LSG Revision Due to Hiatal Hernia & Relevant Issues

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no potential conflict of interest to report

01
OPTION

Profile

02
OPTION

Guidelines

03
OPTION

Our experience

Review 2.742 > Surg Clin North Am. 2011 Dec;91(6):1353-71, x. doi: 10.1016/j.suc.2011.08.004.

Revisional bariatric surgery

Todd Andrew Kellogg [1]

2011

修正手术总发生率 5--50%

BPD/BPD-DS 5%（最低）
RYGB 10-20%
VBG 25-54%
AGB 40-50%

OVERVIEW

With the increasing number of bariatric procedures being performed annually, it is expected that the incidence of revisions will increase. The overall incidence of surgical revision after a primary bariatric operation is 5% to 50%. The lowest rate of revision is associated with the biliopancreatic diversion (BPD) with duodenal switch (BPD-DS) procedure and is 5%.[1,2] The Roux-en-Y gastric bypass (RYGB) fails to produce adequate durable weight loss in 15% to 25%, with revision estimates of 10% to 20%.[3,4] The incidence of revision after vertical banded gastroplasty (VBG) is 25% to 54%.[5–7] The laparoscopic adjustable gastric band (AGB) has the highest rate of revision at 40% to 50%,[8] although recent studies suggest that this rate is decreasing.[9–11]

12.964 > Ann Surg. 2021 Jul 29. doi: 10.1097/SLA.0000000000005117. Online ahead of print.

Defining Global Benchmarks in Elective Secondary Bariatric Surgery Comprising Conversional, Revisional and Reversal Procedures

选择性再次减重手术全球基准的定义（转化、修订和逆转程序）

Objective: To define "best possible" outcomes for secondary bariatric surgery (BS).

Background: Management of poor response and of long-term complications after BS is complex and under-investigated. Indications and types of reoperations vary widely and postoperative complication rates are higher compared to primary BS.

Methods: Out of 44,884 BS performed in 18 high-volume centers from 4 continents between 06/2013-05/2019, 5,349 (12%) secondary BS cases were identified. Twenty-one outcome benchmarks were established in low-risk patients, defined as the 75th percentile of the median outcome values of centers. Benchmark cases had no previous laparotomy, diabetes, sleep apnea, cardiopathy, renal insufficiency, inflammatory bowel disease, immunosuppression, thromboembolic events, BMI> 50 kg/m2 or age> 65 years.

2021

2013.05—2019.05

18 个大中心

5349/44884 再次手术（12%）

4.730 > Surg Obes Relat Dis. 2020 Jul;16(7):908-915. doi: 10.1016/j.soard.2020.03.002. Epub 2020 Apr 3.

Trends in revisional bariatric surgery using the MBSAQIP database 2015–2017

ELSEVIER

Surgery for Obesity and Related Diseases 16 (2020) 908–915

SURGERY FOR OBESITY AND RELATED DISEASES

2020

codes. There is no exact code for sleeve gastrectomy (SG) to laparoscopic Roux-en-Y gastric bypass (LRYGB), so we used 43644 (GB)+REVCONV+PREVIOUS_SURGERY for this.

Results: For the years 2015 to 2017 there were 57,683 revisions/conversions of 528,081 patients. The number of revisions increased over the study period by 5213 cases. The most common revision was laparoscopic adjustable gastric band (LAGB) to SG with 15,433 cases and the second was LAGB to LRYGB with 10,485 cases. There were 14,715 LAGB removals. It is more difficult to track SG to LRYGB but there were 8491 unlisted cases, which may have been sleeve to bypass.

没有确切的LSG修正为LRYGB的代码

跟踪LSG-LRYGB困难

8491/528081未列入病例可能是LSG修正(1.6%)，占修正手术的14%

Comparative Study 4.122 > Obes Surg. 2017 Nov;27(11):2855-2860.
doi: 10.1007/s11695-017-2712-8.

Revisional Surgery After Failed Laparoscopic Sleeve Gastrectomy: Retrospective Analysis of Causes, Results, and Technical Considerations

2017

Results A total of 500 patients underwent primary LSGs during the study period, and 32 of these patients were subjected to revisional bariatric surgery after a failed LSG. Weight regain, poor weight loss, and gastroesophageal reflux disease (GERD) were the most common causes of revision. A revisional LSG (r-LSG) was performed in 23 patients, while 9 patients received a revisional laparoscopic Roux-en-Y gastric bypass (r-LRYGB). There were complete sleeve pouch dilations in 10 patients. A

Clinical characteristic	r-LSG ($n = 23$)	r-LRYGB ($n = 9$)	p
Age [a] (year)	36.1 ± 12.2	37.3 ± 9.1	0.23
Gender [b]			0.61
Female	15 (65.2)	6 (66.6)	
Male	8 (34.8)	3 (33.4)	
Indication [b]			
Poor weight loss	8 (34.8)	–	
Weight regain	15 (65.2)	3 (33.4)	
Symptoms of GERD	–	6 (66.6)	

32/500修正

再次LSG　　23例（8例体重改善不明显，15例反弹）

再次LRYGB　　9例（3例反弹，6例GERD）

Review 3.163 > Diabetes Metab Syndr Obes. 2021 Feb 10;14:575-588.
doi: 10.2147/DMSO.S295162. eCollection 2021.

Revisional Surgeries of Laparoscopic Sleeve Gastrectomy

Siyuan Li [#1], Siqi Jiao [#1], Siwei Zhang [#1], Jiangjiao Zhou [1]

2021

common performed procedure and has maintained its predominance in 2019 (1 340,550; 53.6%).[3] LSG can help improve metabolic syndromes, such as diabetes and hypertension, and it has the short-term satisfying outcomes of weight loss.[4] However, long-term failure rates are up to 64%.[5] Considering the long-term weight recurrence and occurrence of complications, revisional surgery is an indispensable part after LSG.

- LSG可改善代谢综合征+短期满意的减重结果
- 长期失败率高达64%
- LSG修正不可或缺

01
OPTION

Profile

02
OPTION

Guidelines

03
OPTION

Our experience

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SURGERY FOR OBESITY
AND RELATED DISEASES

Surgery for Obesity and Related Diseases 10 (2014) 952–972

Review article

Systematic review on reoperative bariatric surgery

American Society for Metabolic and Bariatric Surgery Revision Task Force

中华肥胖与代谢病电子杂志 2018 年 2 月第 4 卷第 1 期 Chin J Obes Metab Dis(Electronic Edition),Feb 2018,Vol.4,No.1

·共识·

肥胖代谢外科修正手术东亚专家共识（2018）

中国医师协会外科医师分会肥胖和糖尿病外科医师委员会

修正(Revison)　初次手术疗效不佳或/（和）术后出现严重并发症需再手术

修理手术(Correction)　术式不变，规范 ➡ 规范

修改手术(Conversion)　术式改变

复原手术(Restoraion)　恢复为正常的消化道解剖结构

减重效果不佳　术后1年的多余体重减少百分比小于50%

复胖　体重下降到最低点后，重新增加的体重数大于最低点体重的15%

➢ LSG修正的目的

减重效果不佳　　复胖　　代谢疾病改善不佳

➢ LSG术后的修正手术选项

残余袖胃体积增大而致减重失败	修正式SG
初次术后出现严重GERD	修改为RYGB
初次术后袖胃体积无增大但减重不佳	修改为RYGB、BPD-DS、SADI-S

从ASMBS第3次立场声明看修正

Surgery for Obesity and Related Diseases
Volume 8, Issue 3, May–June 2012, Pages e21-e26

ASMBS online statements/guidelines

Updated position statement on sleeve gastrectomy as a bariatric procedure

ASMBS Clinical Issues Committee

Summary and recommendations

Substantial comparative and long-term data have now been published in peer-reviewed studies demonstrating durable weight loss, improved medical co-morbidities, long-term patient satisfaction, and improved quality of life after SG.

The ASMBS therefore recognizes SG as an acceptable option as a primary bariatric procedure and as a first-stage procedure in high-risk patients as a part of a planned staged approach.

From the current published data, SG has a risk/benefit profile between LAGB and laparoscopic RYGB.

As with any bariatric procedure, long-term weight regain can occur and, in the case of SG, this can be managed effectively with reintervention. Informed consent for SG used as a primary procedure should be consistent with the consent provided for other bariatric procedures and should include the risk of long-term weight gain.

总结和建议

- 长期数据表明，SG术后体重持续减轻+合并症改善，患者长期满意度+生活质量改善
- ASMBS视SG为可接受选项，作为初级减肥手术和高风险患者的第一阶段手术
- SG的风险/获益介于LAGB和LRYGB之间
- 对LSG术后GERD不可预测，GERD可能会恶化或重新发展
- 复胖可以通过再次干预有效管理

10.1016/j.soard.2017.08.007

从返流和LSG共识看LSG修正

3.479 > Obes Surg. 2020 Oct;30(10):3695-3705. doi: 10.1007/s11695-020-04749-0. Epub 2020 Jun 12.

Gastroesophageal Reflux and Laparoscopic Sleeve Gastrectomy: Results of the First International Consensus Conference

Results

Forty-six experts responded (92%). Esophago-gastro-duodenoscopy was considered mandatory before (92%) and after (78%) surgery. No consensus was achieved as to time intervals after surgery and the role of specialized tests for GERD. Higher degrees of erosive esophagitis (94%) and Barrett's esophagus (96%) were viewed as contra-indications for LSG. Roux-en-Y gastric bypass was recommended in postoperative patients with uncontrolled GERD and insufficient (84%) or sufficient (76%) weight loss and Barrett's esophagus (78%). Hiatal hernia (HH) repair was deemed necessary even in asymptomatic patients without GERD (80% for large and 67% for small HH). LSG with fundoplication in patients with GERD was considered by 77.3% of panelists.

- 糜烂性食管炎（94%）和Barrett食管（96%）被视为LSG的禁忌证
- 术后GERD无法控制、体重减轻不足以及Barrett食管 推荐修正为LRYGB
- 无论有无GERD症状，Hiatus Hernia修复是必须的

从LSG国际专家组共识2看LSG修正

3.453 > Surg Endosc. 2021 Dec;35(12):7027-7033. doi: 10.1007/s00464-020-08216-w.
Epub 2021 Jan 12.

