

# ABSTRACTS BOOK

8<sup>th</sup> IFSO-APC  
MEETING 2023

30th November-1st December, 2023

10<sup>th</sup> CSMBS 2023

2nd December, 2023

Shangri-La Hotel Shenzhen, China





# ABOUT IFSO-APC

**IFSO-APC** was founded during September and October, 2008 and had its constitution passed by the Executive and Council at the meeting in Argentina.

Formation of this regional chapter will help having IFSO meetings in this part of the world and hence new researches and findings would surface. Along with this, this would also encourage multi-cultural transfers. By enlarging the awareness about Bariatric procedures is on the high all over the Asia-Pacific region. The growing number of societies and Bariatric procedures has been evident.

The founding president was Harry Frydenberg.

Subsequently Council members from the United Arab Emirates, South Africa, Saudi Arabia and Philippines became affiliated to the APC and the first meeting was held in March 2009 together with the Australian OSSANZ meeting in Cairns, Australia. This was attended by 150 people, of which 30 were from elsewhere in the Asia Pacific area.

The current Asia Pacific Chapter member societies are:

Australia-New Zealand, China, Hong Kong (China), Iran, India, Indonesia, Japan, South-Korea, Malaysia, Philippines, Singapore, Sri Lanka, Taiwan (China), Thailand.

The total number of members is about 1,000.

## PAST IFSO-APC MEETINGS

**IFSO-APC 2022** Manila, Philippines 3-4 November

**IFSO APC VIRTUAL CONGRESS 2021** 25 November

**IFSO-APC VIRTUAL CONGRESS 2020** 27-28 November

**IFSO-APC 2019** Guangzhou, China 21-23 March

**IFSO-APC 2017** Goa, India 21-23 April

**IFSO-APC 2015** Kintex, Goyan, Korea 9-11 April

**IFSO-APC 2013** Kaohsiung, Taiwan, China 10-13 April



# Conference Invitation

Dear colleagues,

你好!(Ni Hao!)

It is our honor and privilege to invite you to The 8th IFSO-APC MEETING in Shenzhen, China from 30th November to 1st December, 2023. The 10th CSMBS MEETING will also be held in Shenzhen, China on 2nd December, 2023.

Renowned as China's Silicon Valley and situated adjacent to Hong Kong, Shenzhen is home to world-class medical enterprises and top-tier talent, making it a hub of technology, innovation, future, and dreams. Let's come together in Shenzhen and shape a resplendent future for Metabolic and Bariatric Surgery!

Embracing the theme of The Future of Metabolic Bariatric Surgery in Asia Pacific, the two conferences will span three action-packed days, immersing us in a tapestry of multidisciplinary sessions, invigorating workshops, and more, all meticulously crafted to enrich our knowledge and ignite fruitful collaborations.

With unbridled excitement, we eagerly anticipate your presence!

Best regards,



CC Wang

IFSO-APC Congress President  
& APC President

- President, IFSO-APC
- President, CSMBS
- The First Affiliated Hospital of Jinan University



# Scientific Organizing Committee



**CC Wang**

IFSO-APC Congress President  
& APC President



**Wah Yang**

IFSO-APC Congress Secretary



**Kazunori Kasama**

IFSO-APC Past President



**Harry Frydenberg**

IFSO-APC Honorary President



**Ahmad Aly**

IFSO-APC Member at large



**Asim Shabbir**

IFSO-APC Secretary  
& President elect



**Muffazal Lakdawala**

IFSO-APC Senior Past President



**Wei-Jei Lee**

IFSO-APC Chair Scientific Committee  
+Chair of Senior Advisory Board



**John Dixon**

IFSO-APC Chair IH Committee



**Kwang-Wei Tham**

IFSO-APC Vice Chair IH Committee



**Shaihong Zhu**

Head of Local Scientific Committee



# IFSO-APC

Thursday, November 30

TIME

Grand Ballroom

08:00-08:30

**CONGRESS OPENING**

**Congress President Opening Address:** Cunchuan Wang (China)

**Moderator:** Shaihong Zhu (China)

08:30-10:00

**The By-Band-Sleeve RCT: How does this impact the practice of bariatric surgery?**

**Chairs:** Kwang-Wei Tham (Singapore), Lilian Kow (Australia)

**Moderators:** Asim Shabbir (Singapore), Yanling Yang (China)

10:00-10:30

COFFEE BREAK

10:30-12:00

**Revisional Surgery**

**Chairs:** Ahmad Aly (Australia), Muffazal Lakdawala (India)

**Moderator:** Shaihong Zhu (China)

12:00-13:00

**ETHICON LUNCH SYMPOSIUM**

13:00-14:30

**Medical Treatment of Obesity & Related Complications: How Will it Fit with Surgery?**

**Chairs:** Kwang-Wei Tham (Singapore), John Dixon (Australia)

**Moderator:** Yan Zhou (China)

14:30-15:00

COFFEE BREAK

15:00-16:30

**New and High Technology, Artificial Intelligence applied to MBS**

**Chairs:** Muffazal Lakdawala (India), Mohit Bhandari (India)

**Moderator:** Xiaocheng Zhu (China)

16:30-18:00

**Endoscopic Bariatric Surgery**

**Chair:** Amit Maydeo (India)

**Moderators:** Asim Shabbir (Singapore), Wei Yang (China)

19:00-21:00

GALA DINNER

TIME

Hong Kong Room

08:00-08:30

08:30-10:00

**National Reports on Metabolic Bariatric Surgery**

**Chair:** Cunchuan Wang (China)

**Moderators:** Gerhard Prager (Austria), Wah Yang (China)

10:00-10:30

COFFEE BREAK

10:30-12:00

**Current Status of OAGB in Asian-Pacific Area**

**Chair:** Wei-Jei Lee (Taiwan, China)

**Moderator:** Kong Han Ser (Taiwan, China)

13:00-14:30

**Journal Symposium: How to run a high-quality medical journal and tips for publications to authors**

**Chair:** Wah Yang (China)

**Moderators:** Cunchuan Wang (China), Mohammad Kermansaravi (Iran)



14:30-15:00

COFFEE BREAK

15:00-16:30

**Body composition during and following weight loss****Chair:** Kwang-Wei Tham (Singapore)**Moderators:** John Dixon (Australia), Jinghai Song (China)

16:30-18:00

**Reflux, Barrett's and Sleeve Gastrectomy: what are the management options?****Chair:** Jaime Ponce (USA)**Moderator:** Anne Rogers (USA)

19:00-21:00

GALA DINNER

TIME

Macau Room

08:00-08:30

08:30-09:50

**FREE PAPERS****Chair:** Hua Meng (China)**Moderator:** Han Hong Lee (Korea)

10:00-10:30

COFFEE BREAK

10:30-12:00

**Robotic Bariatric Surgery****Chair:** Rana C Pullatt (USA)**Moderators:** Bobby Rao (USA), Weidong Tong (China)

13:00-14:20

**FREE PAPERS****Chair:** Sang-Moon Han (Korea)**Moderators:** Aili Aikebaier (China), Sang Hyun Kim (Korea)

14:30-15:00

COFFEE BREAK

15:00-16:30

**Young IFSO Session****Chair:** Wah Yang (China)**Moderators:** Shahab Shahabi (Iran), Yi Chen (China)

16:30-18:00

**FREE PAPERS****Chair:** Ajjana Techagumpuch (Thailand)**Moderators:** Aung Myint Oo (Singapore), Yanjun Liu (China)

19:00-21:00

GALA DINNER



# IFSO-APC

## Friday, December 1

TIME	Grand Ballroom
08:30-10:00	<p><b>New IFSO-ASMBS Guidelines</b>  <b>Chair:</b> Gerhard Prager (Austria)  <b>Moderators:</b> Lilian Kow (Australia), Guanglong Dong (China)</p>
10:00-10:30	COFFEE BREAK
10:30-12:00	<p><b>PRESIDENTIAL SESSION</b>  <b>Chairs:</b> Cunchuan Wang (China), Kazunori Kasama (Japan), Asim Shabbir (Singapore)</p>
12:00-13:00	<b>NOVO NORDISK LUNCH SYMPOSIUM</b>
13:30-15:00	<p><b>Complications VIDEO Session: Bariatric Horror Pictures Show</b>  <b>Chair:</b> Kazunori Kasama (Japan)  <b>Moderators:</b> Wifanto S. Jeo (Indonesia), Liyong Zhu (China)</p>
15:00-15:30	COFFEE BREAK
15:30-17:00	<p><b>Multi-Disciplinary Team Session</b>  <b>Chair:</b> Edward Oliveros (Philippines)  <b>Moderators:</b> Bing Wang (China), Yosuke Seki (Japan)</p>
17:00-18:30	<p><b>IFSO-APC Championship Debate Session</b>  <b>Chairs:</b> Rana C Pullatt (USA), Camilo Boza (Chile)</p>
18:30	<p><b>CLOSING REMARKS</b>  Cunchuan Wang (China) - IFSO APC President 2021-2023  Asim Shabbir (Singapore) - IFSO APC President 2023-2025</p>

TIME	Hong Kong Room
08:30-10:00	<p><b>14th Meeting of Asian Diabetes Surgery Summit</b>  <b>Chair:</b> Wei-Jei Lee (Taiwan, China)  <b>Moderators:</b> Jingge Yang (China), Kazunori Kasama (Japan)</p>
10:00-10:30	COFFEE BREAK
10:30-12:00	
12:00-13:00	<b>TONGEE LUNCH SYMPOSIUM</b>
13:30-15:00	<p><b>APMBSS Session "Sleeve Plus: the Update"</b>  <b>Chair:</b> Suthep Udomsawaengsup (Thailand)  <b>Moderators:</b> Daniel King Hung Tong (Hong Kong, China), Zhen Li (China)</p>
15:00-15:30	COFFEE BREAK
15:30-17:00	<p><b>Patient Reported Experience and Outcome Measures (PREMS and PROMS)  – putting the patient in the centre of clinical care, research and registries</b>  <b>Chair:</b> Jane Blazeby (UK)  <b>Moderators:</b> Camilo Boza (Chile), Zefeng Xia (China)</p>
17:00-18:30	<p><b>Hernia Surgery</b>  <b>Chair:</b> Asim Shabbir (Singapore)  <b>Moderators:</b> Darwin Salonga (Philippines), Matt Hsin (Taiwan, China)</p>



# IFSO-APC

Friday, December 1

**TIME**

**Macau Room**

08:30-09:30

**FREE PAPERS**

**Chair:** Wei Guan (China)

**Moderators:** Kwang-Wei Tham (Singapore), Jiangfan Zhu (China)

10:00-10:30

**COFFEE BREAK**

10:30-12:00

12:00-13:00

**GENERAL COUNCIL MEETING**

13:30-14:50

**FREE PAPERS**

**Chair:** Khaled Gawdat (Egypt)

**Moderators:** Anne Rogers (USA), Peng Zhang (China)

15:00-15:30

**COFFEE BREAK**

15:30-17:00

**FREE PAPERS**

**Chair:** Xitai Sun (China)

**Moderators:** Brian Oldfield (Australia), Erfei Song (China)

17:00-18:30

**FREE PAPERS**

**Chair:** Xiaodong Han (China)

**Moderators:** Masoumeh Shahsavan (Iran); Lilian Gao (China)





# CSMBS

## Saturday, December 2

### TIME Grand Ballroom

08:30-10:00

**Keynote Speech 主题演讲**
**Chairs (主席):** Cunchuan Wang (China) 王存川, Shaihong Zhu (China) 朱晒红

**Moderators (主持):** Zhongtao Zhang (China) 张忠涛, Jingang Liu (China) 刘金钢  
Sanyuan Hu (China) 胡三元

10:00-10:30

COFFEE BREAK

10:30-12:00

**Bariatric Surgery + Type 2 Diabetes 减重手术+2型糖尿病**
**Chairs (主席):** Shaihong Zhu (China) 朱晒红, Pin Zhang (China) 张 频

**Moderators (主持):** Liyong Zhu (China) 朱利勇, Jingge Yang (China) 杨景哥

### TIME Beijing Room

12:00-13:00

**Johnson & Johnson - Innovative Technology Solutions for Bariatric Surgery**  
强生·减重外科手术创新技术解决方案

13:30-15:00

**Database Session 数据库专场**
**Chairs (主席):** Jingang Liu (China) 刘金钢, Zhongtao Zhang (China) 张忠涛

**Moderators (主持):** Cunchuan Wang (China) 王存川, Jiangfan Zhu (China) 朱江帆  
Jianhong Bu (China) 卜建红

15:00-15:30

COFFEE BREAK

15:30-17:00

**Sleeve Gastrectomy Plus + as Primary or Secondary Surgery**  
SG+作为一期手术还是二期手术

**Chairs (主席):** Hui Liang (China) 梁 辉, Guanglong Dong (China) 董光龙

**Moderators (主持):** Zefeng Xia (China) 夏泽锋, Liming Tang (China) 汤黎明  
Chang Liu (China) 刘 昶, Junjiang Wang (China) 王俊江

17:30-19:00

**Accurate and Standardized Bariatric Surgery 精准规范减重手术**
**Chairs (主席):** Nengwei Zhang (China) 张能维, Zhong Cheng (China) 程 中

**Moderators (主持):** Tao Jiang (China) 姜 涛, Bing Wang (China) 王 兵  
Zhongqi Mao (China) 毛忠琦

### TIME Hong Kong Room

08:30-10:00

10:00-10:30

COFFEE BREAK

10:30-12:00

**Clinical Research Session 临床研究专场**
**Chairs (主席):** Peng Zhang (China) 张 鹏, Yi Chen (China) 陈 亿

**Moderators (主持):** Yan Gu (China) 顾 岩, Rixing Bai (China) 白日星  
Shaozhuang Liu (China) 刘少壮

12:00-13:30

CORPORATE LUNCH SYMPOSIUM



TIME	Hong Kong Room
13:30-15:00	<b>Basic Research Session 基础研究专场</b> <b>Chairs (主席):</b> Sanyuan Hu (China) 胡三元, Liyong Zhu (China) 朱利勇 <b>Moderators (主持):</b> Guoping Li (China) 李国平, Yao Lu (China) 陆瑶 Xiongzong Ruan (China) 阮雄中
15:00-15:30	COFFEE BREAK
15:30-17:00	<b>Complication Cases Session 并发症病例专场</b> <b>Chairs (主席):</b> Xiaocheng Zhu (China) 朱孝成, Qiyuan Yao (China) 姚琪远 <b>Moderators (主持):</b> Gang Ji (China) 季刚, Yixing Ren (China) 任亦星 Zhiyong Dong (China) 董志勇, Liyong Zhu (China) 朱利勇
17:30-19:00	<b>Support Session 支持专场</b> <b>Chairs (主席):</b> Xiaomei Chen (China) 陈笑梅, Linli Sun (China) 孙林丽 <b>Moderators (主持):</b> Xiaomei Chen (China) 陈笑梅, Ningli Yang (China) 杨宁琳 Linli Sun (China) 孙林丽, Lilian Gao (China) 高丽莲 Xiaowei Zhang (China) 张晓薇
TIME	Macau Room
08:30-10:00	
10:00-10:30	COFFEE BREAK
10:30-12:00	<b>Overseas Chinese 华人华侨</b> <b>Chairs (主席):</b> Cunchuan Wang (China) 王存川, Zhiyong Dong (China) 董志勇 Wah Yang (China) 杨华 <b>Moderators (主持):</b> Wei-Jei Lee (Taiwan, China) Wei Yang (China) 杨威
12:00-13:30	CORPORATE LUNCH SYMPOSIUM
13:30-15:00	<b>BRICS Session 金砖国家专场</b> <b>Chairs (主席):</b> Yan Gu (China) 顾岩, Almino Ramos (Brazil) <b>Moderators (主持):</b> Yan Gu (China) 顾岩, Muffazal Lakdawala (India) Lei Lian (China) 练磊, Dongsheng Hou (China) 侯栋升 Jianjun Yang (China) 杨建军, Alexandr Neimark (Russia)
15:00-15:30	COFFEE BREAK
15:30-17:00	<b>The Greater Bay Area Session 粤港澳大湾区专场</b> <b>Chairs (主席):</b> Xiangwen Zhao (China) 赵象文, Jingge Yang (China) 杨景哥 <b>Moderators (主持):</b> Liangping Wu (China) 吴良平, Shaowei Xiong (China) 熊少伟 Xiaojiang Dai (China) 戴晓江, Nim Choi (China) 蔡念
17:30-19:00	<b>Clinical Case Speech Contest 临床病例演讲比赛</b> <b>Chairs (主席):</b> Cunchuan Wang (China) 王存川, Shaihong Zhu (China) 朱晒红 <b>Moderators (主持):</b> Liyong Zhu (China) 朱利勇, Zhiyong Dong (China) 董志勇 Zefeng Xia (China) 夏泽锋, Wah Yang (China) 杨华 Shuai Han (China) 韩帅



