telemedicine and 30th POD outpatient visits. All RBS data were collected anonymously in a prospective, online database with a dedicated website. Each center had its own slot for data submission: anthropometrics data, date of primary BS, weight loss evolution, reasons for RBS, date of and anthropometrics at RBS, mortality, intraoperative and perioperative complications (30th POD), hospital readmission after discharge, and reintervention for any reason.

The study group included all consecutive patients undergoing RBS between October 2021 and March 2022 and was compared with the control group, which included all cases of RBS performed during the 2016–2020 period in the same semester (October–March).

Patients were not involved in designing the research questions, outcome measures, or interpretation or writing up of results of this study. Patients' representatives in our ethics committee were asked for comments on general comprehensibility. The patients' representatives of each participating hospital were informed about the study and its start.

Statistical analysis

In this prospective observational study, categorical data were described by absolute and relative frequency, continuous data by mean and standard deviation (SD). Analysis of the categorical and continuous data were performed by χ^2 test or z test for 2 proportions and t test for independent samples, respectively. The significance was fixed at .05 and all analysis was carried out with the SPSS v.28 software.

Results

A total of 220 consecutive patients were prospectively enrolled during the study period by the 10 participating centers. Demographics are reported in Table 2, together with data extracted for the control group of 560 patients operated in the same calendar periods of the 4 previous years (2016–2020), before the COVID-19 pandemic's onset. RBS represented 8.38% of all bariatric procedures performed between 2016 and 2022. Fig. 1 reports trends of RBS in the last 5 years in Italy, and Fig. 2 reports type of revised primary bariatric procedures. Thirty-day follow-up was 100% for each group.

Mortality in the study group was .45% (1 case of massive pulmonary embolism on the first POD). Mortality in the control group was .35% (1 case of myocardial infarction and 1 case of massive pulmonary embolism). Conversion

Table 2
Demographics of 220 consecutive patients undergoing revisional bariatric surgery during October 2021–March 2022, compared with a control group operated in the same calendar periods of the 4 previous years (2016–2020), and 30-day mortality, readmission, and/or reoperation rates for any reason in both groups

Characteristic	2016–2020 (n = 560)	2021–2022 (n = 220)	*P* value
Age	48 (10)	47.9 (9.8)	.957
Sex			.325
Male	100	46	
Female	460	174	
BMI initial (kg/m^2)	44.8 (6.7)	45.9 (10.6)	.206
BMI nadir (kg/m^2)	30.3 (5.6)	30.3 (6.8)	.959
BMI revision (kg/m^2)	39.8 (7.6)	38.7 (8.5)	.094
Time interval (mo)*	136 (921)	101 (70)	.580
Steps†			.147
1 step	392	166	
Multiple steps	166	54	
Readmission			.977
No	554	217	
Yes	6 (1.07%)	3 (1.3%)	
Reintervention			.471
No	553	215	
Yes	7 (1.25%)	5 (2.2%)	
Mortality	0.35%	0.45%	.657

BMI = body mass index.
* Time interval = months between primary and revisional bariatric surgery.
† Steps = 1 or more sequential operations between primary and revisional surgery.

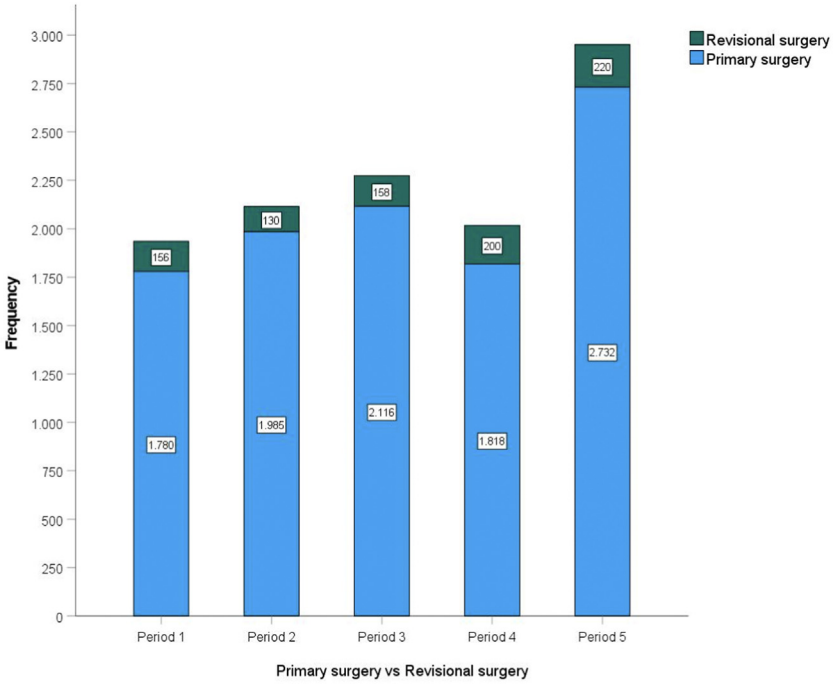

Fig. 1. Primary versus revisional bariatric surgery trends in Italy during 2016–2022.