The first modified Delphi consensus statement on sleeve gastrectomy

Table 4 Results of voting on key aspects of management of complications and revisional bariatric surgery in the context of sleeve gastrectomy (SG) (see Supplemental Data 5 for full results)

From: The first modified Delphi consensus statement on sleeve gastrectomy

Serial nos	Statements	Final voting results
1	Patients developing symptomatic GERD unresponsive to maximal medical therapy after SG can be offered surgical correction in the form of conversion to Roux-en-Y gastric bypass (RYGB)	Agree 100.0%
2	SG strictures may be successfully managed with balloon dilatation	Agree 83.3%
3	SG strictures may be successfully managed with a conversion to RYGB	Agree 100.0%
4	SG leaks may be managed by laparoscopic drainage +/− re-suture +/− t-tube placement +/− feeding jejunostomy as appropriate depending on the clinical circumstances	Agree 88.9%
5	SG leaks may be managed by stent placement in appropriate patients	Agree 92.6%
6	SG leaks may be managed by conversion to RYGB in appropriate patients	Agree 77.8%
7	SG is an acceptable revisional surgery option after gastric banding for suitable patients seeking further bariatric/metabolic benefits if they do not suffer from severe symptoms of GERD requiring daily medication	Agree 79.6%
8	One anastomosis gastric bypass (OAGB) is an acceptable revisional surgery option after SG for suitable patients seeking further bariatric/metabolic benefits if they do not suffer from severe symptoms of GERD requiring daily medication	Agree 79.6%
9	Bilio-pancreatic diversion/duodenal switch (BPD/DS) is an acceptable revisional surgery option after SG for suitable patients seeking further bariatric/metabolic benefits	Agree 85.2%
10	RYGB is an acceptable revisional surgery option after SG for suitable patients seeking further bariatric/metabolic benefits	Agree 79.6%
11	Single anastomosis duodeno-ileal bypass with sleeve gastrectomy (SADI-S) is an acceptable revisional surgery option after SG for suitable patients seeking further bariatric/metabolic benefit	Agree 94.4%
12	SG can be a suitable revisional procedure for patients who suffer from severe reactive hypoglycemia after RYGB	Agree 85.2%

Serial nos	Statements	Final voting results
1	SG术后 GERD，最大剂量治疗无效者，修正为LRYGB	同意 100.0%
2	球囊扩张治疗SG 狭窄	同意 83.3%
3	SG狭窄可修正为LRYGB	同意 100.0%
4	SG 漏：腔镜引流、重新缝合、T 管置入、空肠造口管饲	同意 88.9%
5	放置支架控制SG 漏	同意 92.6%
6	SG漏可修正为LRYGB	同意 77.8%
7	SG是LAGB一种修正选择（无GERD）	同意 79.6%
8	SG可修正为OAGB（无GERD）	同意 79.6%
9	SG可修正为BPD/DS	同意 85.2%
10	SG可修正为LRYGB	同意 79.6%
11	SG可修正为SADI-S	同意 94.4%
12	RYGB后患严重反应性低血糖者可修正为LSG	同意 85.2%

从Bariatric Surgery修正手术共识看LSG修正

3.453 > Surg Endosc. 2020 Apr;34(4):1648-1657. doi: 10.1007/s00464-019-06937-1. Epub 2019 Jun 19.

The first consensus statement on revisional bariatric surgery using a modified Delphi approach

Methods: We created a committee of 22 recognised opinion-makers with a special interest in RBS. The committee invited 70 RBS experts from 27 countries to vote on 39 statements concerning RBS. An agreement amongst ≥ 70.0% experts was regarded as a consensus.

Results: Seventy experts from twenty-seven countries took part. There was a consensus that the decision for RBS should be individualised (100.0%) and multi-disciplinary (92.8%). Experts recommended a preoperative nutritional (95.7%) and psychological evaluation (85.7%), endoscopy (97.1%), and a contrast series (94.3%). Experts agreed that Roux-Y gastric bypass (RYGB) (94.3%), One anastomosis gastric bypass (OAGB) (82.8%), and single anastomosis duodeno-ileal bypass with sleeve gastrectomy (SADI-S) (71.4%) were acceptable RBS options after gastric banding (84.3%). OAGB (84.3%), bilio-pancreatic diversion/duodenal switch (BPD/DS) (81.4%), and SADI-S (88.5%) were agreed as consensus RBS options after sleeve gastrectomy. lengthening of bilio-pancreatic limb was the only consensus RBS option after RYGB (94.3%) and OAGB (72.8%).

- **39项声明**
- **RBS抉择应基于个体化(100.0%)和MDT(92.8%)原则**
- **RBS术前需营养(95.7%)、心理(85.7%)、内窥镜(97.1%)和造影剂(94.3%)评估**
- **LRYGB(94.3%)、OAGB(82.8%)和SADI-S(71.4%)是LAGB术后RBS选择(84.3%)**
- **OAGB(84.3%)、BPD/DS(81.4%)和SADI-S(88.5%)是LSG术后RBS 选择**
- **胆胰肢延长是LRYGB(94.3%)和OAGB(72.8%)术后公认的RBS选择**

从Sleeve修正共识看LSG修正

3.709 > Surg Obes Relat Dis. 2019 Feb;15(2):173-186. doi: 10.1016/j.soard.2018.11.006. Epub 2018 Nov 15.

Reoperative surgery for nonresponders and complicated sleeve gastrectomy operations in patients with severe obesity. An international expert panel consensus statement to define best practice guidelines

- 第一份专家共识会议，就肥胖患者SG失败或复杂后再次干预的表现提供基于共识的实践指南
- 在适应证和禁忌证、手术技术、管理和并发症预防等基本方面取得了充分共识
- 35/54共识，包括关于再手术技术的共识建议、SG后GERD和Barrett食道的管理，以及初始体重减轻不良的手术选择

Highlights

- An expert consensus conference was held with 32 of the most experienced bariatric surgeons worldwide to provide consensus-based best practice guidelines regarding performance of re-interventions after failed or complicated SG in patients with obesity.
- Full consensus was obtained for the essential aspects of indications and contraindications, surgical technique, management, and prevention of complications.
- Consensus was achieved for 35 of 54 key questions, including consensus recommendations regarding technique in reoperation, management of GERD and Barrett's esophagus after SG, and surgical options for poor initial weight loss.
- This paper provides 35 statements and recommendations for a clinical consensus guideline regarding standardization of indications, contraindications, surgical options, and surgical techniques when re-operating on patients that underwent a failed or complicated SG.
- To our knowledge, the present consensus report represents the first document that defines best practice guidelines for the performance of re-interventions after failed or complicated SG.

General considerations, indications, contraindications, and technique			
The left crus should always be visualized during sleeve to identify hiatal hernia and to assure adequate resection of the gastric fundus	**91.3%**	8.7%	.0%
Staple height when dividing the gastric antrum should not be smaller than green or purple	**88.5%**	7.7%	3.8%
Staple size when dividing the fundus should not be smaller than blue or purple	**88.0%**	4.0%	8.0%
Sleeve provides superior long-term outcomes in comparison to adjustable gastric banding or vertical banded gastroplasty	**83.3%**	8.3%	8.3%
Sleeve has been shown to have an acceptable long-term weight loss based on available 5- to 10-yr data	**79.2%**	12.5%	8.3%
There is enough clinical evidence to standardize the VSG distance from pylorus	14.8%	**70.4%**	14.8%

一般注意事项、适应证、禁忌证和技术

- 充分暴露左膈肌脚，便于确诊食管裂孔疝和充分胃底切除
- 胃窦用钉不应小于绿色或紫色
- 胃底用钉不应小于蓝色或紫色
- 相对于LAGB和VBG，LSG更具良好的长期效果
- 基于现有的 5-10 年数据，LSG子具有可接受的长期体重减轻

Sleeve and strictures			
Segmental narrowing of the sleeve diameter can lead to functional obstruction and increases the risk of GERD symptoms	**100.0%**	.0%	.0%
Functional obstruction of the sleeve is most often due to a technical error of the primary procedure, as opposed to postoperative adhesions	**73.1%**	15.4%	11.5%
Adhesiolysis with freeing up sleeve adhesions is a reasonable RBMI to	25.9%	**70.4%**	3.7%

管状胃和狭窄

- *管状胃直径节段性狭窄可致功能性梗阻并增加GERD症状的风险*
- *管状胃功能性梗阻的原因往往是首次手术的技术失误造成的*
- *松解是治疗某些管状胃功能性梗阻合理RBMI*

Sleeve, GERD, and Barrett's esophagus

Patients with sleeve who require surgical intervention for significant ongoing GERD are best treated by conversion to RYGB	**100.0%**	.0%	.0%
Patient with hiatal hernia and symptomatic GERD unresponsive to medications after VSG is best treated by conversion to RYGB	**100.0%**	.0%	.0%
Regarding GERD after sleeve, RYGB is superior to BPD-DS	**96.4%**	.0%	3.6%
Newly diagnosed Barrett's esophagus (intestinal metaplasia) identified after VSG requires intensive medical treatment and strong consideration for RYGB conversion	**92.3%**	7.7%	.0%
In a patient with previous sleeve who develops GERD and hiatal herniation of the proximal sleeve, the best treatment modality is to repair the hiatal hernia and RYGB	**88.9%**	11.1%	.0%
Newly diagnosed Barrett's esophagus (intestinal metaplasia) identified after VSG in a patient without GERD symptoms does not require surgical intervention	19.2%	**80.8%**	.0%
In a patient with previous sleeve, surgical treatment by reducing the hiatal hernia and repairing the hiatal defect along with median arcuate ligament gastropexy (Hill) is often successful at controlling GERD symptoms	9.5%	**71.4%**	19.0%
In a patient with previous sleeve, surgical treatment by reducing the hiatal hernia and repairing the hiatal defect is often successful at controlling GERD symptoms	8.0%	**72.0%**	20.0%

SG、胃食管反流病、食管裂孔疝和Barret食管

- **100%共识同意** **SG术后出现顽固性GERD修正为RYGB**

  VSG术后出现Hiatus Hernia修正为RYGB

  VSG术后症状性GERD对药物无反应者修正为RYGB

- **96% 共识同意** **SG术后发生 GERD ， RYGB 优于BPD-DS**

- **92%共识同意** **VSG术后肠化生Barret食管需要强化药物治疗者修正为RYGB**

Weight regain and insufficient weight loss

There was consensus among our panelists that multidisciplinary evaluation and treatment are mandatory before revisional bariatric or metabolic interventions (RBMI) in patients with SG who develop weight regain or have insufficient weight loss (84% agreed). In evaluating poor initial weight loss after an anatomically correct SG, conversion to another procedure is the preferred approach (74% agreed). Similarly, if weight regain is identified after an anatomically correct SG, conversion to another procedure is the preferred approach (77.3% agreed). Our consensus agreed that conversion of SG to an alternative procedure is indicated in the presence of SG dilation and weight regain or insufficient weight loss (80.8% agreed), and conversion to an alternative procedure is preferable in the presence of a dog ear or retained fundus (72% agreed).