## IFSO SECRETARIAT

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## Important Dates

### November 30th

08:00-08:30 CONGRESS OPENING  
(3F Grand Ballroom)

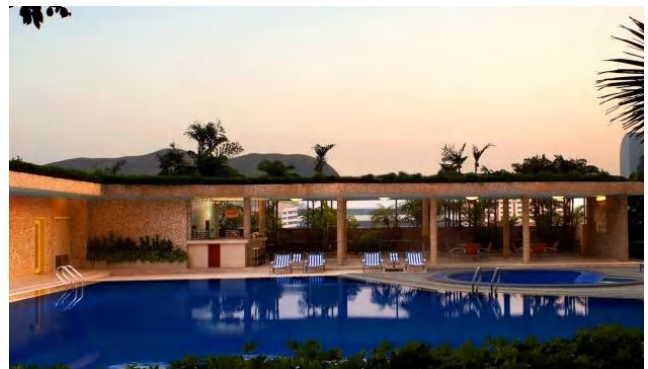
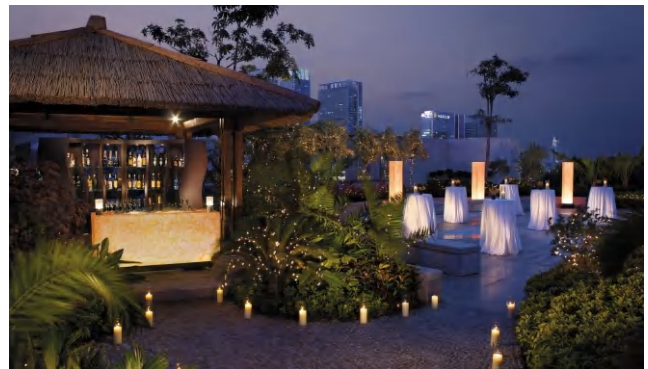
19:00-21:00 Gala Dinner at the  
Shangri-La Hotel Shenzhen

### December 1st

10:30-12:00 PRESIDENTIAL SESSION  
(3F Grand Ballroom)

## Congress Venue

Shangri-La Hotel Shenzhen, China  
East Side, Railway Station, 1002 Jianshe Road, Shenzhen, 518001 China



## Language

The Official Language of the Congress is English.



## CONGRESS REGISTRATIONS

The following Registration Fees are available for IFSO-APC 2023:

Registration Fees	By 15th October, 2023		After 15th October, 2023 and on site	
Delegate IFSO Member	\$115.00	¥ 800.00	\$145.00	¥ 1,000.00
Delegate non-IFSO Member	\$150.00	¥ 1,000.00	\$200.00	¥ 1,400.00
Delegate Integrated Health	\$50.00	¥ 350.00	\$80.00	¥ 550.00
Residents & Students	\$20.00	¥ 150.00	\$40.00	¥ 300.00
Gala Dinner on 30th November	\$60.00	¥ 400.00	\$60.00	¥ 400.00



# Oral Presentations



## SAFETY AND EFFICACY OF ONE ANASTOMOSIS GASTRIC BYPASS IN CHILDREN AND ADOLESCENTS: A 5-YEAR COHORT STUDY

Fahime Yarigholi<sup>1</sup>, Masoumeh Shahsavan, Ali Salman<sup>1</sup>,

Abdolreza Pazouki<sup>2,3</sup> Ali Mazaherinezhad<sup>1,4</sup>, Mohammad Kermansaravi<sup>2,3</sup>

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<sup>3</sup> Center of Excellence of European Branch of International Federation for Surgery of Obesity, Hazrat\_e Rasool Hospital, Tehran, Iran<sup>4</sup> Department of Sports and Exercise Medicine, School of Medicine, Iran University of Medical Sciences, Tehran, Iran

**Background:** Childhood obesity is an important worldwide issue of serious medical and social concern. One anastomosis gastric bypass (OAGB) is an approved, effective, and long-lasting procedure for weight loss and the remission of obesity associated medical problems in the adult patients, but its efficacy and safety in children and adolescents are still on debate. This study aimed to evaluate safety and efficacy of OAGB compare to SG and RYGB during a 5-year follow-up.

**Methods:** A retrospective cohort study on children and adolescents with severe obesity who underwent primary OAGB, sleeve gastrectomy (SG), and Roux-e-Y gastric bypass (RYGB) at an academic hospital, between March 2016 and December 2020.

**Results:** Two hundred twenty-eight patients with 24 to 60 months of follow-up including 107 SG, 37 RYGB, and 84 OAGB were included in the final analysis. The mean age, preoperative weight, and BMI were  $15.71 \pm 2.09$  years (range, 9–18 years),  $126.3 \pm 22.0$  kg (74.5–215 kg), and  $45.1 \pm 6.9$  kg/m<sup>2</sup> (36.4–79.3 kg/m<sup>2</sup>), respectively. The mean of follow-up was  $30.05 \pm 19.98$  months. The mean of  $\Delta$ BMI was  $30.2 \pm 5.1$ ,  $30.0 \pm 5.4$ , and  $31.1 \pm 6.8$  at 12th, 36th, and 60th months postoperative. At the 60-month follow-up, there were statistically significant differences in  $\Delta$ BMI between SG and OAGB and SG and RYGB.

**Conclusion:** OAGB is a safe and effective procedure for the treatment of obesity in children and adolescents in 24 to 60 months follow-ups.



O-02

## **SLEEVE GASTRECTOMY AND GASTRIC BYPASS IN THE TREATMENT OF NONALCOHOLIC FATTY LIVER DISEASE IN CHINESE PATIENTS WITH OBESITY**

**Guixiang Zhang, Zhong Cheng**

*West China Hospital, Sichuan University*

**Background:** Nonalcoholic Fatty Liver Disease (NAFLD) has become the most common chronic liver disease in the world in patients with obesity. Bariatric surgery can improve the degree of nonalcoholic fatty liver. Here we compared the effect of Sleeve gastrectomy (SG) and Roux-Y gastric bypass (RYGB) on NAFLD.

**Objectives:** The effects on weight loss, resolution of comorbidities, liver function tests and Aspartate aminotransferase/platelet ratio index (APRI) were compared between SG and RYGB.

**Methods:** A nonrandomized cohort of patients who underwent SG (68) and LSG (22) were followed up for 1 year.

**Results:** SG and RYGB had no significant difference in the remission rate of diabetes, hypertension and hyperlipidemia. RYGB improved total cholesterol (TC), triacylglycerol (TG) and Low-Density Lipoprotein Cholesterol (LDL-C) better than SG. The improvement of alanine aminotransferase (ALT)-Aspartate aminotransferase (AST) and Aspartate Transaminase to Platelet Ratio Index (APRI) in LSG group was significantly better than in RYGB group ( $p < 0.05$ ). RYGB significantly improved serum ALT, while APRI score and AST had no significant change at first year after surgery.

**Conclusion:** No significant difference between SG and RYGB was found regarding complications, change in BMI, remission of hypertension, diabetes and hyperlipidemia at 1 year after surgery. Both surgical procedures can significantly improve liver function in NAFLD. SG improve APRI better than RYGB in patients with NAFLD.





## ENDOSCOPIC AND HISTOPATHOLOGICAL ASSESSMENT FOLLOWING ONE ANASTOMOSIS GASTRIC BYPASS

Mohammad Kermansaravi<sup>1,2</sup>, Masoumeh Shahsavan<sup>3</sup>, Shiva Safari<sup>3</sup>,  
Foolad Eghbali<sup>1,2</sup>, Seidamir Pasha Tabaeian<sup>4,5</sup>, Seyed Amin Setaredan<sup>3</sup>,  
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<sup>2</sup> Center of Excellence of European Branch of International Federation for Surgery of Obesity, Hazrat\_e Rasool Hospital, Tehran, Iran

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<sup>5</sup> Colorectal Research Center, Iran University of Medical Sciences, Tehran, Iran

### Abstract

**Background/Introduction:** One anastomosis gastric bypass (OAGB) as a combined procedure including both restrictive and hypo-absorptive components is now a popular and effective metabolic and bariatric surgical procedure. Chronic biliary reflux (BR) after OAGB can be a risk factor for esophagitis, Barret's esophagus (BE), and maybe marginal ulcers.

**Objectives:** This study aimed to assess the endoscopic and histopathological results in patients who underwent primary OAGB, throughout short to long-term follow-ups at a metabolic and bariatric surgery academic and tertiary center.

**Methods:** This retrospective cohort study was carried out on a sample of 831 patients aged 18 years and older, who had undergone primary OAGB between March 2014 and April 2022, and had a BMI of at least 40 kg/m<sup>2</sup>. Totally 293 of 831 patients agreed to participate in the study and underwent an esophagogastroduodenoscopy (EGD) and biopsy at an academic and tertiary center. Patients with one to more than five years of follow-up were invited to take part in the study and underwent EGD and biopsy.

**Results:** The mean age and mean BMI of participants were 43.2±11.1 and 46.4±7.9 kg/m<sup>2</sup> respectively. All 293 patients completed their one-year follow-up and underwent follow-up EGD. According to the one-year EGD findings, the incidence of marginal ulcers (MU), Barret's esophagus (BE), gastric intestinal metaplasia (GIM), and esophagitis were %23.5, %0.3, %2.4 and %14.3, respectively. In the long-term period (5 years and more), 39 patients underwent follow-up EGD that found the incidence of MU, BE, GIM, and esophagitis as %17.9, %0, %0, and %25.6 respectively. The incidence of de novo esophagitis was %10.8 and %23.1 at one-year and long-term follow-ups.

**Conclusion:** Although there is no evidence of esophagogastric malignancy following OAGB, the occurrence of complications such as marginal ulcers, esophagitis, intestinal metaplasia, and Barret's esophagus necessitates treatment and ongoing follow-up. Therefore, long-term EGD follow-up is deemed necessary.



## REDOX STATUS AND ANTIOXIDANT DEFENSE AFTER METABOLIC AND BARIATRIC SURGERY: A COMPREHENSIVE REVIEW

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**Background/Introduction:** severe obesity is a chronic low-grade inflammatory condition often associated with the overproduction of free radicals, creating a vicious circle that ultimately leads to the development of chronic diseases. Consequently, metabolic and bariatric surgery (MBS) has recently gained considerable appeal as a treatment option for severe obesity, Barrett's esophagus (BE), and maybe marginal ulcers.

**Objectives:** This systematic review aims to determine whether MBS modifies the oxidative/antioxidative balance in people with obesity, based on recent evidence.

**Methods:** A comprehensive electronic search was conducted in PubMed, EMBASE, Scopus, Cochrane, and Google Scholar databases from 1980 to December 2022, without any language limitations. All studies were included with a focus on evaluating the influence of bariatric surgery on antioxidant/oxidative biomarkers, including total antioxidant capacity (TAC), total oxidant status (TOS), total antioxidant status (TAOS), reduced glutathione (GSH), superoxide dismutase (SOD), and catalase (CAT).

**Results:** The search yielded 17 articles for further review. Some studies did not show significant alterations in TOS, TAOS, and TAC levels after bariatric surgery when compared to baseline values. Studies also highlighted conflicting results regarding the effect of MBS on GSH levels. In certain studies, the levels of SOD did not normalize or increased after bariatric treatment. CAT activity exhibited significant variation in response, depending on gender, age, degree of obesity, and duration after surgical weight loss. These factors may explain the lack of change or decrease in CAT activity after surgery.

**Conclusion:** While oxidative/antioxidative balances improved in the first year after bariatric surgery, reports indicated that antioxidative capacity returned to pre-surgery values. As a hypothesis, the decrease in antioxidative marker levels may be responsible for insufficient long-term weight loss and even recurrent weight gain following bariatric surgery.



## ONE ANASTOMOSIS GASTRIC BYPASS AMELIORATES DIABETIC NEPHROPATHY VIA REGULATING THE GLP-1 MEDIATED SIRT1/AMPK/PGC1A PATHWAY

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### Abstract

**Background:** Diabetic nephropathy (DN), a complication of diabetes, is the most leading cause of end-stage renal disease. Bariatric surgery function on the remission of diabetes and diabetes-related complications. Gastric bypass surgery (MGB), one of popular bariatric surgery, can improve diabetes and its complications by regulating the glucagon-like peptide-1 (GLP-1) level. Meanwhile, GLP-1 can alleviate renal damage in high-fat diet-induced rats with obesity. However, the effect of MGB on renal injury remains uncertain in DN.

**Methods:** A diabetes model was elicited in rats via HFD feeding and STZ injection. The role and mechanism of MGB were addressed in DN rats by the body and kidney weight and blood glucose supervision, oral glucose tolerance test (OGTT), enzyme-linked immunosorbent assay (ELISA), biochemistry detection, histopathological analysis and western blot assays.

**Results:** MGB surgery reversed the increase in body weight and glucose tolerance indicators in diabetes rats. Also, MGB operation neutralized the DN-induced the average kidney weight, kidney weight/body weight, and renal injury indexes accompanied with reduced glomerular hypertrophy, alleviated mesangial dilation and decreased tubular and periglomerular collagen deposition. Additionally, MGB introduction reduced the DN-induced renal triglyceride and renal cholesterol with the regulation of fatty acids-related proteins expression. Mechanically, MGB administration rescued the DN-induced expression of Sirt1/AMPK/PGC1 $\alpha$  pathway mediated by GLP-1. Pharmacological block of GLP-1 receptor inverted the effect of MGB operation on body weight, glucose tolerance, renal tissue damage and fibrosis and lipids accumulation in DN rats.

**Conclusion:** MGB improved renal damage and fibrosis and lipids accumulation in DN rats by GLP-1-mediated Sirt1/AMPK/PGC1 $\alpha$  pathway.