to open surgery was registered in 3 cases (1 in group A and 2 in group B) due to intraoperative findings, and in 1 case during a reoperation in the third POD due intestinal obstruction after conversion to RYGB. Two of the operations converted to open surgery from group B developed gastro-jejunal fistula requiring reoperations. Three RBS laparotomies were initially scheduled, due to the previous, multiple open surgeries. Overall, laparoscopic approach was possible in 99% of all RBS patients.

Readmissions and reoperations

In the study group, there were 3 readmissions (1.3%): 1 for pleural effusion treated conservatively, 1 for fistula after conversion from laparoscopic adjustable gastric banding

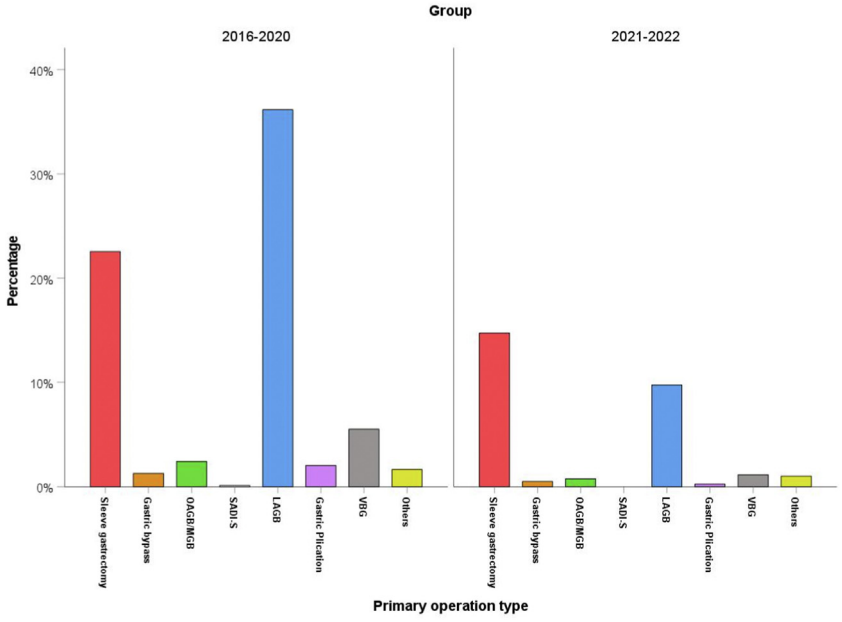

Fig. 2. Primary operation types, divided by groups.

(LAGB) to SG, and 1 for intestinal obstruction after conversion from SG to to RYGB; the last 2 complications were followed by reoperations. A total of 5 reoperations (2.2%) were registered; apart of the previously mentioned 2 reoperations due to readmissions, the remaining 3 occurred in the first POD, for bleeding, for intestinal obstruction and for anastomotic leakage after one conversion to normal anatomy.

In the control group, 6 readmissions occurred (1.07%); 3 required conservative treatment for pneumonia, postoperative abdominal pain, and intraperitoneal hematoma. The latter one needed percutaneous drainage. Reoperations occurred in 3 cases due to fistula of the gastro-jejunal anastomosis after conversion from sleeve to RYGB, jejuno-jejunal anastomotic leakage, and biliary leak after extensive adhesiolysis during conversion to RYGB after previous, multiple bariatric operations. A total of 7 reoperations were registered in this group (1.25%): 3 due to the readmissions reported above, while 4 were registered immediately postoperatively, one for gastric pouch fistula, one for intestinal obstruction after conversion from SG to RYGB, one for bleeding after conversion from SG to SADI, and finally one for jejuno-jejunal anastomotic leakage after conversion to open surgery.

Postoperative nonsurgical complications included pulmonary embolism (PE) (2 cases per group), pneumonia or pleural effusion (2 cases per group), uncomplicated abdominal pain (2 cases in control group), postoperative nausea, and atrial fibrillation. Hemorrhage (5 cases) or intraabdominal collection (4 cases) that did not require transfusion, drainage, or reoperation completed the perioperative morbidity, with no statistical difference between the 2 groups for any of these complications, successfully treated by conservative treatment. All adverse events from time of surgery up to 30 days postoperatively for all patients, both in the study and control group, are reported in Table 3 based on Clavien-Dindo classification [32].