In contrast to conversion to another procedure, the consensus panel achieved consensus in their disagreement that revision of SG has been shown to be beneficial after weight regain or insufficient weight loss. When asked if resleeve or gastric antrum resection are indicated for insufficient weight loss or weight regain in the presence of dilation of SG or isolated antral dilation, 72% and 76.9% disagreed, respectively. The majority (88.9%) disagreed that there is enough clinical evidence to conclude that resleeve is a safe and effective revisional intervention for weight regain or poor weight loss after index sleeve. They also disagreed that there is enough evidence to use banding as a RBMI for a failed SG (95.2% disagreed). Similarly, the consensus did not feel that there is enough evidence to recommend simultaneous gastric band placement at the time of a primary SG to improve results (88.9% disagreed).

Sleeve and duodenal switch for insufficient weight loss or weight regain

The panel reached consensus that there is enough clinical evidence to conclude that conversion to duodenal switch is a safe and effective revisional intervention for weight regain and poor weight loss after index SG (70.8% agreed, 21% disagreed,

体重复胖和体重减轻不足

- **84%共识同意** 修正或代谢干预（RBMI）之前，必须进行MDT评估和治疗
- **74%共识同意** 对于体重减轻不足且解剖学正常者，修正为另一种手术是首选
- **77.3%共识同意** 对于复胖，解剖学正确者，修正为另一种手术是首选
- **80.8%共识同意** SG术后残胃扩张出现复胖或体重减轻不足者，修正为另一种手术是首选
- **72%共识同意** SG术后胃底扩张出现复胖或体重减轻不足者，修正为另一种手术是首选
- **70.8%共识同意** SG术后体重恢复和体重减轻不良修正为**BPD/DS**是安全有效的干预方式
- **72.4%共识同意** **SADIS**是**SG** 失败后合理的**RBMI**
- **92.8%共识同意** 对于修正手术体重减轻，**BPD-DS**优于**RYGB**

反对意见

- **72%和76.9%的人不同意** **SG**扩张或孤立性胃窦扩张+体重减轻不足或复胖者是否适用于**Resleeve**或胃窦切除术
- **88.9%不同意** **Resleeve**是一种安全有效的修正干预
- **95.2%不同意** 束带可用于失败**SG**的**RBMI**
- **88.9%不同意** 初次**SG**时同时放置胃束带以改善结果

LSG Revision虽有诸多共识指南

但证据级别低

存在一定不一致性

多基于经验

Low evidence of LSG revision ……

Editorial Not Found > Cir Esp (Engl Ed). 2019 Nov;97(9):477-479. doi: 10.1016/j.ciresp.2019.03.004. Epub 2019 Apr 13.

Revisional bariatric surgery: Are we opening a Pandora's box?

[Article in English, Spanish]

Ricard Corcelles [1], Juan S Barajas-Gamboa [2], Matthew Kroh [2]

Review 56.272 > JAMA. 2020 Sep 1;324(9):879-887. doi: 10.1001/jama.2020.12567.

Benefits and Risks of Bariatric Surgery in Adults: A Review

David E Arterburn [1], Dana A Telem [2], Robert F Kushner [3], Anita P Courcoulas [4]

4.122 > Obes Surg. 2020 Jun;30(6):2280-2284. doi: 10.1007/s11695-020-04484-6.

The Safety and Efficacy of One Anastomosis Gastric Bypass as a Revision for Sleeve Gastrectomy

Mohammad H Jamal [1], Rawan Elabd [2], Rawan AlMutairi [2], Aqeel Albraheem [2], Ahmad Alhaj [2], Haytham Alkhayat [2], Obaid AlHarbi [2], Husain Almahmeed [2]

4.734 > Surg Obes Relat Dis. May-Jun 2015;11(3):612-20. doi: 10.1016/j.soard.2014.04.033. Epub 2014 Nov 4.

Worthy or not? Six-year experience of revisional bariatric surgery from an Asian center of excellence

Anirudh Vij [1], Kirubakaran Malapan [1], Ching-Chung Tsai [2], Kuo-Chung Hung [3], Po-Chi Chang [4], Chih-Kun Huang [5]

4.581 > Surg Endosc. 2020 Apr;34(4):1573-1584. doi: 10.1007/s00464-019-06917-5. Epub 2019 Jun 17.

Outcomes in conventional laparoscopic versus robotic-assisted revisional bariatric surgery: a retrospective, case-controlled study of the MBSAQIP database

Edwin Acevedo [1], Michael Mazzei [1], Huaqing Zhao [2], Xiaoning Lu [2], Michael A Edwards [3 4]

必要性？

安全性？

有效性？

Review 6.499 > Ann N Y Acad Sci. 2020 Dec;1482(1):26-35. doi: 10.1111/nyas.14467.
Epub 2020 Sep 6.

Do we understand the pathophysiology of GERD after sleeve gastrectomy?

What is the "perfect" SG to prevent GERD?

Since the above outlined evidence is based on small, retrospective studies, the relative impact of all these observations is impossible to define. However, the available evidence fits together nicely, and the findings point in the same direction. Hence, some important technical considerations can be discussed to reduce the risk of post-sleeve GERD. Daes *et al*. reported that if close attention was paid to technical details, GERD could be successfully avoided in 64 out of 66 patients with SG.[59] Numerous studies attempted to disentangle which technical factors contributed to a successful, GERD-free SG. Keidar *et al*. observed that a narrowing of the mid-portion of the sleeve, at the angular notch, and with upstream dilation was associated with higher rates of GERD following SG. Therefore, the sleeve should be the widest at the antrum and the narrowest at the cardia.[60] Some controversy concerning the ideal bougie size used for sleeve calibration exists. However, a retrospective study on 120 SG patients showed that using a 42-Fr bougie has a positive impact on the prevalence of GERD after surgery when compared with a 32-Fr bougie. For the group with a 42-Fr bougie, around 80% of patients reported postoperative improvement of GERD symptoms, compared with 60% of patients in the 32-Fr group. Further, GERD symptoms decreased postoperatively in 3% and 10% of the patients, respectively.[61] This observation is in keeping with the law of

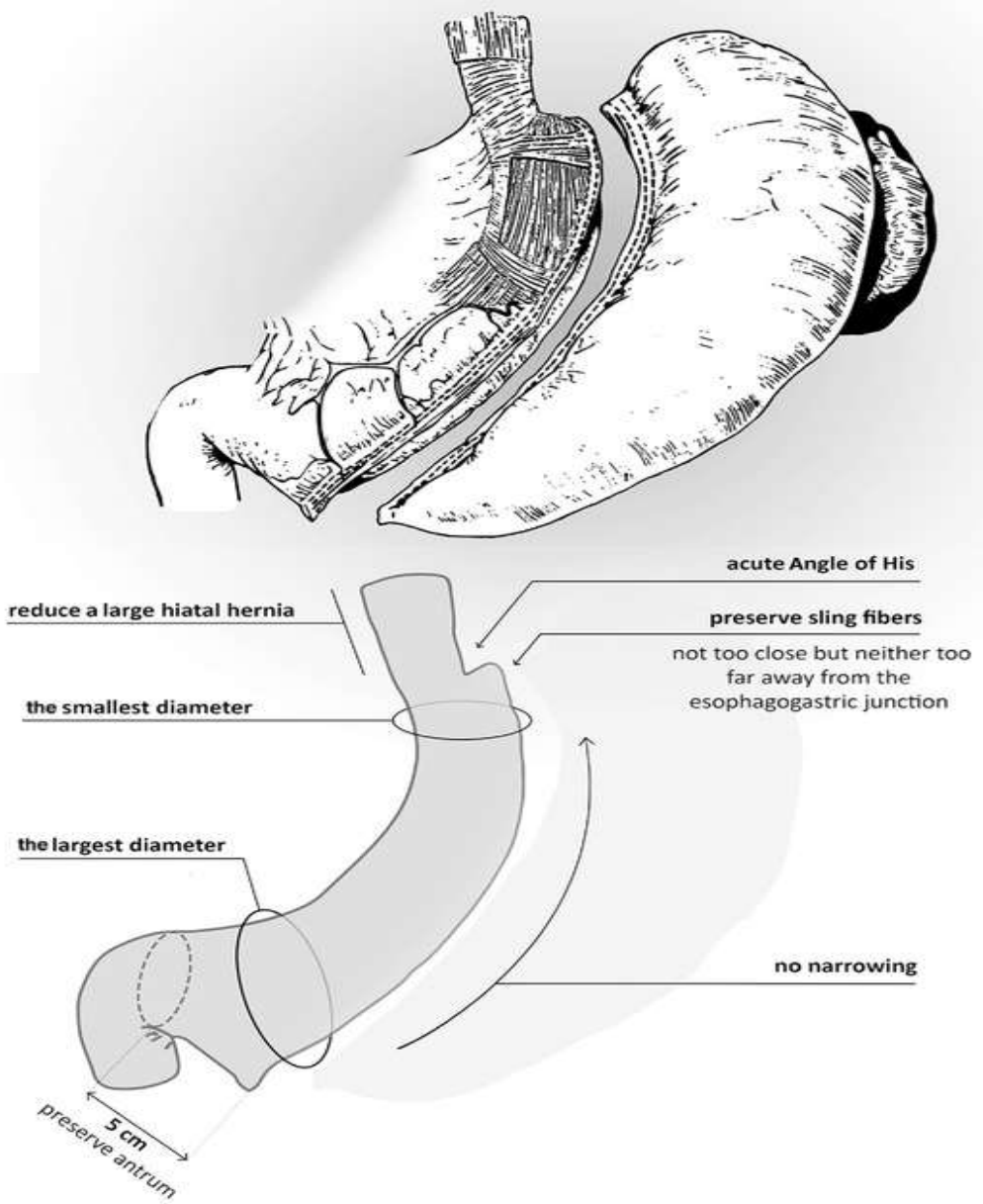


Table 1. Criteria for a "perfect" sleeve gastrectomy to prevent GERD

Criterion	Goal
Use a large (e.g., 42 Fr) bougie to reduce the risk of narrowing	Minimizing intragastric pressure
Shape the sleeve in such a manner that it is the widest at the antrum and the narrowest at the cardia (trapezoid shape)	Preventing (functional) stenosis
Prevent narrowing of the mid-portion of the sleeve, especially at the angular notch, by appropriate angulation of the stapler and preventing twisting or kinking of the sleeve	Preventing (functional) stenosis
Preserve the antrum (by placing the first staple line >5 cm from the pylorus) to preserve antral motility	Minimizing intragastric pressure
Place the last staple line close, but not too close, to the esophagus to not injure the sling fibers of the LES	Preserving an acute Angle of His and maintaining high pressure at the LES
Repair large hiatal hernias (>4 cm)	Restoring the Angle of His