**Key Words:** MGB;GLP-1; Diabetic nephropathy; Sirt1/AMPK/PGC1 $\alpha$



## FERTILITY RESTORATION AFTER BARIATRIC SURGERY, A CASE SERIES CONDUCTED ON POST BARIATRIC SURGERY PATIENT OPERATED IN KHYBER TEACHING HOSPITAL PESHAWAR

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**Background/Introduction:** Obesity has become epidemic around the globe and has nearly tripled since 1975. According to WHO Fact sheet, more than 1.9 billion people of age group 18 years and older, were overweight. Among these over 650 million suffered from obesity. Obesity is a risk factor for many health issues, including type 2 diabetes, cardiovascular diseases and several types of neoplasia. Obesity is also known risk factor for infertility in both genders, and it has been proven to increase the risk of pregnancy related complications and decrease chance of conception.

**Objectives:** To describe the clinical characteristics of women who undergo bariatric surgery for obesity and To Assess the impact of bariatric surgery on fertility outcomes in women.

**Methods:** This s was a case series, conducted on post bariatric surgery patients whom underwent bariatric surgery for reason of primary infertility from May 2017 to Jun 2022, in department of General Surgery, Khyber Teaching Hospital, Peshawar. The medical records of 23 eligible participants was reviewed to collect demographic and clinical information, including age, gender, ethnicity, education level, occupation, income, type of bariatric surgery, time since bariatric surgery, weight and height before and after bariatric surgery, comorbidities, medications. A structured questionnaire was used to collect information on post-surgery fertility and reproductive health, including current attempts to conceive, length of time trying to conceive, number of pregnancies, history of miscarriage or ectopic pregnancy, history of abortion, other pregnancy related complications and any fertility testing. Descriptive statistics were used to summarize the demographic and clinical characteristics of the study population. Qualitative data on association between bariatric surgery and fertility restoration was analyzed thematically.

**Results:** The participants' ages ranged from 25 to 38 years, with a mean of 29.70 years (SD = 3.522). The preoperative BMI (Body Mass Index) ranged from 35.29 to 73.60 kg/m<sup>2</sup>, with a mean of 50.3448 kg/m<sup>2</sup> (SD = 9.10591). The time since surgery ranged from 21 to 37 months, with a mean of 29.96 months (SD = 4.866).

Regarding the surgical procedures, 14 participants (60.9%) underwent sleeve gastrectomy, while 9 participants (39.1%) underwent gastric bypass.

The most common comorbidity was polycystic ovarian syndrome, (5 participants, 21.7%), followed by diabetes mellitus and hypertension (3 participants each, 13.0%), depression and hypothyroidism (2 participants each, 8.7%), and endometriosis and fibroids (1 participant each, 4.3%), no comorbid, were found in 6 (26.1%) participants.

Normal pregnancy was reported by 12 participants (52.1%), while 4 participants (17.3%) experienced miscarriages. 6 participants (26.6%) reported infertility, and one participant (4.3%) had an ectopic pregnancy.

Among pregnant women various pregnancy-related complications were following. Hyperemesis gravidarum was reported by 73.9% of participants, while preeclampsia was reported by 13.0%. Gestational diabetes mellitus (GDM) was reported by 39.1% of participants, and anemia was present in 60.9% of participants.

**Conclusion:** This case series provides compelling evidence of the positive impact of bariatric surgery on fertility restoration. This series includes 23 patients who underwent bariatric surgery for primary infertility. 17 out of 23 patients successfully conceived after bariatric surgery.



## **O-06**

These findings are suggestive of crucial role of weight loss surgery in individuals struggling with obesity related infertility. The significant increase in conception rates observed in this study highlight the potential benefits of weight loss achieved through bariatric surgery.



O-07

## PREOPERATIVE LH/FSH RATIO CAN BE USED AS A PREDICTOR FOR THE REMISSION OF PCOS AFTER LAPAROSCOPIC SLEEVE GASTRECTOMY

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**Background:** Sixty percent of women with Polycystic ovarian syndrome (PCOS) suffer from obesity. Bariatric and metabolic surgery can effectively relieve the symptoms of PCOS, including normalization of menstruation, resumption of regular ovulation, and alleviation of hyperandrogenism, while reducing body weight. It is well known that laparoscopic sleeve gastrectomy (LSG) is currently the most commonly used bariatric surgery. Despite this, studies on bariatric and metabolic surgery for PCOS are still sparse, with few research has identified a reliable indicator for predicting PCOS recovery after LSG.

**Objectives:** The aim of this study was to investigate the prognostic value of preoperative indicators for remission of PCOS.

**Methods:** The clinical data of 97 patients with obesity [body mass index (BMI)  $\geq 27.5$ ] with PCOS who underwent LSG and completed follow-up at our hospital from Aug. 2016 to May. 2020 were retrospectively analyzed. All the patients were followed for 12 months. Preoperative BMI, testosterone (TESTO), luteinizing hormone/ follicle stimulating hormone (LH/FSH), insulin, C-peptit (C-P), glycosylated hemoglobin (HbA1c), triglyceride (TG), total cholesterol (TC) were measured. Postoperative BMI, menstrual status, TESTO and LH/FSH was also collected. Binary logistic regression related preoperative indicator with remission of PCOS recovery.

**Results:** There were 97 patients with obesity with average age ( $27.4 \pm 4.9$ ) years, with menstrual dysfunction and were diagnosed PCOS. The preoperative BMI was ( $37.4 \pm 6.9$ )  $\text{kg/m}^2$ , respectively. LSG was successfully implemented in all patients without conversion to laparotomy. There were no severe postoperative complications. The mean BMI was ( $24.2 \pm 4.1$ )  $\text{kg/m}^2$ , postoperatively. The remission rate of PCOS at 12 months was 76.3% (74/97). To identify acceptable indicators for predicting the remission of PCOS in patients after surgery, we conducted a univariate binary logistic regression. Preoperative LH/FSH was substantially related to remission of PCOS at 12 months after surgery ( $P < 0.001$ ,  $B = 0.251$ , 95% CI: 0.108, 0.686), the other preoperative indicators were not related to remission of PCOS at 12 months after surgery.

**Conclusion:** LSG has a significant effect on remission PCOS. Preoperative sexual hormone levels, as expressed by LH/FSH, has the potential to predict the fate of remission of PCOS following LSG at one year post-operatively.



## SLEEVE GASTRECTOMY IMPROVES THE SEXUAL FUNCTION IN MALE PATIENTS WITH OBESITY

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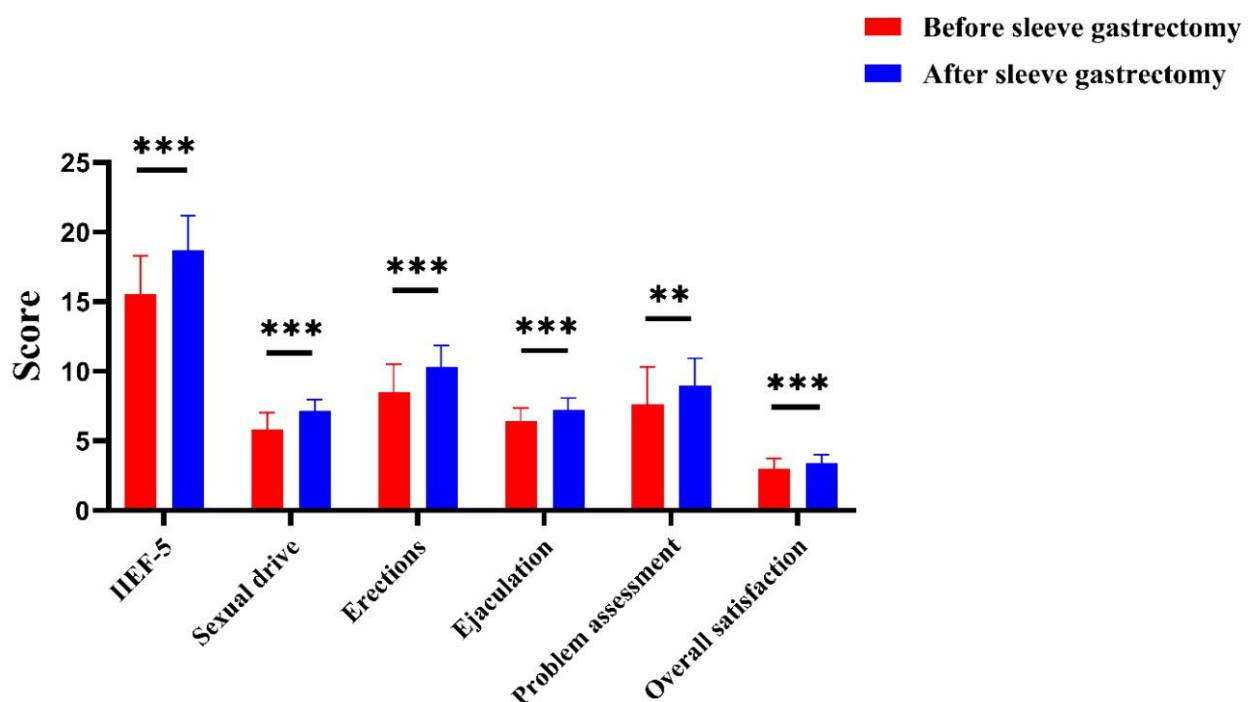
**Background/Introduction:** Male patients with obesity usually have higher rate of sexual function problems, such as erectile dysfunction.

**Objectives:** The aim of this study is to investigate the effect of sleeve gastrectomy on sexual function in patients with obesity.

**Methods:** Adult male patients receiving sleeve gastrectomy in our hospital from October 2021 to February 2023 were included, and those without sexual life were excluded. The sexual function before and six months after surgery were assessed by the International Index of Erectile Function-5 (IIEF-5) questionnaire and Brief Sexual Function Inventory (BSFI).

**Results:** A total of 58 patients were included, with a mean age of 35.67 years old. The sleeve gastrectomy significantly reduced the average BMI of patients by 7.85 at six months after surgery ( $P < 0.001$ ). The mean postoperative IIEF-5 score was significantly higher than it before sleeve gastrectomy (18.67 vs. 15.53,  $P < 0.001$ ). Furthermore, in BSFI, the mean score of the five domains (sexual drive, erections, ejaculation, problem assessment, and overall satisfaction) were all significantly elevated after sleeve gastrectomy.

**Conclusion:** Sleeve gastrectomy can significantly improve sexual function in male patients with obesity.





## TRANS-UMBILICAL TWO-SITE LAPAROSCOPIC ONE-ANASTOMOSIS GASTRIC BYPASS: A COMPARISON WITH CONVENTIONAL LAPAROSCOPIC TECHNIQUES

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### Summary

**Background:** Many Single-site or single-incision laparoscopic surgery (SILS) has been reported for sleeve gastrectomy (SG) because of its outstanding performance in cosmetic effects. However, it is difficult to routinely apply SILS in relatively complex bariatric procedures, such as one anastomotic gastric bypass (OAGB). Here we reported a modified SILS technique, Trans-Umbilical Two-Site(TUTS) technique, for OAGB.

**Materials and Methods:** From March 2022 to October 2022, 20 consecutive patients received OAGB using the trans-umbilical 2-site technique in our bariatric/metabolic surgery center. We used the umbilical site incision to place 2 ports (12 and 10 mm) to serve as the video port and working port for the stapler. Another small skin incision was placed at a left lateral abdominal site for the 5-mm working port. Through these working channels, we could use conventional laparoscopic instruments to perform OAGB. The data of the 20 patients with 2-site OAGB procedures were compared with the data of another matched 40 patients using conventional 4 ports technique selected from the data bank our patients' cohort.

**Results:** The mean age was 33.75 ± 7.69 years old and the mean BMI was 35.03 ± 6.47 Kg/m<sup>2</sup> of the 2-site procedures underwent OAGB. There was no significant difference of clinical characters between the two groups at pre-operation. The operation time of 2-site OAGB group was significantly longer than the conventional OAGB group (118.65 ± 20.54 vs 101.40 ± 17.27 minutes; p=0.001). The postoperative hospital stay and Postoperative flatus passage was shorter in the 2-site OAGB group than the conventional OAGB group (2.60 ± 0.60 vs 3.77 ± 0.53 days; p < 0.001; 1.45 ± 0.51 vs 2.03 ± 0.16 days; p < 0.001). There was a significant difference between the two groups in Analgesic dosage (50.5 ± 9.98 vs 60.50 ± 11.53mg; p=0.002). No perioperative major complication or mortality occurred in the present series. Two patients developed minor complications, separately in each group (10% vs. 5%; p=0.464). Cosmetic score of 2-site OAGB group was more prominent (4.85 ± 0.37 vs 4.52 ± 0.60; p=0.030).

**Conclusion:** Transumbilical two-site modified SILS technique is feasible and safe for OAGB. By reducing ports, this technique has achieved excellent performance in cosmetic result and postoperative rehabilitation. We believe that it can be used as a routine surgical choice for patients.

**Keywords:** Bariatric surgery; One-anastomosis gastric bypass; Transumbilical two-site surgery; Single-incision laparoscopic surgery





## EFFECT OF ANTI-REFLUX SUTURE ON GASTROESOPHAGEAL REFLUX SYMPTOMS AFTER ONE ANASTOMOSIS GASTRIC BYPASS: A RANDOMIZED CONTROLLED TRIAL

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### Abstract:

**Background:** Gastroesophageal reflux disease (GERD) is an issue after one anastomosis gastric bypass (OAGB) and modification of OAGB with adding an anti-reflux system may decrease the incidence of postoperative GERD.

**Objectives:** This study aimed to compare the efficacy of the anti-reflux mechanism to treat preoperative GERD and prevent de novo GERD.

**Materials:** A prospective randomized clinical trial study was conducted on patients with a body mass index of 40 and more from August 2020 to February 2022. Patients undergoing one anastomosis gastric bypass with and without anti-reflux sutures (groups A and B, respectively). The anti-reflux sutures were added for group A patients to fix the biliopancreatic loop to the gastric pouch with running, PDS 2-0 suture in an upward direction approximately along 8-10 cm and also to gastric remnant as the described technique by Carbajo. These patients had follow-ups for one year after the surgery. GERD symptoms were assessed in all the patients using the GERD symptom questionnaire.

**Results:** The mean age was  $39.5 \pm 9.8$  years and  $40.7 \pm 10.2$  years in groups A and B respectively. GERD symptoms remission occurred in 76.5% and 68.4% of patients in groups A and B, respectively. The incidence of de novo GERD symptoms was lower in group A, compared to group B (6.2% and 16.1% in groups A and B respectively), without any statistically significant difference (p-value: 0.239).

**Conclusion:** GERD symptoms and de novo GERD after OAGB seems to be under-reported after OAGB. This study suggests that applying an anti-reflux suture can decrease de novo GERD symptoms.



## AN ASSESSMENT OF A HOLISTIC AND MULTIDISCIPLINARY DIGITAL THERAPEUTICS FOR BARIATRIC PATIENT

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**Background/Introduction:** This study aimed to assess the efficacy of AI-based digital therapeutics for nonmedical and medical weight loss. The non-medical weight loss and weight maintenance assessment has been completed with compelling results, complementing the medical weight loss assessment is in preparation.

**Objectives:** To validate the efficacy of a digital therapeutics platform for nonmedical weight loss. The objective was to achieve 10% of the initial body weight with a stretch goal of 15% of the initial body weight.