More grade IIIb Clavien-Dindo complications related to surgery, requiring surgical, endoscopic, or radiologic intervention were encountered in 2021–2022 compared with the control group, without showing a statistically significant difference (Table 3). All complications were successfully treated, with no further complications.

There was no significant difference when analyzing IWL/WR and gastroesophageal reflux disease (GERD) as causes of revisional surgery between the 2 examined periods. IWL/WR represents the main cause of revision (Table 4, Fig. 3). The only significative difference between the 2 groups is the type of revised operation, LAGB being the most converted procedure during 2016–2020, especially to RYGB, while SG became the most revised procedure in the study group (Fig. 2, Table 5). Conversion from LAGB to a further procedure was performed in 2 steps in 54%, first procedure being the band removal, followed after a mean of 4.5 months by the second bariatric procedure and sometimes even the third one in 1.5% (Fig. 4). RYGB was the most frequent RBS, in all analyzed periods (56%).

Discussion

This is the first Italian prospective, multicenter, observational study on trends and safety of RBS. A network of 10 high-volume centers enrolled 220 consecutive patients that

Table 3
Complications by CD[32] classification after revisional bariatric procedures, with all adverse events from time of surgery up to 30 days postoperatively for all patients in the study group (220 patients operated between October 2021 and March 2022) and control group (560 patients operated in the same calendar periods of 2016–2020)

	2016–2020 (n = 560)	2021–2022 (n = 220)	*P* value
Complication by CD classification system grade			
CD grade I	7 (1.25)	4 (1.81)	.691
CD grade II	9 (1.6)	4 (1.81)	.884
CD grade IIIA	1 (0.17)	0 (0)	n.s
CD grade IIIB	8 (1.42)	5 (2.27)	.626
CD grade IVA	1 (0.17)	0 (0)	n.s
CD grade IVB	0 (0)	0 (0)	–
CD grade V	2 (0.35)	1 (0.45)	.657
Total	28 (5)	14 (6.36)	.786

CD = Clavien-Dindo.
Grade I = any deviation from the normal postoperative course without the need for pharmacologic treatment or surgical, endoscopic, or radiologic interventions.
Grade II = requiring pharmacologic treatment with drugs other than such allowed for grade I complications; blood transfusions and total parenteral nutrition are also included.
Grade III = requiring surgical, endoscopic, or radiologic intervention.
Grade IIIA = not under general anesthesia.
Grade IIIB = under general anesthesia.
Grade IV = life-threatening complication.
Grade V = death.

Table 4
Causes of revisional bariatric surgery (5 most frequent causes recorded)

Cause of revision	2016–2020 (n = 560)	2021–2022 (n = 220)	*P* value
IWL/WR + GERD			.004
No	524	192	
Yes	36	28	
IWL/WR + surgical causes			.002
No	530	219	
Yes	30	1	
IWL/WR			.581
No	207	86	
Yes	353	134	
GERD			.160
No	483	181	
Yes	77	39	
Surgical causes*			.332
No	507	204	
Yes	53	16	

IWL = insufficient weight loss; WR = weight recidivism; GERD = gastroesophageal reflux disease.

For IWL/WR + GERD, "no" is more associated with 2016–2020, and for IWL/WR + surgical causes, "yes" is more associated with 2016–2020. There was no significant difference analyzing IWL/WR and GERD as causes of revisional surgery (between the 2 periods). IWL/WR represents the main cause of revision.

* Surgical causes included any reason related to the primary bariatric technique.

underwent RBS in a 6-month interval and compared them with 560 patients operated in the previous 4 years.

The main reason for RBS was IWL or WR and the second cause was severe GERD after SG, followed by surgical complications related to different procedures, including intragastric migrations or other LAGB complications; SG's midstenosis, twist, or intrathoracic pouch migration; malnutrition or other vitamin deficiencies; and gastro-gastric fistulas. Primary operations no longer in use and almost abandoned in Italy (vertical banded gastroplasty, gastric plications, bilio-intestinal or jejuno-ileal bypasses) were converted to further BS, mainly RYGB, or reversed to normal anatomy in 91 patients (11.66%). As a matter of fact, RYGB was the most used revisional procedure, mainly to obtain further WL and/or remission of persistent or de novo severe GERD after SG.