粗bougie来降低变窄的风险 最小化胃内压

套管在胃窦最宽，贲门最窄　　预防功能性狭窄

防止套管扭曲、扭结和胃角变窄　　预防功能性狭窄

保留胃窦　　最小化胃内压

最后一订与LES纤维束　　保 持 HIS 锐 角 并

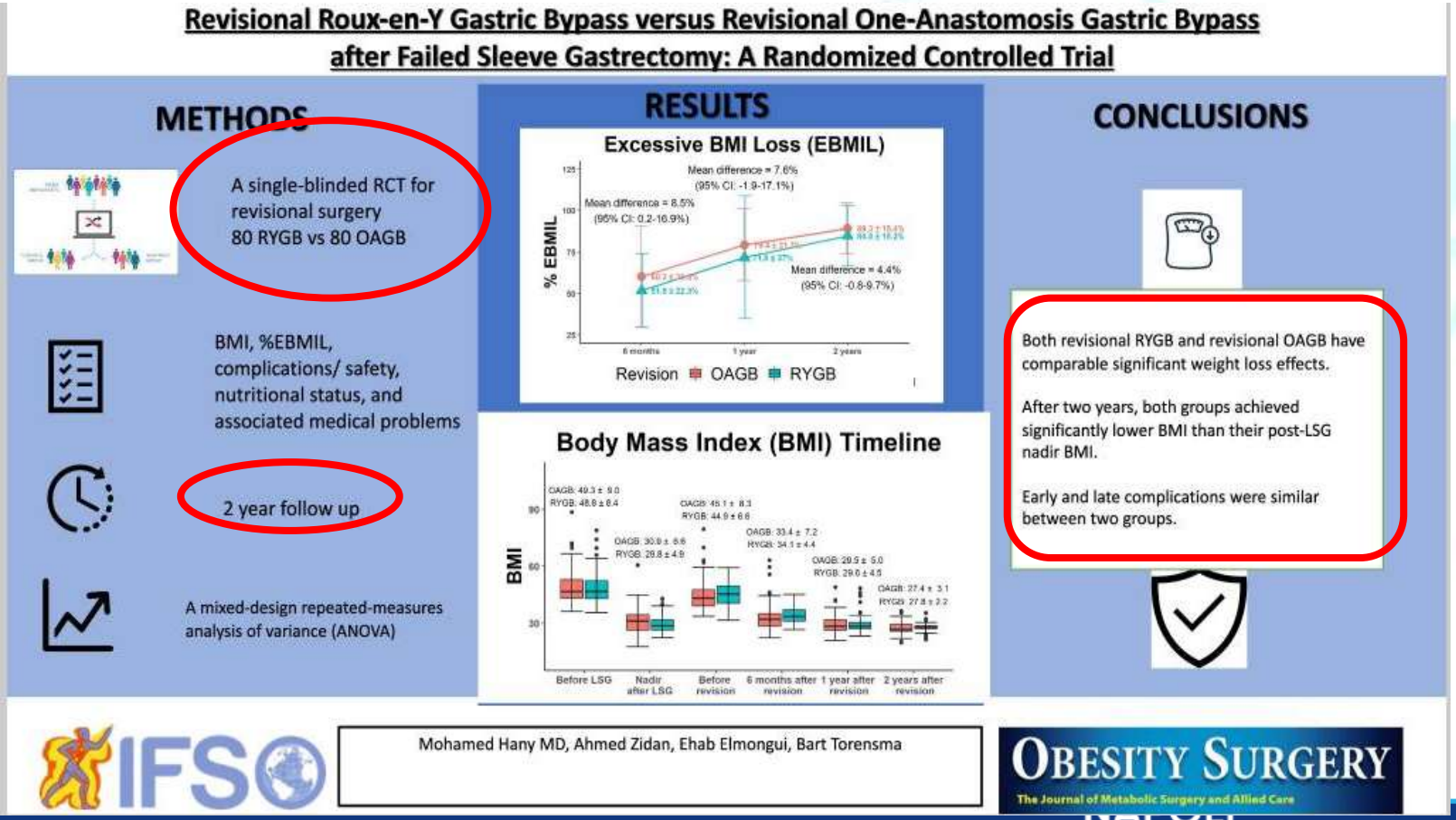
保持LES高压

修复食管裂孔疝　　恢复角度

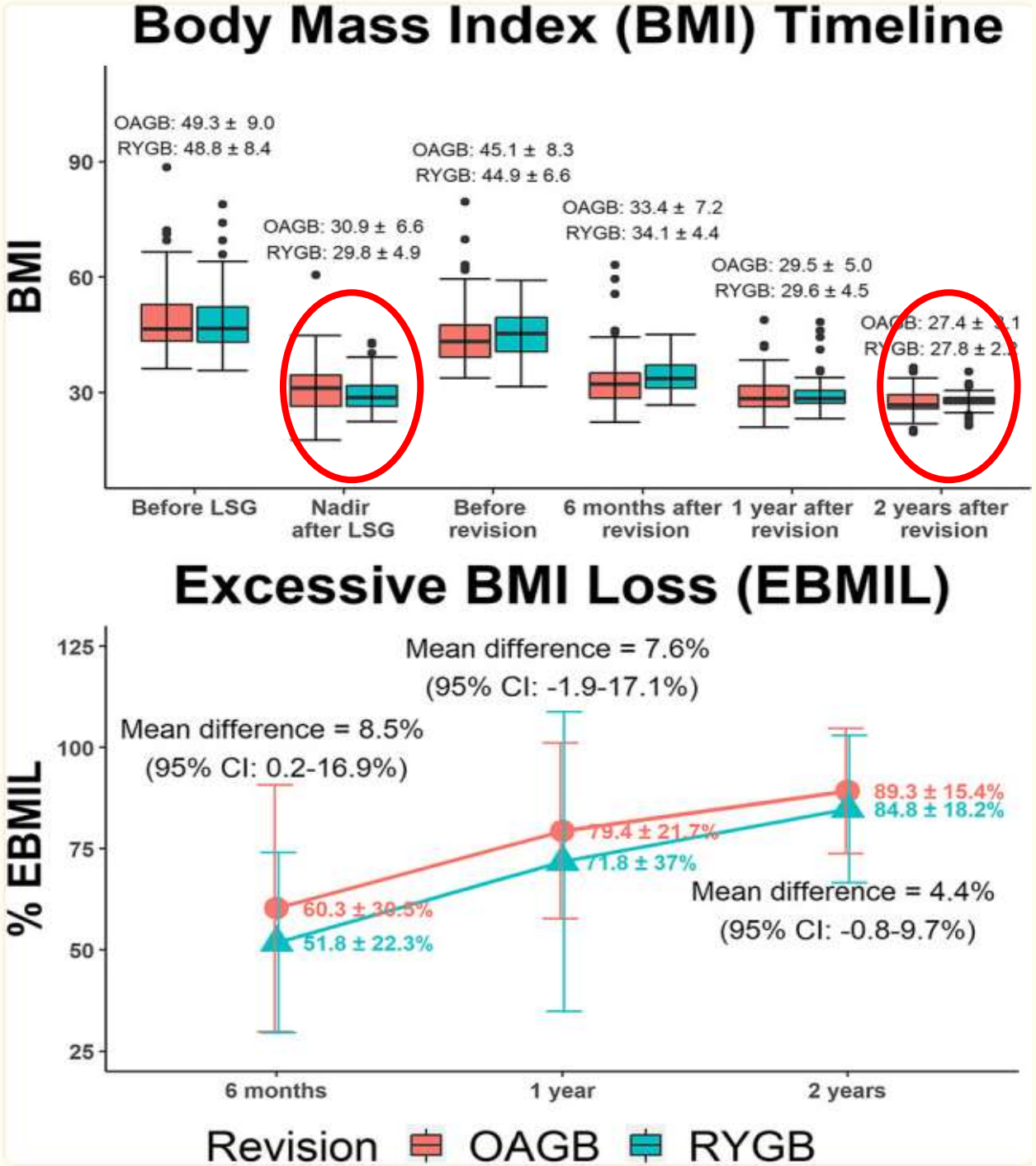
rLRYGB vs rOAGB: on the Basis of Prospective Study

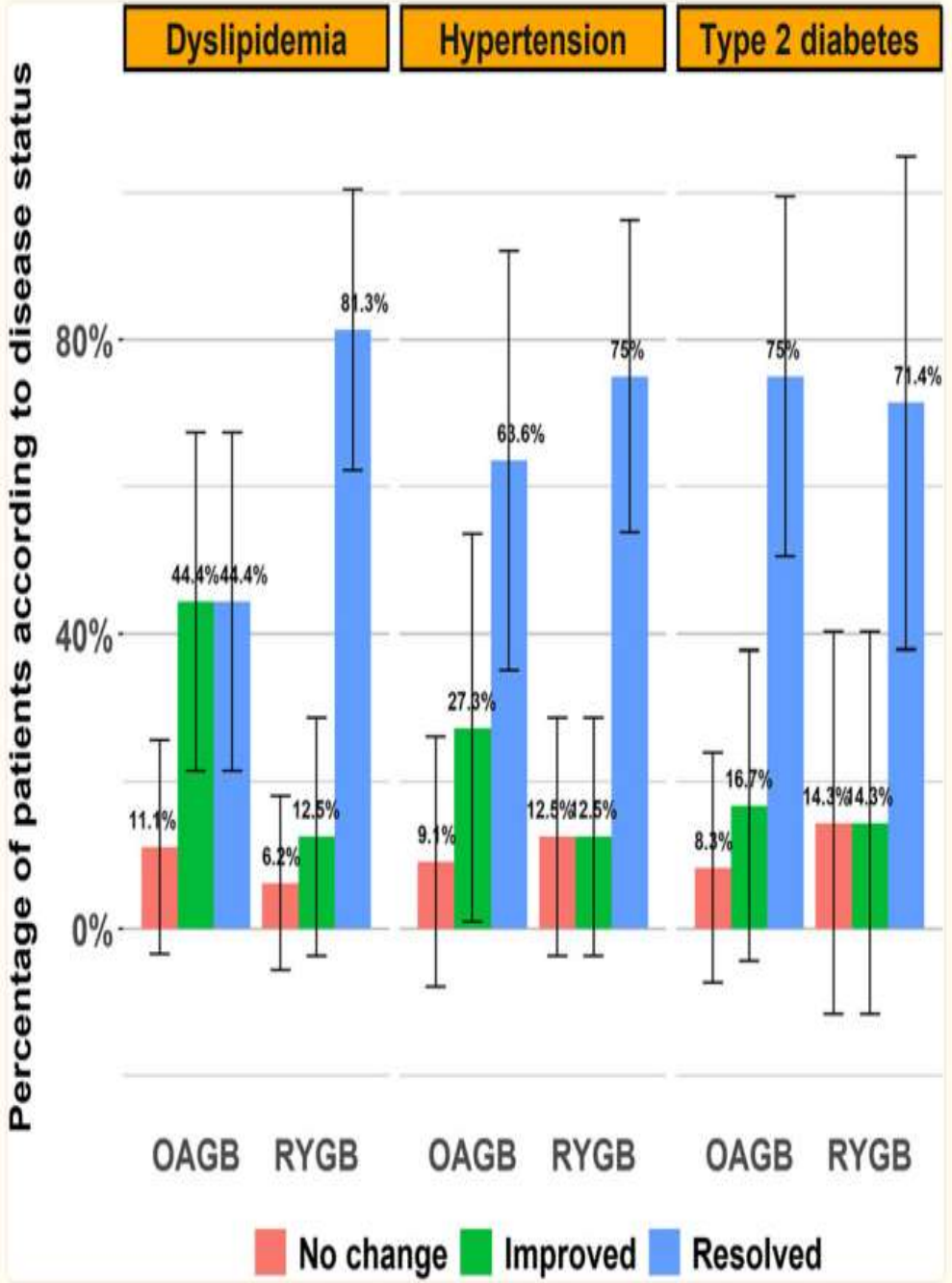
3.479 > Obes Surg. 2022 Sep 13;1-13. doi: 10.1007/s11695-022-06266-8. Online ahead of print.