**Methods:** This was a nonrandomized study of 391 participants, 59% of the participants were female and 41% were male. A digital therapeutics platform consisting of a special purpose scale at the participants' premise, a mobile app to deliver guidance, education, motivation, accountability, and community support, an AI agent, human coaches, and a dashboard to manage the participants were used. A knowledge base from a large research body about guidance, education about nutrition and physical activities, and psychosocial coaching were coded into the AI. The participants followed a low-calorie diet, 60-90 minutes of physical activity, and psychosocial coaching through their mobile app. The objective was to achieve 10% (stretch goal of 15%) weight loss in 24 weeks for the participants, divided into 6 weight buckets.

**Results:** Overall for all weight buckets, 65-181 Kg, the weight loss (wl) was 13.89% with SD,  $\sigma_{wl} = 7.0$ , 95% confidence interval (CI): 13.45% - 14.33%,  $p < 0.001$ .

Weight Bucket1, 65-85 Kg, wl = 13.29% with SD,  $\sigma_{wl} = 3.4$ , CI: 12.18% - 14.38%,  $p < 0.0001$ .

Weight Bucket2, 86-105Kg, wl = 14.20% with SD,  $\sigma_{wl} = 4.4$ , CI: 13.20% - 15.19%,  $p < 0.0001$ .

Weight Bucket3, 106-125Kg, wl = 14.0 % with SD,  $\sigma_{wl} = 5.2$ , CI: 13.03% - 14.96%,  $p < 0.0001$ .

Weight Bucket4, 126-145 Kg, wl = 14.50% with SD,  $\sigma_{wl} = 5.9$ , CI: 13.41% - 15.58%,  $p < 0.0001$ .

Weight Bucket5, 146-165Kg, wl = 12.53%, with SD,  $\sigma_{wl} = 6.8$ , CI: 11.45% - 13.60%,  $p < 0.0001$ .

Weight Bucket6, 166-181Kg, wl = 14.81%, with SD,  $\sigma_{wl} = 7.3$ , CI: 13.54% - 16.07%,  $p < 0.0001$ .



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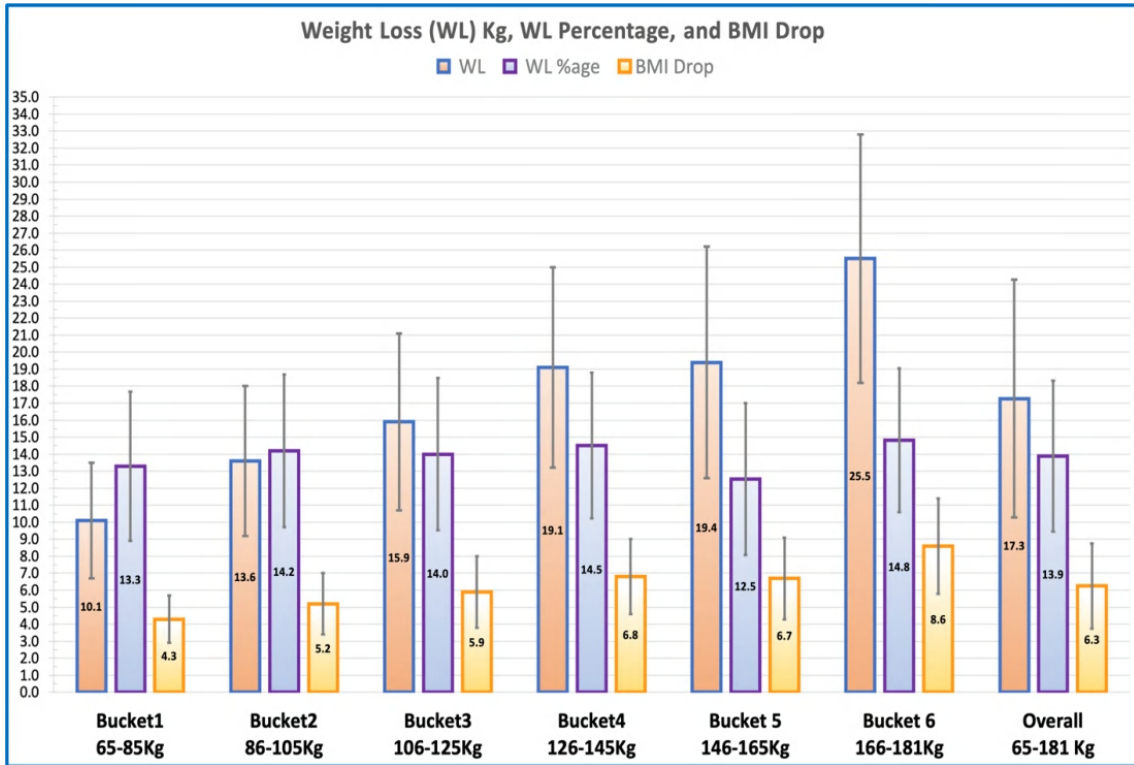


Figure1: Weight loss statistics

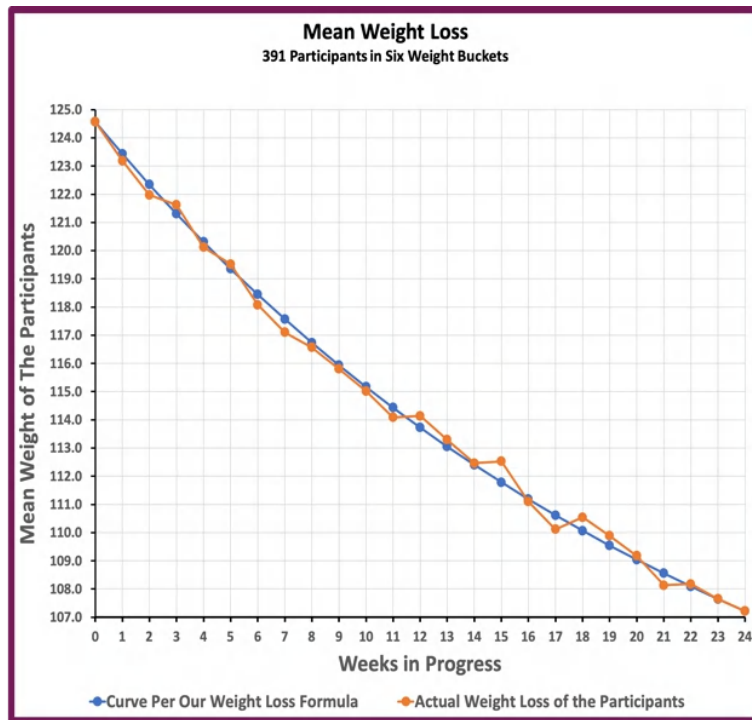


Figure2: Weekly weight loss progress of all 391 participants

**Conclusion:** An evidence-based, well-designed digital therapeutic with proper and effective guidance through AI and human coaching, motivation, and accountability can achieve more than 10% weight loss. It’s a promising technological platform as a standalone measure, complementing GLP-1, and pre and post-bariatric surgery.



O-12

## **SADI-S AFTER SLEEVE GASTRECTOMY, ARE PATIENTS AT HIGHER RISK OF NUTRITIONAL DEFICIENCIES?**

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**Background / introduction:** Nutritional deficiencies post bariatric surgery are widely reported, with the Laparoscopic Sleeve Gastrectomy (LSG) generally carrying a lower risk for nutritional deficiencies, compared with bypass procedures. Recently we have seen an increase in the single-anastomosis duodeno-ileal bypass with sleeve gastrectomy (SADI-S) performed as a revisional procedure following recurrent weight gain post LSG.

**Objectives:** The study aimed to investigate the nutritional status and prevalence of nutritional deficiencies amongst bariatric surgical patients, who had previously undergone LSG. Further, to assess the effectiveness of current replacement protocols.

**Methods:** A retrospective study looking at patients who underwent the SADI-S between 2019-2022. Patients were recommended a bariatric nutritional supplementation regimen. Nutritional markers were obtained preoperatively and at 3 monthly intervals for the first year and 6 monthly thereafter. Comparative analyses of nutritional markers were performed at established intervals.

**Results:** There were minimal striking differences in nutritional status in the pre and postoperative stages. The nutritional deficiencies identified were vitamin D, ferritin and vitamin B12. A small number of vitamin A and zinc deficiencies seen post operatively in the SADI patients. Adherence to a bariatric multivitamin was poor.

**Conclusion:** The SADI-S is an effective revisional procedure following recurrent weight gain post LSG. The nutritional outcomes between LSG and SADI-S showed some differences. Establishing a strict supplementation protocol and regular education and monitoring of supplement compliance can optimise nutritional status. With such protocol, a reduction in nutritional deficiencies can be seen.



## EFFECT OF IMMUNOSUPPRESSIVE AGENTS ON BARIATRIC SURGERY: A SYSTEMATIC REVIEW

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**Background/Introduction:** Bariatric surgery is a well-established treatment for obesity and its associated comorbidities. The impact of immunosuppressive therapy on patients undergoing bariatric surgery remains poorly understood, although it has been associated with higher infection rates, poor wound healing, and anastomotic leakage. Evidence on the effect of immunosuppressive agents on bariatric surgery is warranted to optimize patient care and surgical success.

**Objectives:** We aimed to evaluate the impact of immunosuppressive agents on weight loss outcomes and complication rates following common bariatric procedures.

**Methods:** A systematic review was conducted across PubMed, Google Scholar, Medline and Embase since December 2013 using keywords related to immunosuppressive agents and bariatric surgery, to select primary, peer-reviewed studies for analysis.

**Results:** A total of 34 studies met inclusion criteria. Immunosuppressive agents analyzed included corticosteroids, disease-modifying antirheumatic drugs, biologic agents and calcineurin inhibitors across various bariatric procedures, most commonly sleeve gastrectomy (SG) and Roux-en-Y gastric bypass (RYGB). Immunosuppressive conditions consisted of inflammatory bowel disease in three studies, solid organ transplant in 20 studies, rheumatoid arthritis in three studies, systemic lupus erythematosus in one study and seven studies with an unspecified immunosuppressive agent, most commonly corticosteroids.

In general, immunosuppressive agents were associated with increased risk of postoperative complications including delayed wound healing and anastomotic leak. SG and RYGB did however demonstrate comparable and effective weight loss outcomes for patients. There appeared to be improvement in underlying immune-mediated conditions following bariatric surgery, with potential for reduction in immunosuppressant doses as well as metabolic comorbidities including hypertension, type 2 diabetes mellitus and dyslipidemia. SG demonstrated lower complication rates compared to RYGB.

**Conclusion:** Immunosuppressive agents were associated with higher postoperative complication rates following bariatric surgery, however weight loss outcomes and metabolic improvements remained consistent with established literature. SG is safe in patients taking immunosuppressive agents, however consideration of individual patient profile is important in procedural planning and selection. Further large-scale prospective research is required to substantiate the evidence for procedural selection and the effects of individual immunosuppressive agents.



## PREVALENCE OF ELEVATED TUMOR MARKER LEVELS IN PATIENTS WITH OBESITY AND THE IMPACT OF BARIATRIC SURGERY

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### Abstract

**Background:** Obesity has been associated with an increased risk of several types of cancers including breast, ovary, endometrium, oesophagus, stomach, intestine, liver, gallbladder, pancreas, and so forth. And through 2035, it is projected that about 40% of endometrial, more than 25% esophageal, and about 20% of liver cancers worldwide will be attributable to having a high body mass index ( $\geq 25$  kg/m<sup>2</sup>).

**Objectives:** The prevalence of abnormal tumor markers in patients with obesity has rarely been reported. In this study, we aim to report the prevalence of several abnormal tumor markers in patients with obesity and the impact of bariatric surgery short-term wise.

**Methods:** Patients who underwent laparoscopic bariatric surgery between January 2022 and May 2023 at our hospital were included. The patients were classified into two groups: 1) patients with normal preoperative tumor markers and 2) patients with abnormal preoperative tumor markers. The parameters for this analysis were the patients' age, gender, weight, body mass index (BMI), tumor markers (CEA, AFP, CA724, CA199, and CA125), fasting blood glucose, and glycosylated hemoglobin (HbA1C). Postoperative three months tumor markers level were re-evaluated and analyzed.

**Results:** 174 patients were included in this study and in which 36 (20.6%) patients have at least one abnormal tumor markers. Out of these 36 patients, 24 patients have elevated CA724 (67%), 6 patients with elevated CA199 (17%), 6 patients with elevated AFP (17%), 5 patients with elevated CEA (14%), and 2 patients with elevated CA125 (5%). Three months postoperatively, only one patient still with elevated tumor marker level (CA125). Resulting in 35 out of 36 patients (97%) with normal tumor marker levels after bariatric surgery.

**Conclusion:** In our small sample size study, approximately 20% of bariatric patients have elevated tumor marker levels. Out of these patients, most of the patients (67%) have elevated CA724 level. Furthermore, bariatric surgery leads to normalized tumor marker levels as early as 3 months postoperatively.

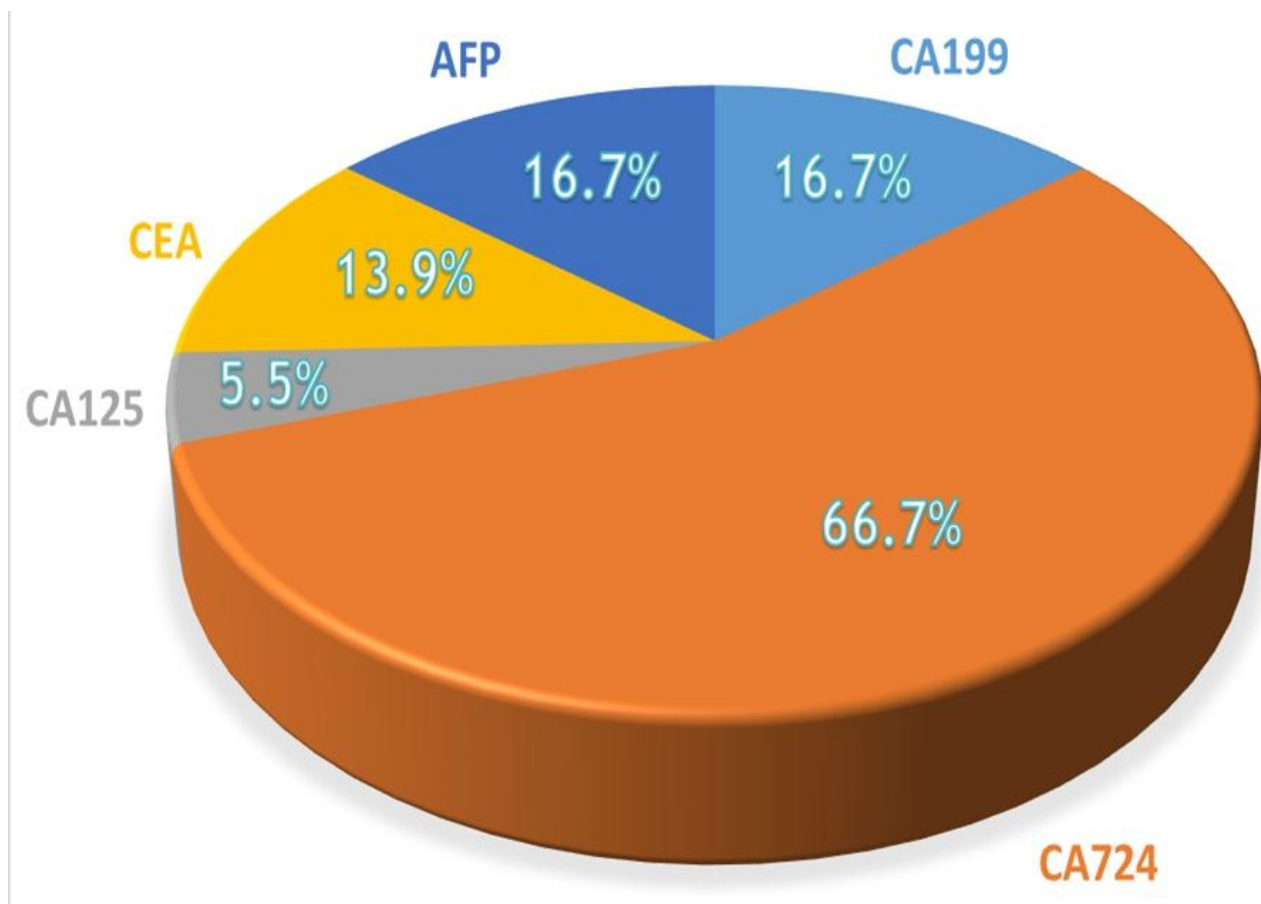


## O-14

**Table 1.** Demographics of patient with obesity and the prevalence of elevated tumor markers

Characteristics	Patients (n=174)
Age, y	33.3 ± 7.9
Gender, Female/Male	126 / 48
Weight, kg	95.8 ± 22.6
Height, cm	165.0 ± 7.9
BMI, kg/m <sup>2</sup>	36.5 ± 6.6
FBG, mmol/L	5.8 ± 1.8
HbA1C, %	6.0 ± 1.1
Elevated Tumor Marker, n (%)	36 (23.5%)

**Figure 1.** Classification of Elevated Tumor Markers Specifically





O-15

## EXPOSURE TO ARTIFICIAL LIGHT AT NIGHT IN ADOLESCENTS AND SUBSEQUENT RISK OF OBESITY IN YOUNG ADULTHOOD: A NATIONWIDE POPULATION-BASED SURVEY

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**Background/Introduction:** Previous studies have shown that outdoor artificial light at night (ALAN) is associated with obesity in adults or school-aged children, however, without addressing the critical transition period from adolescence to young adulthood.