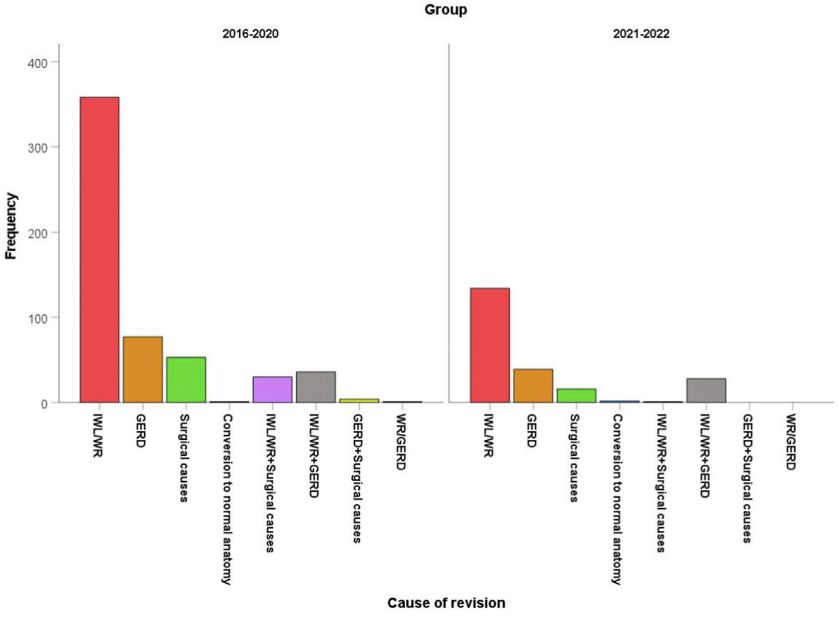

Fig. 3. Causes of revisional bariatric surgery, divided by groups.

Table 5
Revised primary operation type

Primary operation type	2016–2020 (n = 560)	2021–2022 (n = 220)	*P* value
Sleeve gastrectomy			<.001
No	384	105	
Yes	176	115	
Gastric bypass			.975
No	550	216	
Yes	10	4	
OAGB/MGB			.635
No	541	214	
Yes	19	6	
SADI-S			.531
No	559	220	
Yes	1	0	
LAGB			<.001
No	278	144	
Yes	282	76	
Gastric plication			.103
No	544	218	
Yes	16	2	
VBG			.071
No	517	211	
Yes	43	9	
Others			.307
No	547	212	
Yes	13	8	

OAGB = one-anastomosis gastric bypass; MGB = mini gastric bypass; SADI-S = single-anastomosis duodeno-ileal bypass with sleeve gastrectomy; LAGB = laparoscopic adjustable gastric banding; VGB = vertical banded gastroplasty.

The difference for sleeve gastrectomy as a revised primary bariatric procedure is more significant for "no" during the 2016–2020 period, while for LAGB as a revised primary bariatric technique, it is more significant for "no" during the 2021–2022 period. Gastric bypass remains constant during 2016–2022.

The major difference in RBS trends registered recently is the shift from LAGB toward SG as the most revised procedure, while the safety of RBS is confirmed throughout the study period [1,33]. RBS is becoming a demanding practice in bariatric centers, reported to increase from 6% of all bariatric procedures in 2013 to 13.5% in 2015 [33]. In the present multicenter study, RBS represented approximately 9% of all bariatric surgical activity. Even if the present study reports the operated cases from a 6-month interval yearly, we can assume that our percentage results could be interpreted on a full year interval due to the annual constant activity in these 10 high-volume centers.

Bariatric conversions to a different procedure represent most RBS for the Metabolic and Bariatric Surgery Accreditation and Quality Improvement Program (MBSAQIP) database in the US, which was purposely expanded to include additional variables like RBS [34]. In a retrospective analysis of the 2020 MBSAQIP database performed on 168,548 bariatric surgeries, 20,387 (12.1%) were revisional, and from those 15,031 (73.7%) were conversions. The most converted index operations were SG (49.3%) and LAGB (45.9%). The most frequent conversions were SG to RYGB (40.3%) for GERD (54.2%) and IWL (35.8%), LAGB to SG (27%) or RYGB (16.2%) for IWL (67% and 61.3%, respectively), and SG to DS (3.2%) or SADI (2%) for IWL (91.2% and 92.4%, respectively). Postoperative overall morbidity, serious morbidity, reoperation, and mortality rates ranged from 5.3% to 20.8%, 2.3% to 19.2%, 1.5% to 10%, and 0% to 0.8%, respectively.