Revisional Roux-en-Y Gastric Bypass Versus Revisional One-Anastomosis Gastric Bypass After Failed Sleeve Gastrectomy: a Randomized Controlled Trial



- 前瞻
- 单盲
- **80LRYGB vs 80 OAGB**
- **2年随访**
- **两组均获显著体重减轻**
- **两组术后BMI均超于LSG术后BMI最低点**
- **并发症无差异**


Body Mass Index (BMI) Timeline
BMI
90
60
30
OAGB: 49.3 ± 9.0
RYGB: 48.8 ± 8.4
OAGB: 30.9 ± 6.6
RYGB: 29.8 ± 4.9
OAGB: 45.1 ± 8.3
RYGB: 44.9 ± 6.6
OAGB: 33.4 ± 7.2
RYGB: 34.1 ± 4.4
OAGB: 29.5 ± 5.0
RYGB: 29.6 ± 4.5
Before LSG
Nadir after LSG
Before revision
6 months after revision
1 year after revision
2 years after revision
Excessive BMI Loss (EBMIL)
% EBMIL
125
100
75
50
25
Mean difference = 7.6%
(95% CI: -1.9-17.1%)
Mean difference = 8.5%
(95% CI: 0.2-16.9%)
89.3 ± 15.4%
84.8 ± 18.2%
79.4 ± 21.7%
71.8 ± 37%
60.3 ± 30.5%
51.8 ± 22.3%
Mean difference = 4.4%
(95% CI: -0.8-9.7%)
6 months
1 year
2 years
Revision
OAGB
RYGB


Dyslipidemia
Hypertension
Type 2 diabetes
Percentage of patients according to disease status
80%
40%
0%
11.1%
44.4%
44.4%
6.2%
12.5%
81.3%
9.1%
27.3%
63.6%
12.5%
12.5%
75%
8.3%
16.7%
75%
14.3%
14.3%
71.4%
OAGB
RYGB
OAGB
RYGB
OAGB
RYGB
No change
Improved
Resolved

rLRYGB vs rSADIS: on the Basis of Multicenter retrospective Study

Multicenter Study 3.479 > Obes Surg. 2018 Dec;28(12):3834-3842.
doi: 10.1007/s11695-018-3429-z.

Failed Sleeve Gastrectomy: Single Anastomosis Duodenoileal Bypass or Roux-en-Y Gastric Bypass? A Multicenter Cohort Study

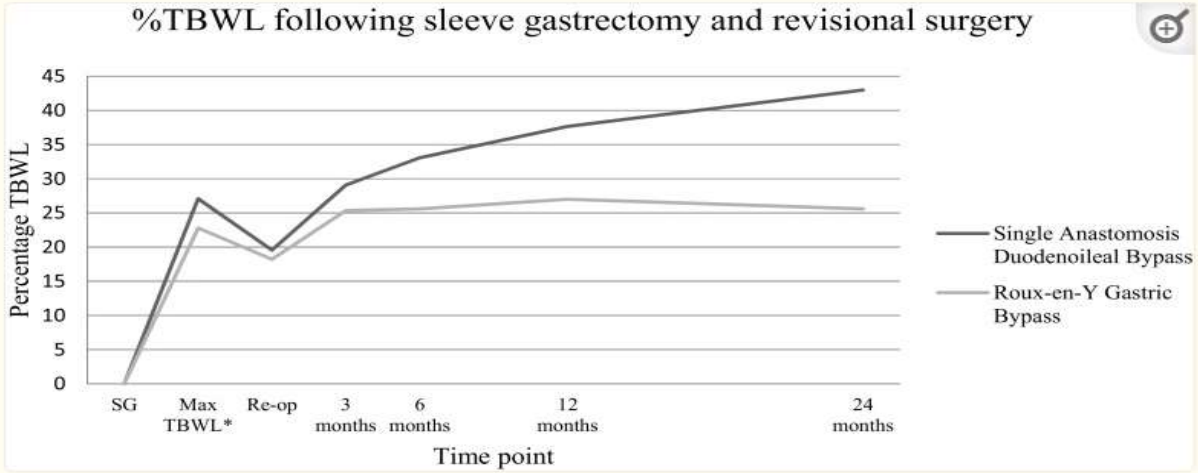
Table 2

Percentage total body weight loss (%TBWL) following secondary surgery

	%TBWL at 3 months	%TBWL at 6 months	%TBWL at 12 months	%TBWL at 24 months
SADI	11.3% (± 4.1)	16.5% (± 5.8)	21.5% (± 8.1)	26.4% (± 10.4)
RYGB	5.9% (± 5.3)	7.8% (± 6.8)	8.9% (± 8.7)	6.9% (± 11.3)
P value	< .001	< .001	< .001	< .001

Open in a separate window

SADI single anastomosis duodenoileal bypass, *RYGB* Roux-en-Y gastric bypass, ± standard deviation in percentage



- **66例SG修正为SADI，74例SG修正为RYGB**
- **rSADIS的TBWL均优于rRYGB（均 $p < 0.001$）**

Short-term (< 30 days) and medium-term (> 1 month and < 12 months) complications

	SADI	RYGB	Total	*P*
	N = 66 (%)	*N* = 74 (%)	*N* = 140 (%)	
Short-term complication (< 30 days)	4 (6.1%)	6 (8.1%)	10 (7.1%)	.639
Readmission	3	4	7	
Reoperation	1	2	3	
Abscess	1			
Anastomic leakage		1		
No focus		1		
Med-term complication (> 1 and < 12 months)	7 (10.6%)	7 (9.5%)	14 (10%)	.821
Readmission	1	3	4	
Reoperation	6	4	10	
Internal herniation		2		
Incisional hernia	1			
Anastomic leakage	1			
Revisional surgery*	1			
Re-sleeve	2			
Stenosis		1		

Post-operative nutritional deficiencies within the first 2 years after revisional SADI and RYGB

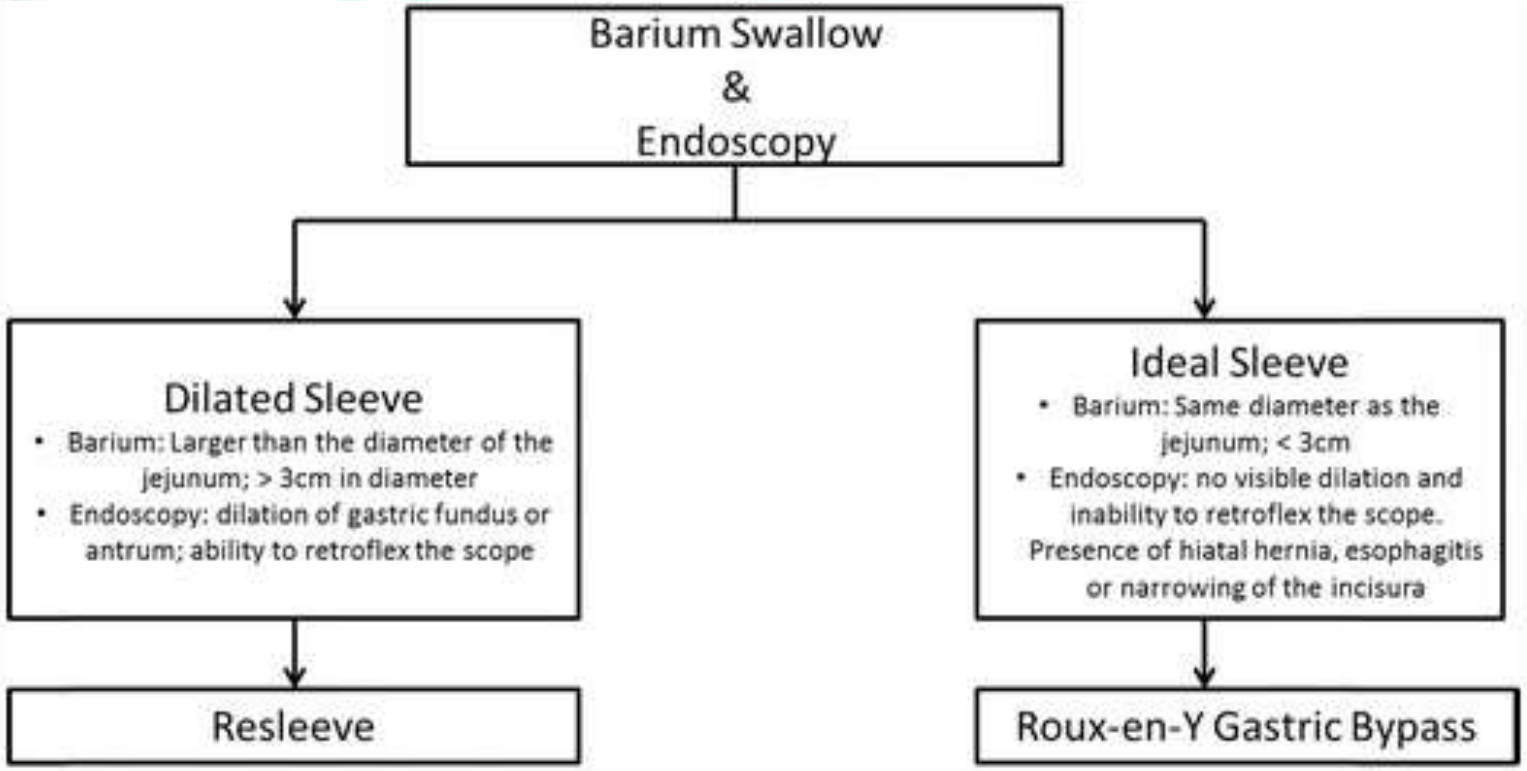
	Post-SADI	Post-RYGB	
	N = 20–47*	*N* = 29–42*	
	Number of deficiencies (%)	Number of deficiencies (%)	*P* value
Anemia	16 (34%)	11 (26%)	.421
Ferritin	6 (14%)	11 (31%)	.071
Folate	10 (31%)	5 (12%)	.066
Vitamin B12	0	13 (33%)	< .001
Vitamin D	13 (28%)	9 (23%)	.587
Parathyroid hormone	3 (7%)	3 (8%)	.875
Calcium	3 (7%)	2 (5%)	.705
Albumin	5 (12%)	5 (17%)	.525
Vitamin B1	1 (5%)	0	N.A.
Vitamin B6	0	0	N.A.