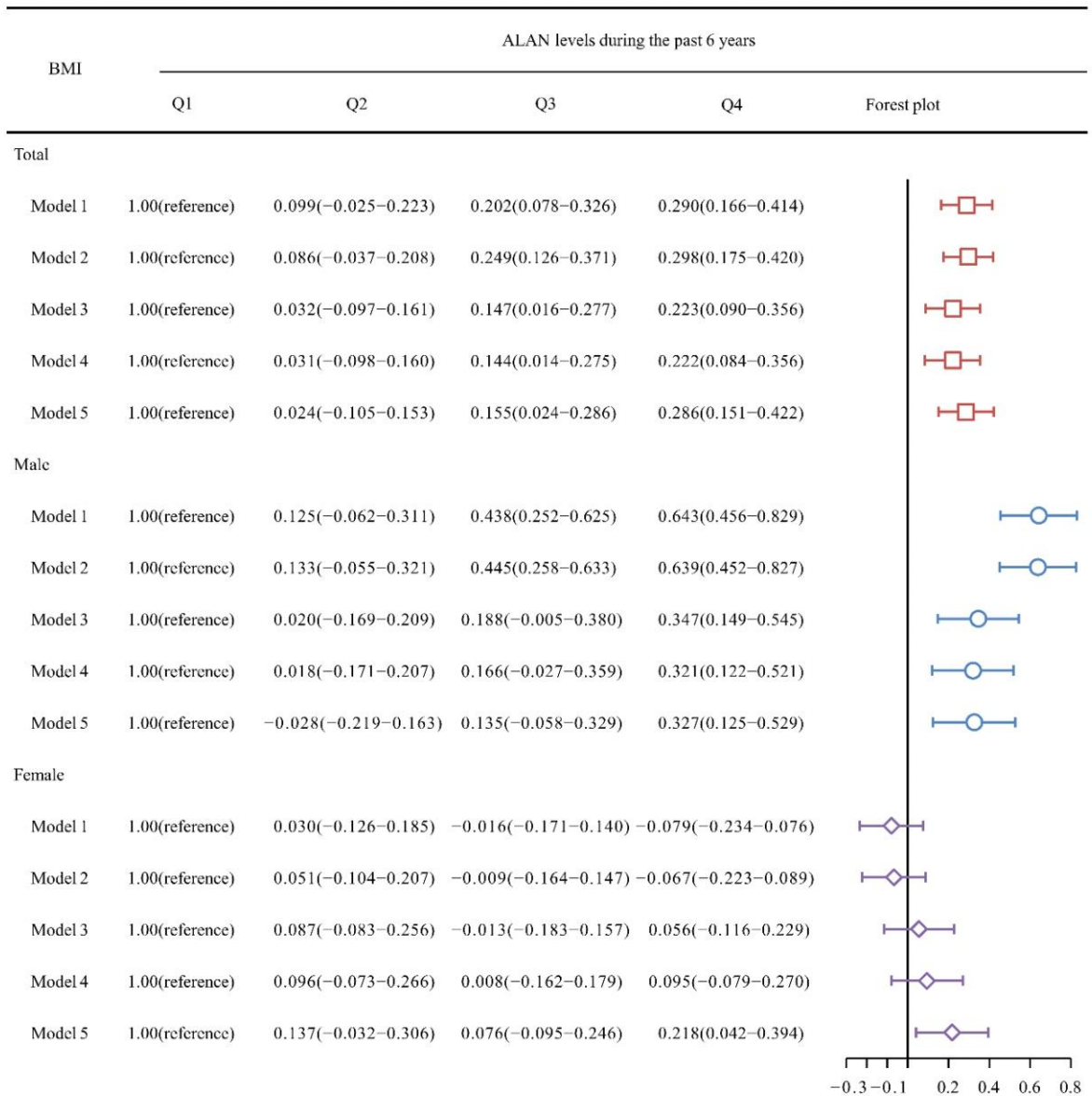
**Objectives:** Incoming students from five geographically dispersed universities located in Changsha, Wuhan, Xiamen, Urumqi, and Hohhot, who came from across China and were enrolled in September 2018.

**Methods:** In this study, we recruited incoming students whose mean ALAN (nanowatts/cm<sup>2</sup>/sr) during adolescence was obtained using remotely observed environmental nighttime data by satellite matched with information on their residence. Body weight and height were measured in a field survey. A mixed generalized linear model assessed the association between ALAN levels and body mass index (BMI).

**Results:** A total of 19721 participants were included with a mean age and BMI of  $18.3 \pm 0.7$  years and  $21.2 \pm 3.0$  kg/m<sup>2</sup>, respectively. Our findings indicated a significant association between ALAN levels during the past 6 years and BMI (the second quartile: HR=0.099, 95%CI=-0.025-0.223; the third quartile: HR=0.202, 95%CI=0.078-0.326; the fourth quartile, HR=0.290, 95%CI=0.166-0.414). The results remained robust after multiple sensitivity analyses and adjustments for all covariate variables. In addition, a significant association between ALAN levels and BMI was observed in males but not in females.

**Conclusion:** These results reveal for the first time that ALAN exposure during adolescence is associated with subsequent increases in BMI at young adulthood. Further studies could help elucidate this association and clarify whether reducing exposure to ALAN during adolescence could contribute to obesity prevention in young adults.



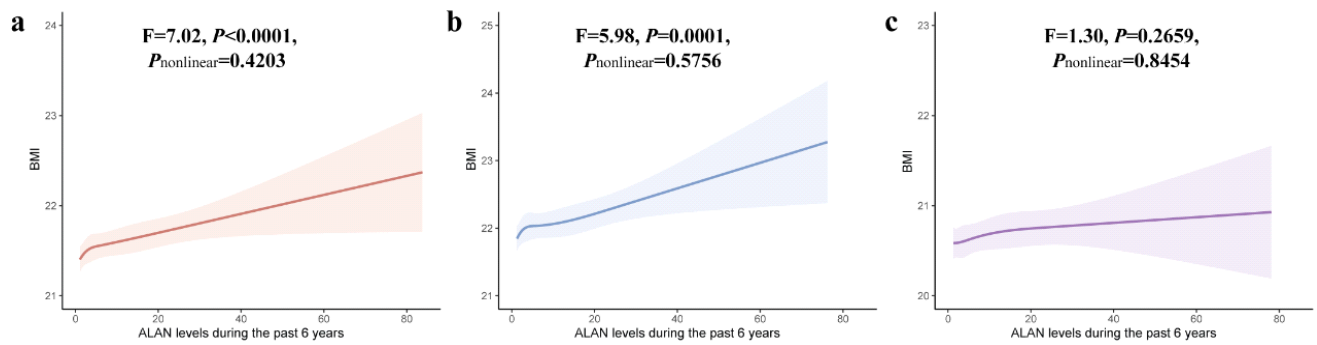


**Figure. 1** Associations between ALAN levels quartiles during the past 6 years and BMI. Abbreviations: ALAN, artificial light at night; BMI, body mass index. Model 1: crude model. Model 2: adjusted for age and sex (adjusted for age in male or female). Model 3: further adjusted for SBP, DBP, current smoking, alcohol, recreational physical activity, and annual household income. Model 4: further adjusted for intake of red meat, intake of poultry, and intake of fish. Model 5: further adjusted for humidity and temperature.



## O-15

The forest map shows the results of Q4.



**Figure. 2** Dose–response curves for the associations of level of artificial light at night with BMI. (a) Total; (b) Male; (c) Female; X-axis refers to level of artificial light at night (ALAN) in nanoWatts/cm<sup>2</sup>/sr; Y-axis refers to BMI.



## THE IMPACT OF BARIATRIC SURGERY ON PRODUCTIVITY AND EMPLOYMENT STATUS: A COMPREHENSIVE SYSTEMATIC REVIEW AND META-ANALYSIS

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**Background/Introduction:** Obesity, linked with decreased workplace productivity and higher unemployment and absenteeism, incurs significant societal costs. While the impact of bariatric surgery on occupation is often reported, it hasn't been holistically synthesized to aid cost-effectiveness analysis related to bariatric surgery.

**Objectives:** Synthesize evidence of bariatric surgery's occupational impact to develop a comprehensive database for societal cost inputs in health economic models of obesity interventions.

**Methods:** A systematic review of studies on bariatric surgery up to 2022 was conducted, focusing on occupational outcomes such as employment rate, absenteeism, and early retirement. Two authors independently performed literature screening, data extraction, and quality assessment. Occupational outcome changes before versus after surgery, or their differences between surgically and conventionally treated patients with obesity (where feasible) were meta-analysed using random-effects model. Between-study heterogeneity and sources of bias were evaluated.

**Results:** N=47 studies between 1977 and 2022 from 16 countries were included (**Figure**). All studies but two were conducted in developed countries (Europe: 31, North America: 13, South America: 2, Australia:1). The USA is the most productive country. Roux-en-Y Gastric Bypass was the most reported surgery type; however, no study specifically investigated sleeve gastrectomy (SG) procedure. Most studies followed outcomes for up to 5 years. Sample sizes ranged from 21 to 54,681, with many involving under 100 participants. Employment rates (n=35), Unemployment rate (n=21), and absenteeism (n=15) were the most reported outcomes. Post-surgery employment rates slightly rose and remained stable for five years, while unemployment decreased but returned to baseline by the fifth year. Females, older individuals, those with lower education levels, and those with chronic diseases faced higher unemployment risks post-surgery. Absenteeism saw a notable reduction from the second year post-surgery.

**Conclusion:** Bariatric surgery positively affects workforce productivity, but its effect on employment return is variable and dependent on several factors. Certain subgroups, such as females, may require additional post-surgery employment support. We need more long-term studies to validate the impact of bariatric surgery on patients' career trajectories. These studies should focus on "surgery vs. control" comparisons, specifically the SG procedure, and involve developing country settings.



## O-16

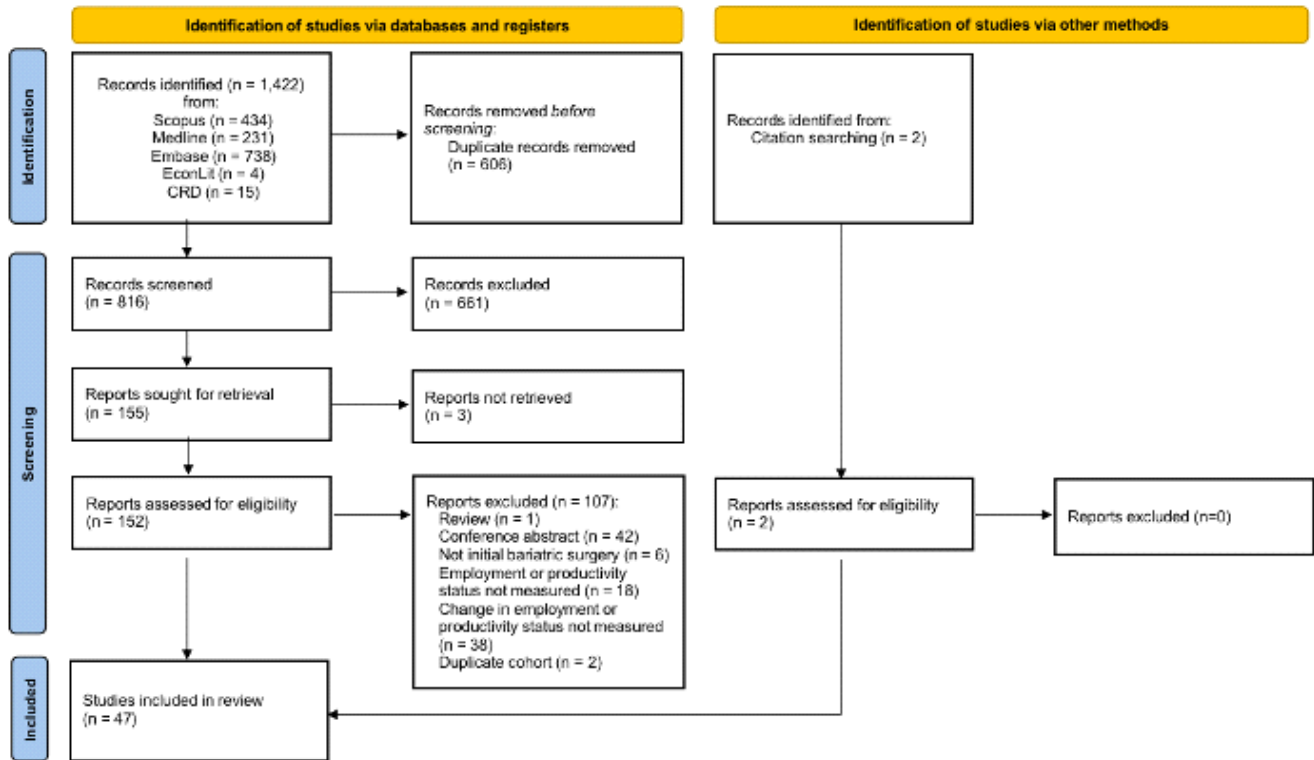


Figure. Flow chart of study selection.