A systematic review and meta-analysis, performed on 48 studies (n = 915 patients) [35], evaluated the indications and results of RBS due to GERD, mostly reported after SG (n = 796, 87%) and OAGB (n = 62, 6.8%) and was performed due to intractable GERD (71.6%), GERD and weight issues (16%), and biliary reflux (6.2%). Pooled estimation of the meta-analysis of studies reported 7% of GERD following primary BS needing RBS, in which remission was experienced by 99% of the patients.

Perioperative morbidity occurred in 11.6% (92 out of 795) of patients enrolled in a Polish study on RBS performed in 12 centers [36]. Revisional surgery after RYGB or LAGB, and revisions due to complication of the primary surgery remained independent risk factors for perioperative morbidity. Another study indicates that RBS is feasible and effective in patients with a complex bariatric history including 2 or more previous procedures [37]. LAGB was the first procedure in almost all patients and the complication rate was up to 33%. Careful patients' selection is

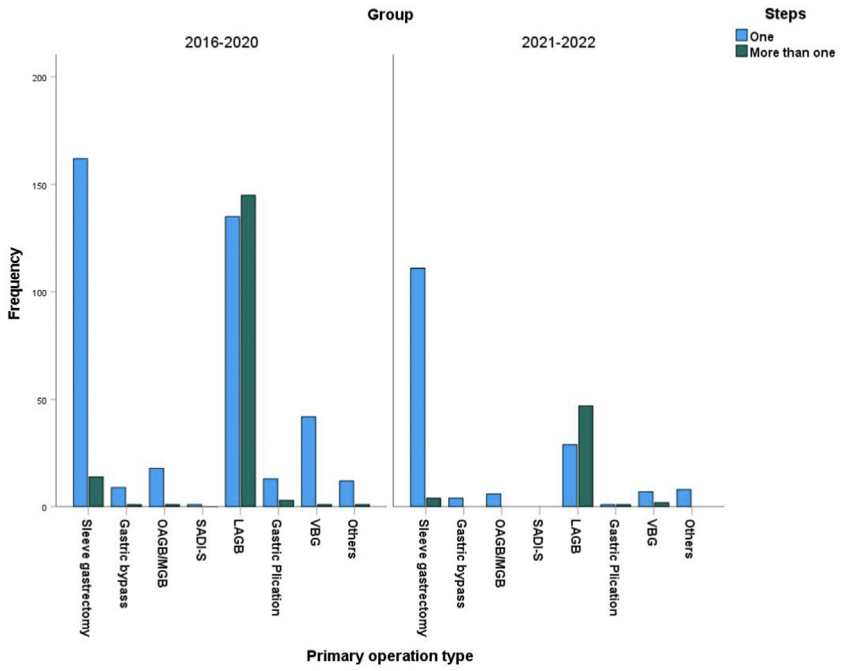

Fig. 4. Primary operation types performed in 1 or more steps, divided by groups.

considered mandatory and extensive information should be given on the increased risk of postoperative complications. Even in our experience, 2 steps were performed in 28% of the patients, mostly band removal as intermediate procedure, followed sometimes by conversion to SG. Actually, due to the SG's low efficacy as revisional procedure, most of the centers involved quit this approach, and nowadays LAGB or other primary restrictive procedures are converted to more complex procedures that involve a type of bypass (RYGB, OAGB, or SADI with SG) [38–40].

Limitations of the present study are represented by its type (observational), the short period analyzed (6 months), and focus on the first 30 PODs, but it respected its initial, registered protocol. On the other hand, a bariatric-centers network (10 high-volume centers) sharing information and protocols could be a guarantee for patients' safety and information due to the quality of the collected data.

In our experience, RBS was accomplished safely, in minimally invasive conditions (99%) with excellent perioperative outcomes, like those of the primary procedures, with low mortality and morbidity rates. Even if there was a shift from LAGB toward SG as the most revised procedure, RYGB remained the most used revisional procedure, with acceptable mortality and morbidity. OAGB remained constant in our cumulative experience, with no proven increased frequency, even if its efficacy as a revisional procedure was demonstrated [41].

Data support the evidence that GERD after SG is the second revisional cause detected and increased by more than 30% compared with the control group. Guidelines based on robust data are needed considering that up to 10% of bariatric surgical activity is represented by RBS.

Conclusion

The current trends in Italy are showing a shift toward SG being the most revised bariatric procedure while RYGB remains the most employed procedure for RBS. This study captures the safety of RBS during recent years and demonstrates low and acceptable complication, readmission, and reoperation rates.

Disclosures

The authors have no commercial associations that might be a conflict of interest in relation to this article.

Supplementary material

Supplementary material associated with this article can be found, in the online version, at https://doi.org/10.1016/j.soard.2023.05.009.

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