- 对于GERD和吞咽困难 rRYGB术后症状消失
- 两组并发症和营养缺乏相似
- 没有术中或术后死亡率

Re-sleeve vs rRYGB: Comparative study

Comparative Study 3.479 > Obes Surg. 2016 Oct;26(10):2302-7. doi: 10.1007/s11695-016-2119-y.

Approach to Poor Weight Loss After Laparoscopic Sleeve Gastrectomy: Re-sleeve Vs. Gastric Bypass

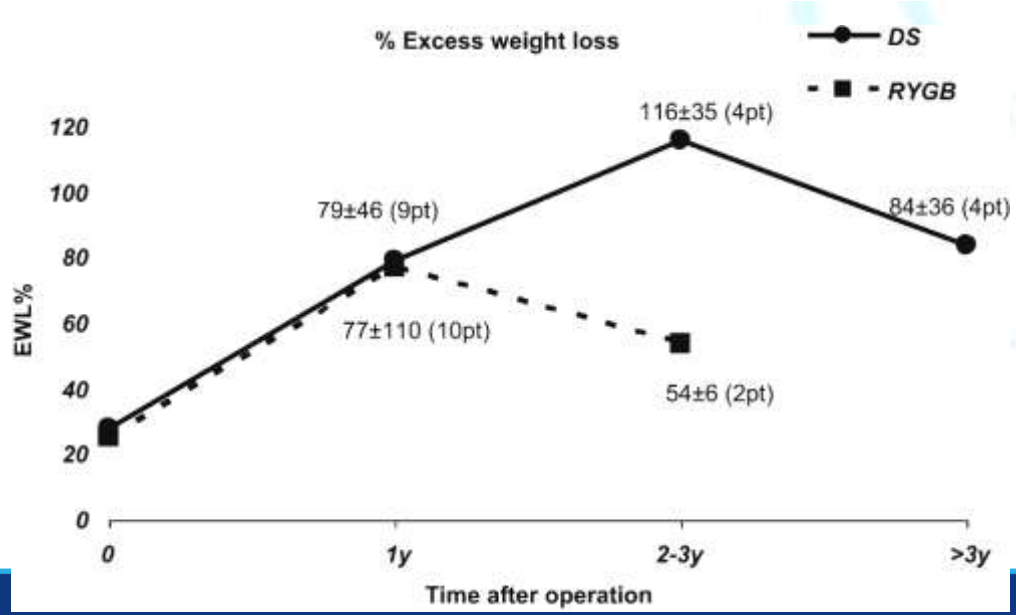


rBPD/DS or rRYGB: the algorithm

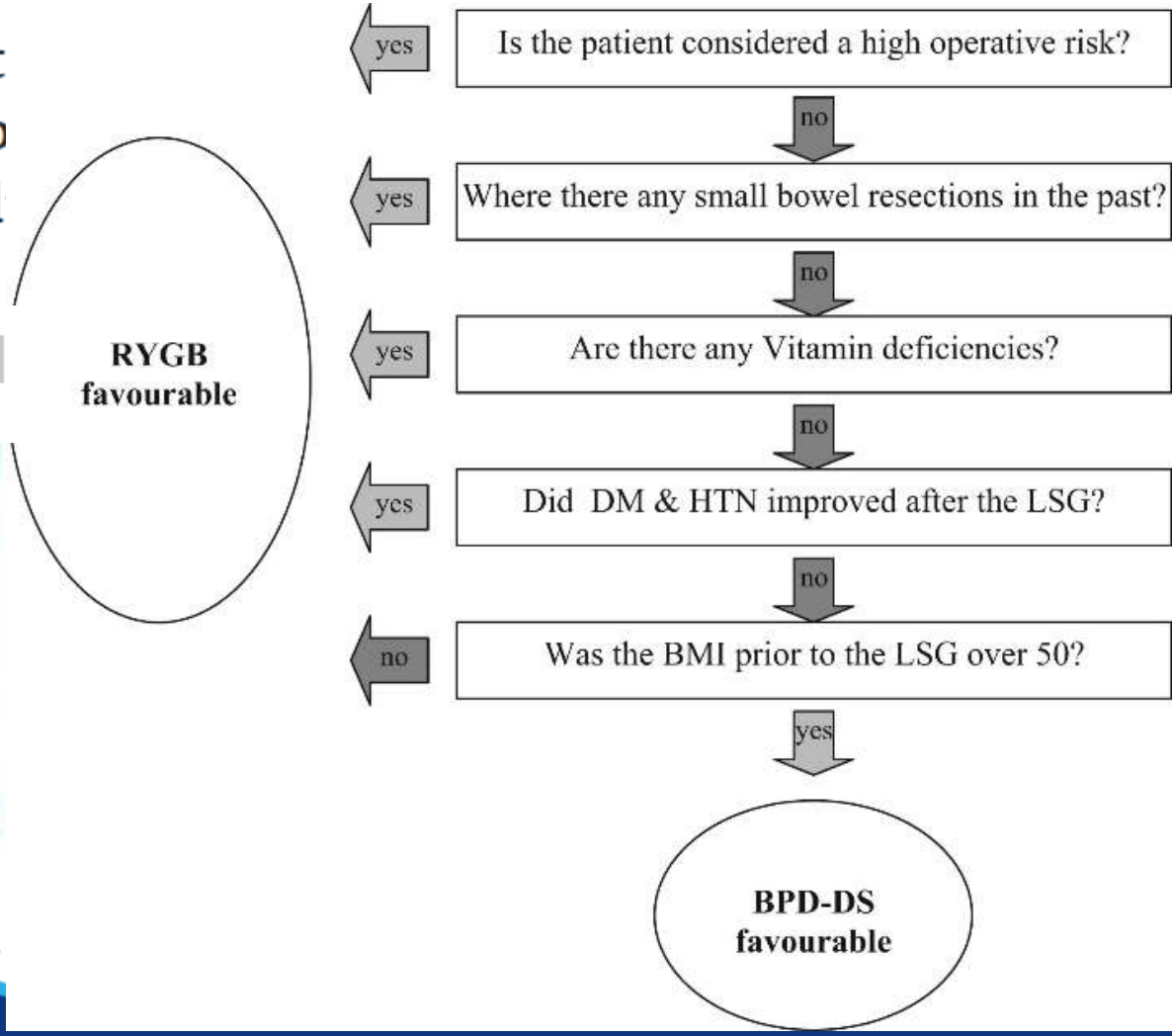
3.709 > Surg Obes Relat Dis. 2015 Jan-Feb;11(1):79-85. doi: 10.1016/j.soard.2014.04.012. Epub 2014 Apr 24.

Laparoscopic conversion of sleeve gastrectomy t biliopancreatic diversion with duodenal switch o Roux-en-Y gastric bypass due to weight loss fail our algorithm

Conclusion: DS and RYGB are feasible and effective operations after a failed SG. The DS yields a greater weight loss. The mechanism of failure should guide selection of the second procedure.



高危、狭窄、维生素、合并症、BMI大于50



01 OPTION

Profile

02 OPTION

Guideline

03 OPTION

Our experience

60例+进行修正

LSG修正为LRYGB　　25例

再次手术后　　7例减重效果仍不佳

1例GERD改善仍不明显（无食道裂孔疝）

34Y Male

2016.08

- Mets plus BMI *34.3*kg/㎡
- Severe OSA（AHI *86.3*，Mean SO_2 90%, Nadir SO_2 *73*%)
- 2-DM（HbA1c *9.4*%)
- OHS（CO2 *47*mmHg)
- NAFLD（ALT 98；AST 51)

2016.09

Non-invasive ventilator for 1 week

LSG+QUPPP

2016.11

- Burkit lymphoma, CVAD
- 无复发，剧烈恶心呕吐
- Nadir weight *85* kg（Nadire BMI为25.38），伴烧心反酸，PPI强化不佳

2021.08

- Mets & weight recurrence（BMI *31.2*kg/㎡)
- OHS（PCO2 51.8mmHg)
- Moderate OSA（AHI 23.9)
- NAFLD
- 2-DM（HbA1c：8.2%）
- GERD，胸腔迁移
- Burkit淋巴瘤（临床治愈)