## EFFECT OF OBESITY COMBINED WITH OSA ON TRANSCRIPTIONAL EXPRESSION IN VISCERAL FAT TISSUE

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**Background:** Coexisting obesity and obstructive sleep apnea (OSA) are known to be associated with increased metabolic dysregulation and systemic immune disorders. Adipose tissue, functioning as a potent endocrine organ, is believed to play a crucial role in these pathophysiological processes, particularly visceral adipose tissue (VAT). The aim of this study was to investigate the transcriptional changes induced by the coexistence of obesity and OSA in adipocytes using a multi-chip joint analysis.

**Methods:** We integrated transcriptional expression profiling data from three data sets of Gene Expression Omnibus (GEO), focusing on human VAT samples from patients with obesity and OSA. Weighted gene co-expression network analysis (WGCNA) was employed to identify significant modules and to distinguish genes related to obesity and OSA, respectively. The intersection of these two modules of genes yielded a list of shared genes associated with the combined presence of obesity and OSA. Gene Ontology (GO) and Kyoto Encyclopedia of Genes and Genomes (KEGG) analyses were conducted to explore the functions and pathways of these shared genes. A protein-protein interaction (PPI) network was constructed using STRING to elucidate interactions among genes within significant modules.

**Results:** Two significant modules were identified using WGCNA, one related to obesity and the other to OSA. By intersecting these modules, we identified six shared genes: CRYAB, CTSS, HK2, LRP1B, MS4A4A, and SAMHD1. These shared genes were found to be enriched in biological processes such as the negative regulation of reactive oxygen species metabolic processes, hypoxia-related pathways, and immune responses. The PPI network for each module consisted of 120 nodes and 138 edges for obesity-related genes and 85 nodes and 89 edges for OSA-related genes. Notably, six proteins interacted with CRYAB, one with CTSS and LRP1B, and two with HK2 and SAMHD1, respectively. To further validate the differential expression levels of shared genes, we conducted differential analysis to demonstrate that the expression levels of HK2 in VAT were lower in individuals with combined obesity and OSA, in comparison to individuals with a normal BMI or with simple obesity. In contrast, CRYAB and SAMHD1 exhibited higher expression levels in VAT from individuals with combined obesity and OSA.

**Conclusion:** Our study highlights the impact of the coexistence of obesity and OSA on gene expression in VAT. The identified shared genes may serve as critical mediators in regulating local metabolic homeostasis. Through multi-chip joint analyses, we have revealed disruptions in key pathways, the coordinated interactions of which may contribute to the observed metabolic dysregulation in this complex co-morbid condition.

**Key words:** Obesity, Obstructive sleep apnea, Visceral fat tissue, bioinformatics analysis, protein-protein interactions



## CAUSAL ASSOCIATION BETWEEN OBESITY AND PSORIASIS: A TWO-SAMPLE BIDIRECTIONAL MENDELIAN RANDOMIZATION STUDY

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**Background/Introduction:** Several observational studies have reported an association between psoriasis and obesity. However, it is crucial to recognize that observational studies are prone to limitations such as causal reversal and confounding factors, which can hinder the establishment of causal relationships and determination of directional influence. As a result, the existing understanding regarding the existence and precise nature of a causal connection between psoriasis and obesity remains inconclusive.

**Objectives:** Our aim was to employ Mendelian randomization (MR) techniques in a comprehensive evaluation of the potential causal relationship between obesity and psoriasis.

**Methods:** In this study, we conducted a genome-wide association study (GWAS) to collect genetic data on genetic instruments associated with psoriasis and its primary subtypes, specifically psoriasis vulgaris and arthropathic psoriasis. A total of 4,510 individuals diagnosed with psoriasis and 212,242 control individuals were included in the study. To investigate the potential causal link between obesity and psoriasis, we utilized aggregated data on obesity obtained from multiple Genome-Wide Association Studies (GWAS), which involved 8,908 individuals diagnosed with obesity and 209,827 control subjects. Our analysis employed a two-sample two-way Mendelian randomization (MR) approach, utilizing inverse variance weighting (IVW) as the preferred method. The main objective was to establish a causal association between obesity and psoriasis. Causal estimates were represented as odds ratios (OR) accompanied by 95% confidence intervals (CI).

**Results:** The results of the Mendelian randomization (MR) study revealed a noteworthy correlation between genetic susceptibility in people with obesity and an increased likelihood of developing psoriasis (OR: 1.036614; 95% CI: 1.0040463 to 1.070238;  $p=0.02724810$ ). Further examination of the two subtypes of psoriasis demonstrated a significant correlation between obesity and psoriasis vulgaris (PsV) (OR: 1.048502; 95% CI: 1.0009236 to 1.098342;  $p = 0.04561256$ ). Similarly, obesity was found to be significantly associated with arthropathic psoriasis (PsA) (OR: 1.048502; 95% CI: 1.0009236 to 1.098342;  $p = 0.04561256$ ). The two-way analysis indicated a significant association between genetic susceptibility in people with psoriasis and obesity (OR: 1.155894; 95% CI: 1.0107266 to 1.321911;  $p = 0.03435988$ ). Psoriasis vulgaris, however, did not show an observed association with obesity. However, individuals with a genetic predisposition to arthropathic psoriasis had a significantly higher risk of developing obesity (OR: 1.3168284; 95% CI: 1.0651702 to 1.627944;  $p = 0.01097651$ ).

**Conclusion:** There is a bidirectional causal relationship between obesity and psoriasis. At the same time, people with joint psoriasis are associated with an increased risk of obesity.



## RELIABILITY AND VALIDITY OF THE CHINESE VERSION OF REPETITIVE EATING QUESTIONNAIRE FOR PATIENTS UNDERGOING BARIATRIC SURGERY

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**Background/Introduction:** The grazing behavior after bariatric surgery is significantly related to postoperative recurrent weight gain, and its incidence will increase with the extension of time after surgery. So it is particularly important to early detect and accurately evaluate the grazing behavior of patients undergoing bariatric surgery. At present, the assessment tools for grazing behavior in these patients in China are still lacking.

**Objectives:** To translate the Repetitive Eating Questionnaire [Rep(eat)-Q] into Chinese and evaluate its reliability and validity among patients undergoing bariatric surgery.

**Methods:** The Brislin's model of translation was adopted for translation. We developed the Chinese version of Rep(eat)-Q following the process of translation of the English version of the Rep(eat)-Q, back translation, expert review and a pilot study. On 2022-08-31, patients undergoing bariatric surgery admitted to the bariatric follow-up clinic of the First Affiliated Hospital with Nanjing Medical University from March to August 2022 were selected for the study using convenience sampling. Then we used the general information questionnaire-Chinese version of Rep(eat)-Q and the 21-item Three-Factor Eating Questionnaire(TFEQ-R21) to conduct a survey among 294 patients undergoing bariatric surgery to test the reliability and validity of the Chinese version of Rep(eat)-Q.

**Results:** According to the score of the Chinese version of Rep(eat)-Q, these patients were divided into high-score group(n=79) and low-score group(n=78) by the critical ratio. High-score group scored higher in each item of the Chinese version of Rep(eat)-Q compared with the low-score group( $P < 0.05$ ). The score of each item in the Chinese version of Rep(eat)-Q was linear positively correlated with the total score( $r = 0.368-0.782$ ,  $P < 0.05$ ). The value of Cronbach's  $\alpha$  for the scale, repetitive eating subscale and compulsive grazing subscale was 0.943, 0.928 and 0.898, respectively. The value of split-half reliability for the scale, repetitive eating subscale and compulsive grazing subscale was 0.835, 0.938 and 0.891, respectively. And the value of test-retest reliability of the scale, repetitive eating subscale and compulsive grazing subscale was 0.867, 0.800, and 0.836, respectively. The item-level content validity index(CVI) ranged from 0.80 to 1.00. The scale-level CVI /universal agreement and S-CVI/average were 0.92 and 0.98, respectively. Two common factors were obtained after varimax orthogonal rotation by principal component analysis, whose eigenvalues were 7.086, and 1.596, respectively, explaining 72.35% of the total variance. The factor loading values of all items ranged 0.637 to 0.878. The confirmatory factor analysis indicated that the values of  $X^2/df$ , GFI, AGFI, NFI, IFI, CFI and RMSEA were 2.211, 0.905, 0.860, 0.920, 0.955, 0.954, and 0.080, respectively. 294 patients' total score of the Chinese version of Rep(eat)-Q showed a significant correlation with three dimensions of the TFEQ-R21( $P < 0.05$ ).

**Conclusion:** The Chinese version of Rep(eat)-Q has good reliability and validity, and is simple and easy-to-operate, which can be used to assess the grazing behavior among Chinese patients undergoing bariatric surgery.



## CHARACTERISTIC AND PREDICTIVE FACTORS OF FOOD PREFERENCE CHANGES IN PATIENTS UNDERGOING BARIATRIC SURGERY

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**Background/Introduction:** The change of food preference after bariatric surgery is an important factor affecting postoperative weight loss. It is particularly important to assess the specific characteristics and predictive factors of food preference changes after the surgery. It is difficult to guide postoperative weight maintenance based on the large variability in results between available studies.

**Objectives:** To investigate the characteristics of food preference change and its effect on weight loss outcomes in patients undergoing bariatric surgery, and to analyze the predictive factors of food preference change

**Methods:** A convenient sampling method was used to select 245 patients undergoing bariatric surgery who were admitted to Outpatient Weight Loss Follow-up Department, the First Affiliated Hospital of Nanjing Medical University from February to August, 2022. The self-developed General Demographic Questionnaire, Weight Loss Outcome Questionnaire and Food Preference Change Features after Bariatric Surgery were used to collect relevant data. Independent samples t-test was used to compare the effects of changes of food preference after bariatric surgery on the weight loss outcome. Univariate analysis and disordered multi-class Logistic regression were performed to analyze the predictive factors of food preference changes after bariatric surgery.

**Results:** Two hundred and thirty-seven(96.7%)patients who returned responsive questionnaires were finally enrolled,and 97.0% of them had food preference changes after bariatric surgery.

Patients with and without changes in food preferences after bariatric surgery had statistically significant differences in postoperative weight,body mass index drop value and total weight loss percentage( $P<0.05$ ). Disordered multi-class Logistic regression analysis showed that postoperative time was the predictor of changes in preferences of patients undergoing bariatric surgery for vegetables and fruits( $P<0.05$ );marital status and preoperative comorbidities were predictors of changes in preference of patients undergoing bariatric surgery for high-quality protein foods( $P<0.05$ );place of residence(northern or southern China)was the predictor of changes in preference of patients undergoing bariatric surgery for spicy foods( $P<0.05$ );gender,place of residence and bariatric surgery methods were predictors of changes in preferences of patients undergoing bariatric surgery for salty snacks(  $P<0.05$ ); gender and bariatric surgery methods were predictors of changes in preferences of patients undergoing bariatric surgery for high-fat meat( $P<0.05$ ); gender and postoperative time were predictors of changes in preferences of patients undergoing bariatric surgery for sweet food( $P<0.05$ ); gender and bariatric surgery methods were predictors of changes in preferences of patients undergoing bariatric surgery for sweet drinks( $P<0.05$ ).

**Conclusion:** The incidence of food preference changes in patients undergoing bariatric surgery is high,showing a decrease in their preference for high calorie foods and an increase in their preference for healthy foods. Gender,marital status,place of residence,preoperative comorbidities,bariatric surgery methods,and postoperative time are predictors of various food preference changes in patients undergoing bariatric surgery. MBS professionals should identify the target population at early stage,pay more attention to postoperative dietary education and guidance for patients, in order to improve the postoperative dietary experience and effectively ensure the effect of bariatric surgery.





## **INTRATHORACIC SLEEVE MIGRATION FOLLOWING SLEEVE GASTRECTOMY: INCIDENCE AND OUTCOMES**

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**Background/Introduction:** With laparoscopic sleeve gastrectomy(LSG) taking its place as the primary metabolic bariatric procedure in the past decade, de novo or persistent GERD has come into the spotlight as one of the most debilitating postoperative complications. Among the causes of GERD, intra-thoracic sleeve migration (ITSM) has become an under-mentioned yet significant phenomenon, with 5-10% of cases requiring surgical intervention.

**Objectives:** The aim of this study is to analyze the actual incidence of spontaneous ITSM at our center, as well as its relationship to the baseline characteristics and perioperative outcomes.

**Methods:** A retrospective chart review of 206 patients who had undergone LSG at our center from July 2019 to December 2022 was done. At 1-year follow-up, a non-enhanced CT scan and esophagoduodenoscopy(EGD) were performed. Baseline characteristics and perioperative outcomes including the clinical disease course of GERD were compared.

**Results:** The incidence of ITSM was 14% (n=29). There was a significant correlation between ITSM and postoperative reflux symptoms(p=0.001). The mean duration of anti-reflux medication use was also significantly longer in the ITSM group than in the no ITM group at 17 and 11 months, respectively( p=0.004). A significantly higher number of patients in the ITSM group were diagnosed with esophagitis on post-operative EGD than in the no ITSM group(p=0.002).

**Conclusion:** The incidence of ITSM at 1-year follow-up using non-enhanced CT was 14%. ITSM was significantly correlated to clinical reflux and EGD-confirmed esophagitis.



## INDICATIONS FOR ESOPHAGEAL HIATUS EXPLORATION AND ROLE OF HIATAL HERNIA REPAIR IN SLEEVE GASTRECTOMY

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**Background:** GERD is the major complication after sleeve gastrectomy (SG).

**Objectives:** To investigate the indications for esophageal hiatus exploration and role of Hiatal Hernia Repair (HHR) in SG.

**Methods:** The clinical data of patients who received SG (178 cases) or SG+HHR (57 cases) were retrospectively collected, and patients who completed the reflux diagnostic questionnaire (RDQ) and gastroscopy before and one year after surgery were screened and compared.

**Results:** The operation time of the SG+HHR group was significantly longer than that of the SG group. 29 cases of preoperative GERD, 2 cases of HH indicated by preoperative gastroscopy, 4 cases of anterior defects of esophageal hiatus detected during surgery, 18 cases of fat accumulation of left crura and 4 cases of left esophageal hiatus defect detected during surgery. The incidence of preoperative GERD in the SG+HHR group was 50.88%, the incidence of total GERD after surgery was 28.07%, the remission rate of preoperative GERD was 58.62%, and the incidence of de novo GERD was 14.29%. The rates of GERD, RE and  $RDQ \geq 12$  points in the SG+HHR group decreased by 22.81%, 24.56% and 17.54% ( $P < 0.05$ ) respectively, compared with the preoperative. The incidence of preoperative GERD in SG group was 21.35%, the incidence of total GERD after surgery was 31.46%, the remission rate of preoperative GERD was 60.52%, the incidence of de novo GERD was 29.29%, the rates of postoperative GERD and RE increased by 10.11% and 23.03% ( $P < 0.05$ ) compared with preoperative, and the rate of patients with  $RDQ \geq 12$  increased by 5.62% compared with preoperative ( $P \geq 0.05$ ). The preoperative incidence of RE and GERD in SG+HHR group was significantly higher than that of SG group ( $P < 0.05$ ), but the postoperative rates of patients with  $RDQ \geq 12$  and de novo  $RDQ \geq 12$  in SG group were significantly higher than that of SG+HHR group ( $P < 0.05$ ).

**Conclusion:** Concomitant HHR is safe, and the indications for esophageal hiatus exploration were preoperative GERD or accidental discovery of hiatal defect during surgery. Compared with SG alone, HHR significantly reduced the postoperative incidence of GERD, which significantly relieved the symptoms of GERD and reduced the incidence of GERD to the level of SG alone.



## A COMPARISON BETWEEN THE POSTOPERATIVE COMPLICATIONS OF LAPAROSCOPIC SLEEVE GASTRECTOMY (LSG) AND LAPAROSCOPIC ROUX-EN-Y GASTRIC BYPASS (RNYGB) IN PATIENTS WITH MORBID OBESITY: A META-ANALYSIS

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- *PMID: 36398039*
- *PMCID: PMC9647859*
- *DOI: 10.7759/cureus.31309*

**Background/Introduction:** Bariatric surgery is considered the most successful method for treating obesity. Long-term, stable weight loss of more than 50% is associated with a reduced risk of mortality and cardiac problems, improved health, and enhanced quality of life. These outcomes have been attributed to anticipated changes in cell function, tissue-specific insulin sensitivity, bile acid concentration, and the gut microbiota, in addition to calorie restriction and altered connections between the gastrointestinal system and the brain [1].

To address morbid obesity, well over 50 different surgical procedures have been proposed and attempted until now. Hence, one may conclude that the best or most suited method of operation has yet to be devised. Moreover, this fact also highlights the passion and creativity of those who advocate for bariatric surgery. Historically, six major surgical procedures have been effective in inducing principal weight reduction and have had considerable influence on the field. These operations are as follows, in the chronological order of when they were first employed by the medical community: jejunioileal bypass (JIB), laparoscopic Roux-en-Y gastric bypass (RNYGB), vertical banded gastroplasty (VBG), biliopancreatic diversion (BPD), or duodenal switch (DS), adjustable gastric banding (AGB), and laparoscopic sleeve gastrectomy (LSG). In addition, it is vital to highlight the following three technological advancements in this field: gastric stimulation, vagal blocking, and, most critically, banded RNYGB [2].

RNYGB and LSG are the most common and standard surgical procedures for treating obesity. During RNYGB, the stomach is surgically reshaped to create a small pocket distant from the gastroesophageal junction. It bypasses the stomach, duodenum, and the first part of the jejunum since it attaches directly to the small intestine. In contrast, SG results in the formation of a narrow gastric tube following the stomach's lesser curvature [1].

Several meta-analyses demonstrating the effectiveness of both these routinely conducted techniques have been reported. However, to our knowledge, no study has directly compared the potential postoperative outcomes of these two procedures.

**Objectives:** The most successful method for treating obesity is bariatric surgery. The two most common surgeries for treating morbid obesity are the laparoscopic Roux-en-Y gastric bypass (RNYGB) and the laparoscopic sleeve gastrectomy (LSG). However, there has not been a thorough analysis of the differences in their adverse effects. The aim of this study was to analyze if RNYGB and LSG had comparable postoperative complications and mortality. To that end, results from trials comparing those who underwent RNYGB and those who underwent LSG were combined. We explored the Cochrane Library, PubMed, EMBASE, and Web of Science databases for collecting pertinent data, and 10 RCTs were included in the study. Standard deviations were used to determine



the risk ratio (RR) and the 95% confidence interval (CI). No substantial difference in mortality was observed between the two procedures. However, our pooled analysis showed that patients who underwent RNYGB needed some reoperation at a higher rate compared to those who had LSG, with a pooled RR of 0.64 (95% CI: 0.42-0.98; p=0.04). Patients who had LSG suffered from fewer postoperative sequelae. While the risk of other complications was higher in RNYGB, our analysis showed that the frequency of gastroesophageal reflux disease (GERD) after LSG was greater than after RNYGB, with a pooled RR of 4.00 (95% CI: 2.55-6.28; p<0.001). Based on the above-mentioned findings, RNYGB and LSG had comparable mortality rates; however, patients who underwent LSG had a reduced risk of complications and reoperations after surgery compared to those who had RNYGB.

**Methods:** We conducted a search on the databases PubMed, EMBASE, the Web of Science, and the Cochrane Library from inception until April 5, 2022. We specifically looked for the following terms: bariatric surgery, sleeve gastrectomy, LSG, SG, gastric bypass, RYGB, RNYGB, and obesity. The bibliographies of selected studies were also combed through. Study titles and abstracts were read by two separate reviewers. After finding supporting evidence, the whole text was obtained for further examination. The inclusion and exclusion criteria are presented in Table 1.

**Table 1: Study inclusion and exclusion criteria**

Parameters	Inclusion criteria	Exclusion criteria
Study design	Randomized controlled trial	Uncontrolled or non-randomized studies
	English publication	Conference proceedings, abstracts; letters; editorials; expert opinions; reviews; or case reports
	Humans	Animals
Participants and intervention	Patients underwent laparoscopic sleeve gastrectomy	Patients underwent other bariatric procedures or re-operations
	Patients underwent laparoscopic Roux-en-Y gastric bypass	
Comparison	Morbidity and mortality	Weight loss and positive outcomes

**Quality Assessment**

This meta-analysis was conducted by two trained assessors who independently rated the quality of all of the papers included [3-12]. All RCTs were assessed for bias, and graphs were created to show the results.

**Data Extraction**

Two reviewers independently collected data to compare the adverse effects of laparoscopic RNYGB and LSG, and their disagreements were addressed by reaching a consensus via a discussion. A consistent form was used to compile the research data, including publication year, place of origin, study design, and primary outcomes. The data were entered into RevMan 5.4 software for further investigation.



### Statistical Analysis

Results from trials comparing those who underwent RNYGB and those who underwent LSG were combined. Standard deviations were used to determine the risk ratio (RR) and the 95% confidence interval (CI). The heterogeneity of the studies was evaluated by using the chi-squared Q statistic test, and the results were quantified using the p-value and the I<sup>2</sup> statistic, which may take on values between 0 and 100%. The pooled RRs were determined by utilizing a random-effects model and a significance threshold of  $p \leq 0.10$ . When statistical heterogeneity was absent ( $p > 0.010$ ), the Mantel-Haenszel approach was used as part of a fixed-effects model. When the 95% CIs for the pooled standardized mean differences (SMD) and the pooled RR did not overlap, the results were considered statistically significant. This study has adhered to the Preferred Reporting Items for Systematic Review and Meta-Analyses (PRISMA) guidelines.

### Results: Included Studies, Study Characteristics, and Quality Assessment

After removing duplicates, the titles and abstracts of 1276 papers were evaluated. Complete texts of the remaining 88 studies were retained for additional analysis after 1188 papers were eliminated. Following a thorough evaluation of all full-text articles, 78 were deemed ineligible for various reasons, leaving only 10 randomized controlled trials for the final analysis [3-12]. These studies originally involved 1222 people, but with 110 persons being lost to follow-up, we were left with a patient population of 1112 participants for this meta-analysis (Figure 1). Sample sizes varied from 29 to 248 patients in the trials.

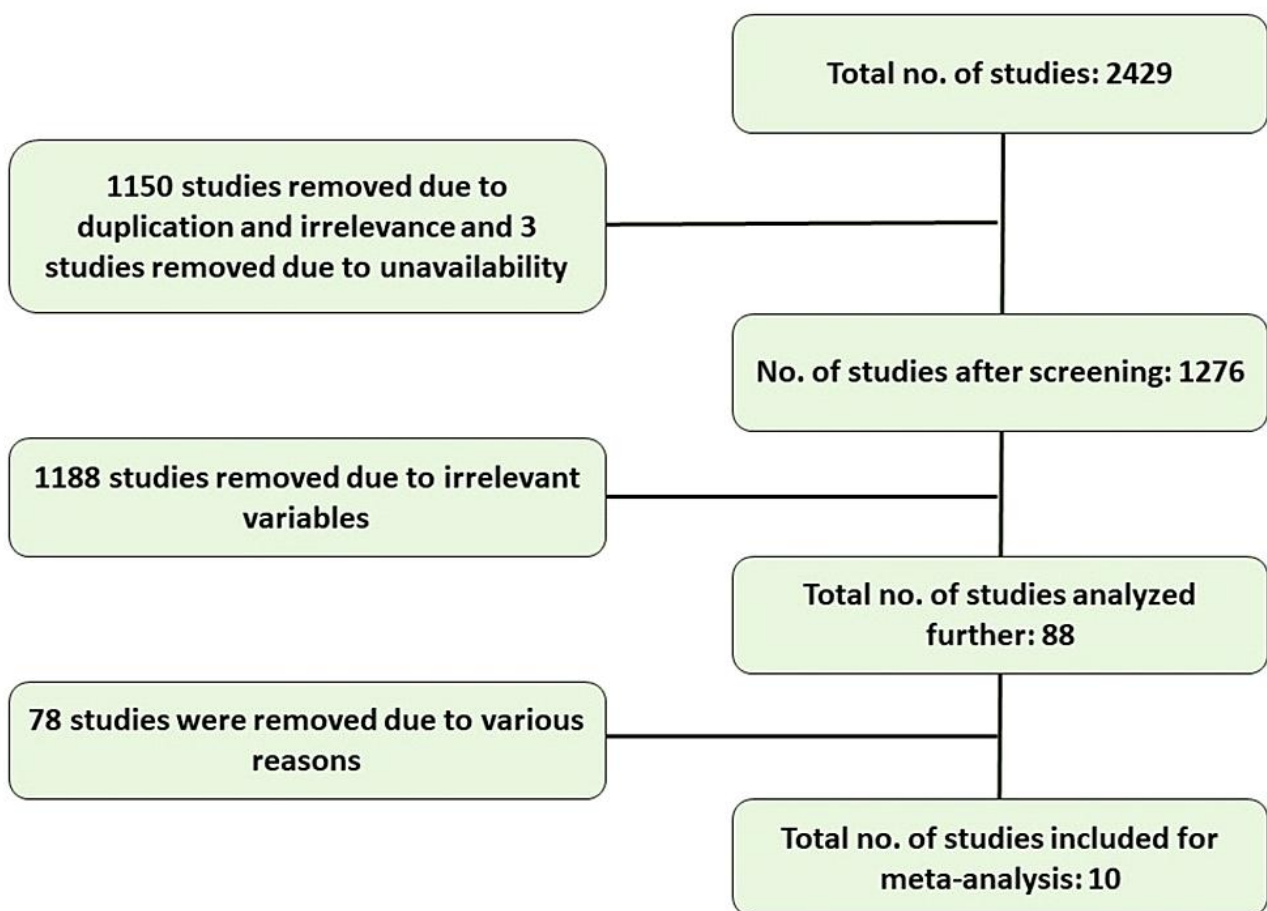


Figure 1: PRISMA flow diagram depicting the selection of articles for review



## O-23

### PRISMA: Preferred Reporting Items for Systematic Reviews and Meta-Analyses

Graphs showing the risk of bias were created. Each RCT's risk of bias is presented as a percentage of the total risk across all trials in Figure 2, while Figure 3 shows the risk of specific forms of bias. The risk of bias graphs for the RCTs demonstrated that the methodological quality was often high, particularly regarding selection and reporting biases. Twelve months of morbidity and mortality were evaluated and compared among all the studies.

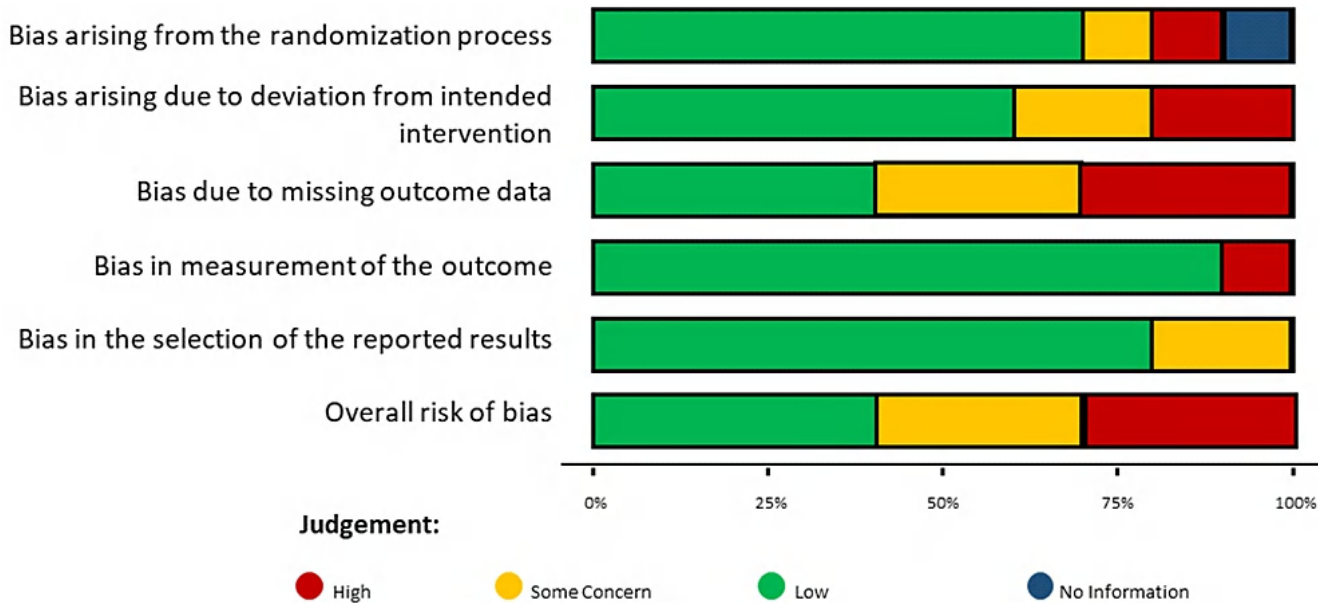


Figure 2: Assessment of the overall risk of bias

Studies	Risk of bias	D1	D2	D3	D4	D5	Overall
Karamanakos et al. [3] 2008		●	●	●	●	●	●
Yang et al. [4] 2015		●	●	●	●	●	●
Casajoana et al. [5] 2017		●	●	●	●	●	●
Salminen et al. [6] 2018		●	●	●	●	●	●
Capristo et al. [7] 2018		●	●	●	●	●	●
Murphy et al. [8] 2018		●	●	●	●	●	●
Peterli et al. [9] 2018		●	●	●	●	●	●
Catheline et al. [10] 2019		●	●	●	●	●	●
Navarini et al. [11] 2020		●	●	●	●	●	●
Barros et al. [12] 2020		●	●	●	●	●	●

#### Domains:

D1: Bias arising from the randomization process  
 D2: Bias arising due to deviation from intended intervention  
 D3: Bias due to missing outcome data  
 D4: Bias in measurement of the outcome  
 D5: Bias in the selection of the reported results

#### Judgement:

● High  
 ● Some Concern  
 ● Low  
 ● No Information

Figure 3: Risk of bias summary



## O-23

### Comparison of the Incidence of Intra-abdominal Hemorrhage and Abscess Formation Between LSG and RNYGB

The pooled analysis had shown that RNYGB was associated with a higher incidence of hemorrhage, with a pooled RR of 0.50 (95% CI: 0.22-1.11;  $p=0.09$ ) (Figure 4), and analysis also showed that RNYGB had more incidences of intra-abdominal abscess formation after the operation, with a pooled RR of 0.32 (95% CI: 0.12-0.85;  $p=0.02$ ) (Figure 5). Since there was no substantial heterogeneity between the trials, the data was analyzed using a fixed-effects model.