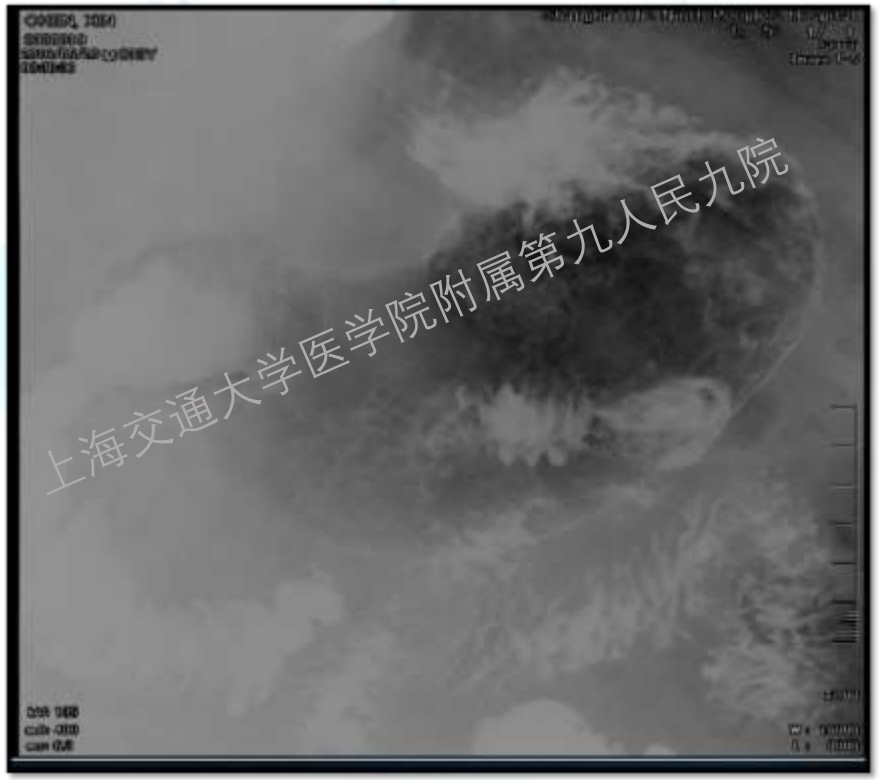
2021.09

- rLRYGB
- Hiatal Repair

PRIMARY SLEEVE 2016

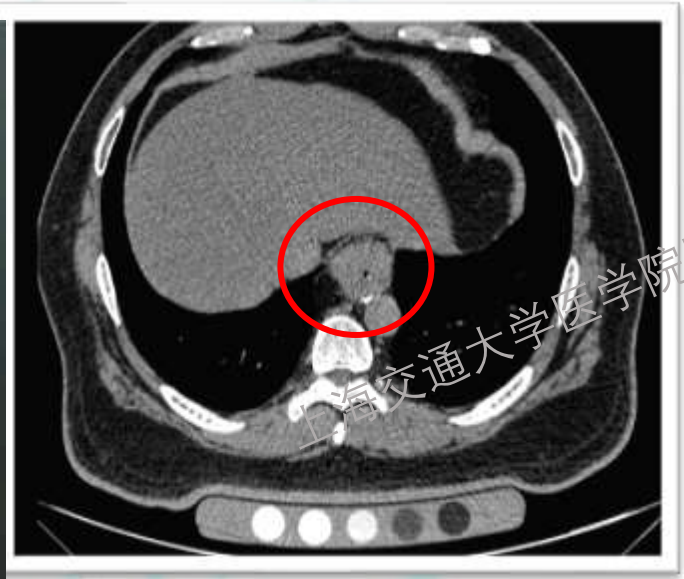
治疗

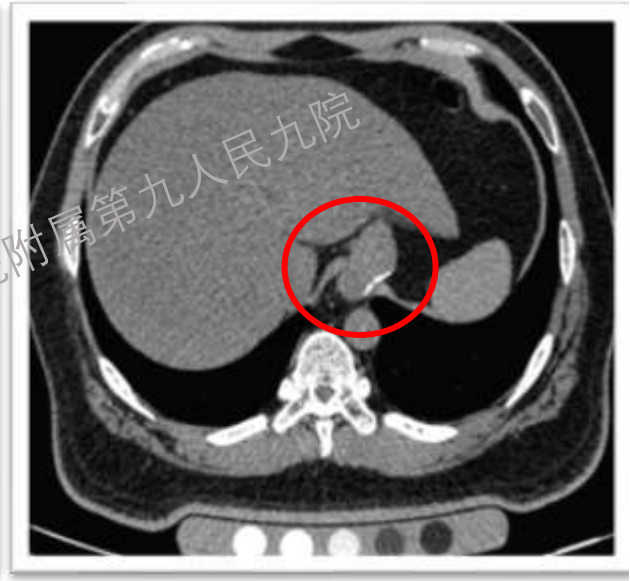
- Postoperative SICU for 1d
- Discharge 4d after surgery
- Continuing CPAP
- No perioperative complications



REVIED SURGERIES 2021

术前检查

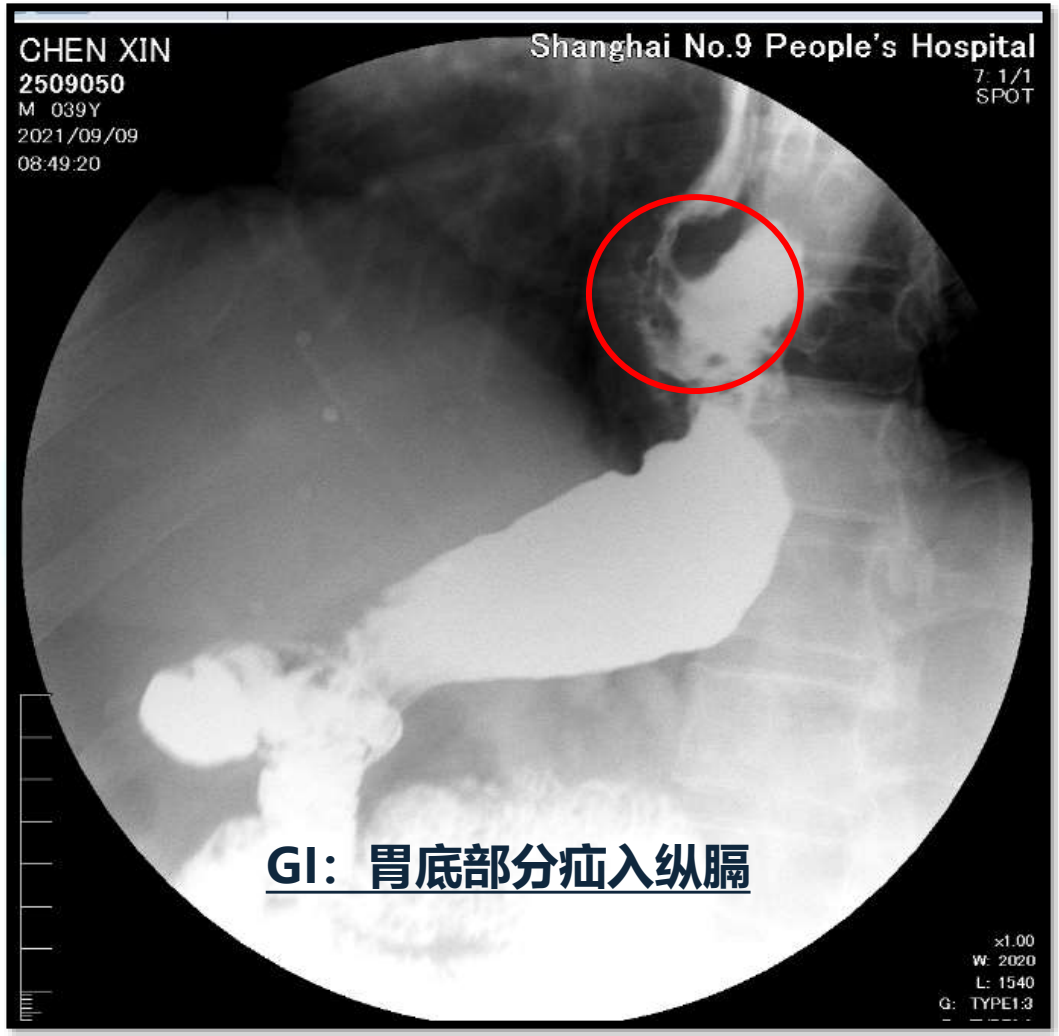




腹部QCT：食管裂孔疝，轻度脂肪肝

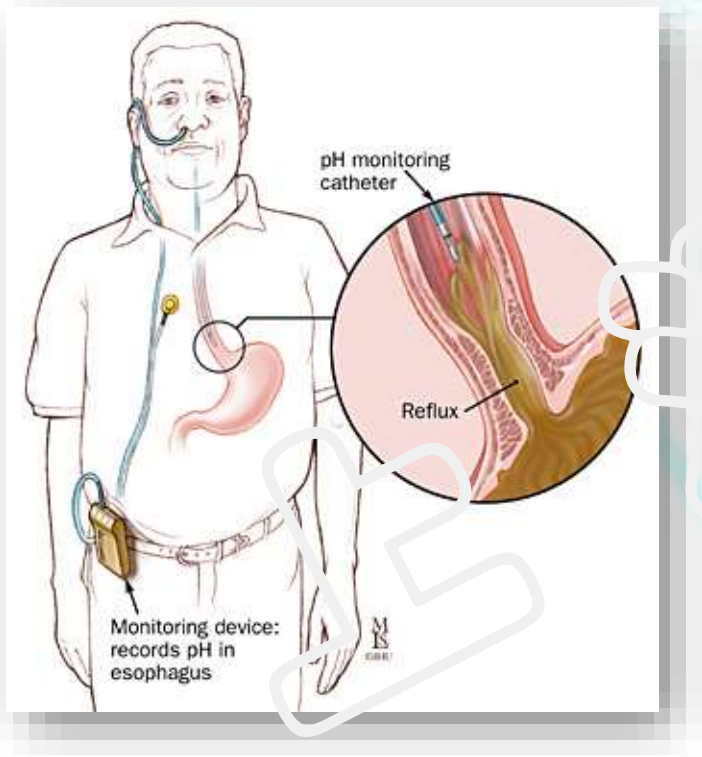
REVIED SURGERIES 2021

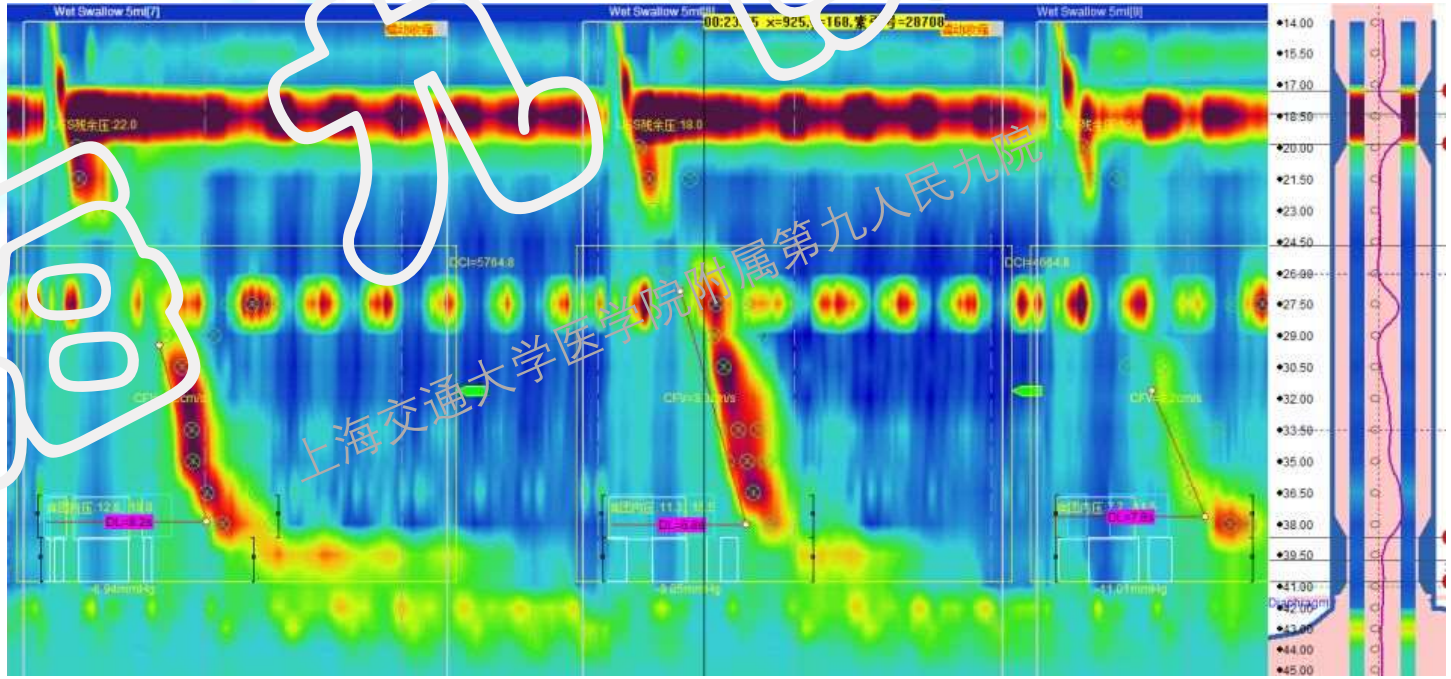
术前检查



REVIED SURGERIES 2021

术前检查

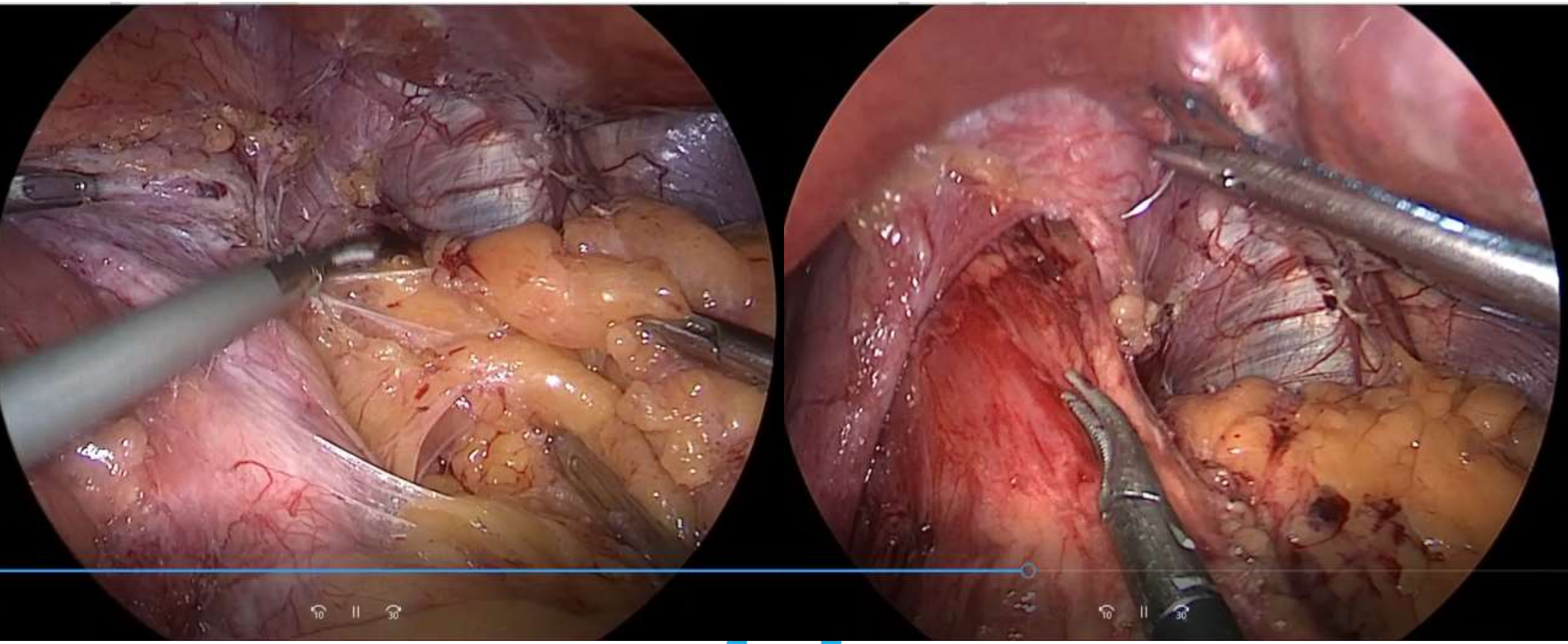




24h测酸：患者拒绝

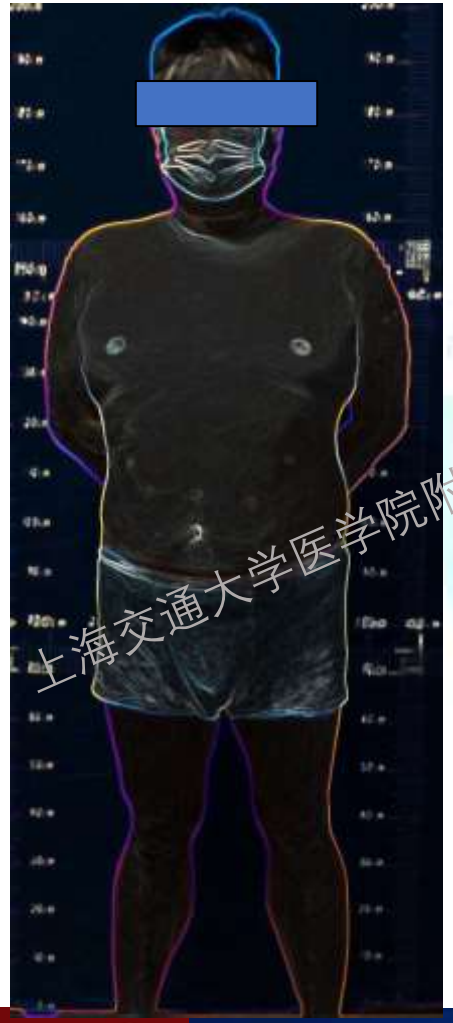
食管测压：见食道裂孔疝特征

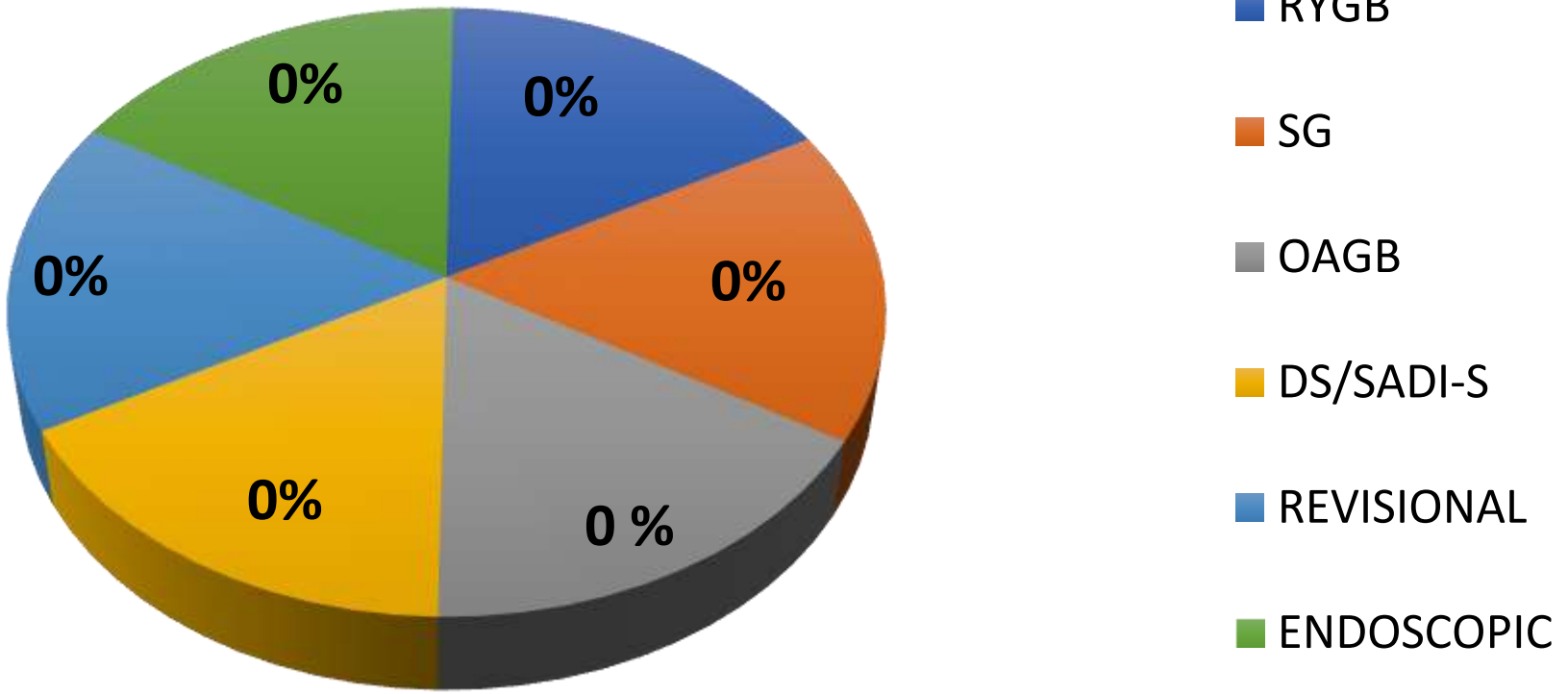
REVIED SURGERIES 2021



REVIED SURGERIES 2021

		修正术前	术后3月
PSG	AHI(/hr)	23.9	9
	Nadir SO_2 （%）	82	95
	Mean SO_2 （%）	95	88
Arterial Blood Gas	PO_2(mmHg)	109	102
	PCO_2(mmHg)	51.8	43.5
Weight (Kg)		104.5	90
BMI(Kg/㎡)		31.2	26.8
Body fat rate （%）		26.3	19.8
HbA1c （%）		8.2	6.3





0%
0%
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RYGB
SG
OAGB
DS/SADI-S
REVISIONAL
ENDOSCOPIC

Please indicate on this Case Mix Disclosure Slide the number of procedures you have performed throughout your whole career.

- The disclosure slide is meant to show the % of procedures performed in the whole career of the surgeon/presenter.
- This is helpful to give the audience a clear idea of the of the type of operations the presenter has done in his professional career.
- This is a requirement for all IFSO endorsed meetings. The Case Mix Slide must be enforced mandatorily by the Director of the endorsed event and it is recommended for all the other Speakers.
- The presenter is free to add/remove to the suggested list any type of procedure to fully reflect his/her own statistics.