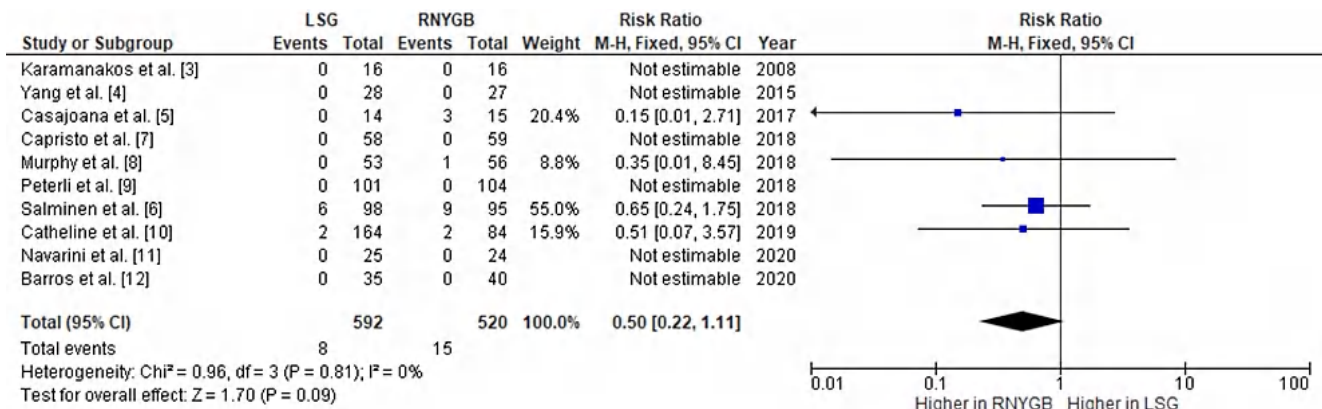


Figure 4: Comparison of hemorrhage incidence between RNYGB and LSG  
LSG: laparoscopic sleeve gastrectomy; RNYGB: Roux-en-Y gastric bypass

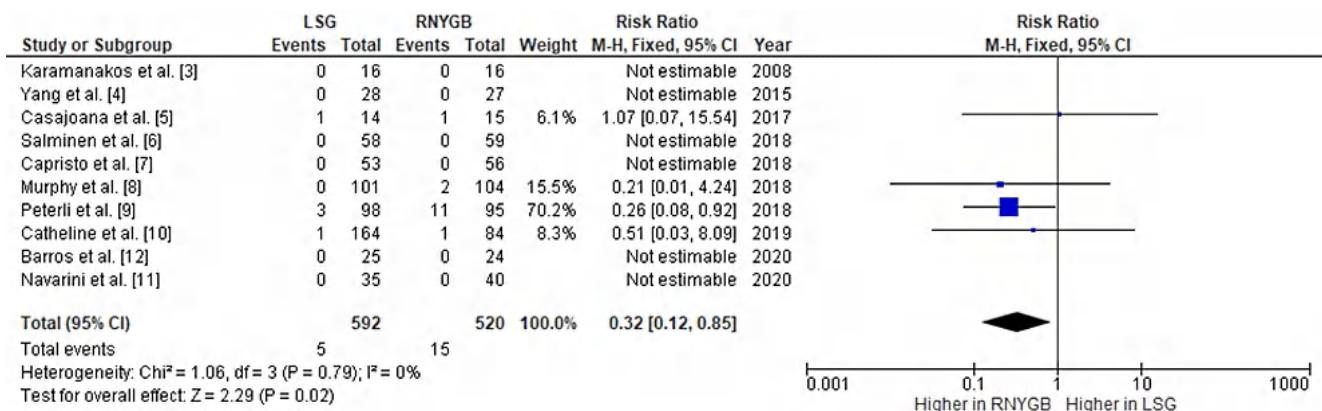


Figure 5: Comparison of intra-abdominal abscess incidence between RNYGB and LSG

LSG: laparoscopic sleeve gastrectomy; RNYGB: Roux-en-Y gastric bypass

### Comparison of the Incidence of Internal Hernia Formation and Gastroenteric Leak Between LSG and RNYGB

Our pooled analysis showed that RNYGB had a higher incidence of internal hernia formation as compared to LSG, with a pooled RR of 0.06 (95% CI: 0.01-0.26;  $p=0.002$ ) (Figure 6). Also, the risk of gastric/enteric leak was also observed more in RNYGB, with a pooled RR of 0.57 (95% CI: 0.12-2.67;  $p=0.47$ ) (Figure 7). Given the lack of significant heterogeneity between the trials, the data were analyzed using a fixed-effects model.



## O-23

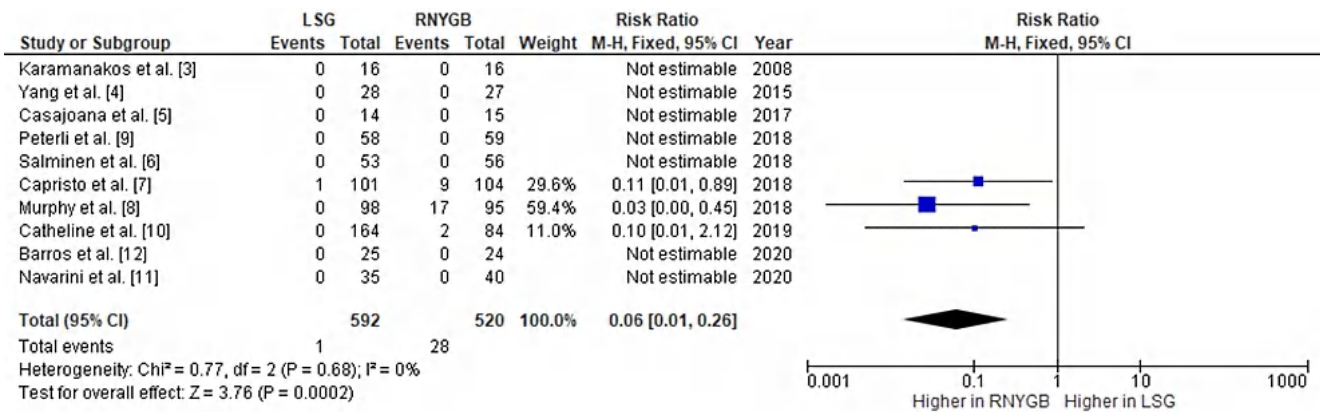


Figure 6: Comparison of internal hernia formation between RNYGB and LSG  
LSG: laparoscopic sleeve gastrectomy; RNYGB: Roux-en-Y gastric bypass

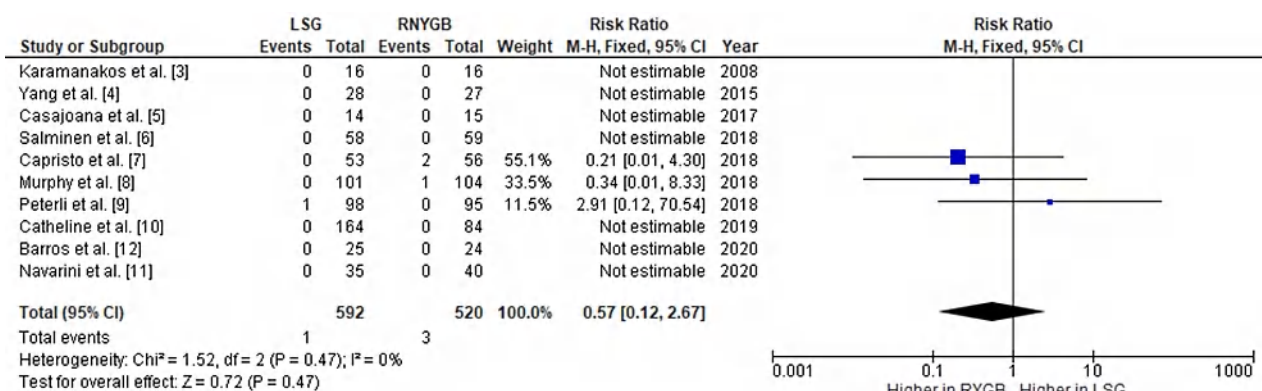


Figure 7: Comparison of gastroenteric leak incidence between RNYGB and LSG

LSG: laparoscopic sleeve gastrectomy; RNYGB: Roux-en-Y gastric bypass

Comparison of the Incidence of Gastroesophageal Reflux Disease (GERD) and Gastric Ulceration Between LSG and RNYGB

Our pooled analysis showed that the frequency of GERD after LSG was greater than that in RNYGB, with a pooled RR of 4.00 (95% CI: 2.55-6.28;  $p < 0.001$ ) (Figure 8). Postoperatively, the risk of gastric ulceration was observed more in RNYGB, with a pooled RR of 0.25 (95% CI: 0.07-0.87;  $p = 0.03$ ) (Figure 9). Given the lack of significant heterogeneity between the trials, the data were analyzed using a fixed-effects model.

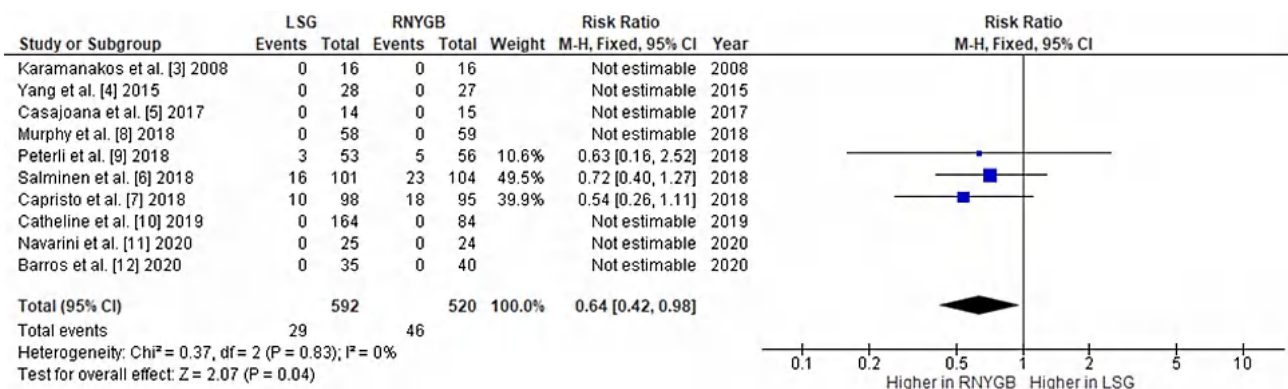


Figure 8: Comparison of GERD incidence between RNYGB and LSG

GERD: gastroesophageal reflux disease; LSG: laparoscopic sleeve gastrectomy; RNYGB: Roux-en-Y gastric bypass





## O-23

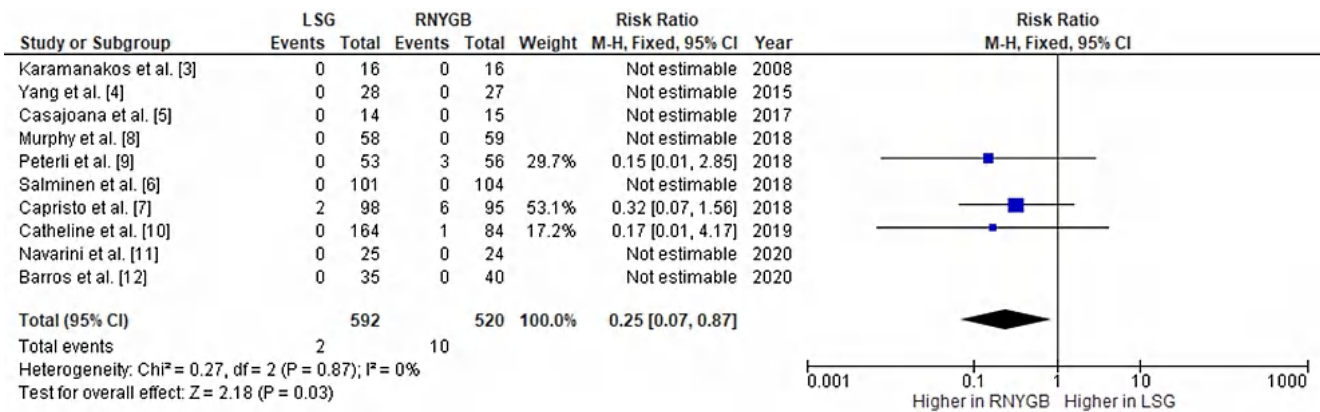


Figure 9: Comparison of gastric ulceration incidence between RNYGB and LSG

LSG: laparoscopic sleeve gastrectomy; RNYGB: Roux-en-Y gastric bypass

### Comparison of the Incidence of Reoperation and Other Complications Between LSG and RNYGB

Our pooled analysis showed that patients who underwent RNYGB needed some reoperation at a higher rate as compared to those who had LSG, with a pooled RR of 0.64 (95% CI: 0.42-0.98; p=0.04) (Figure 10). Also, the risk of other complications was observed more in RNYGB, with a pooled RR of 0.52 (95% CI: 0.31-0.85; p=0.01) (Figure 11). Given the lack of significant heterogeneity between the trials, the data were analyzed using a fixed-effects model. Other complications observed were gastric outlet obstruction, fistula formation, dehydration, superficial wound infection, pneumonia, and stricture formation.

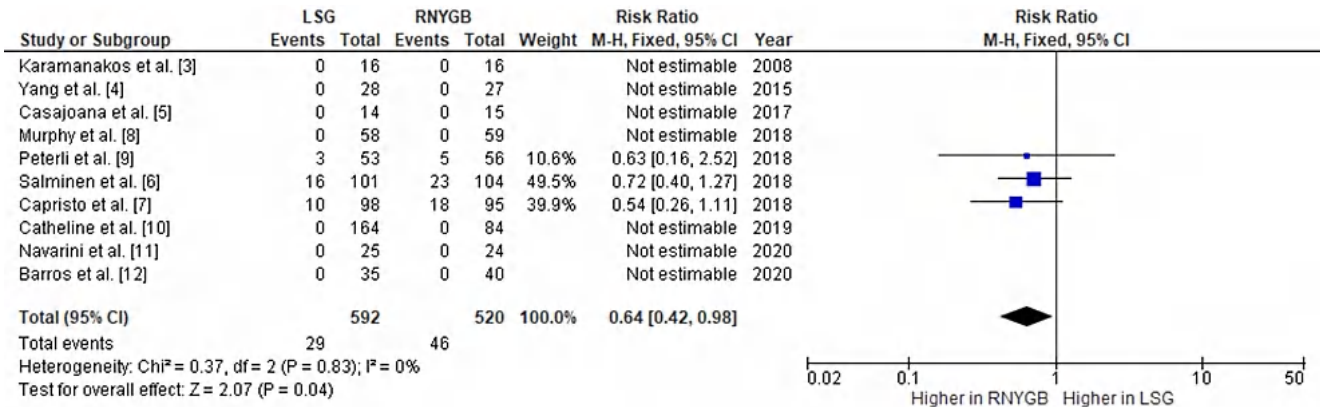


Figure 10: Analysis of RNYGB and LSG reoperation rates

LSG: laparoscopic sleeve gastrectomy; RNYGB: Roux-en-Y gastric bypass



**O-23**

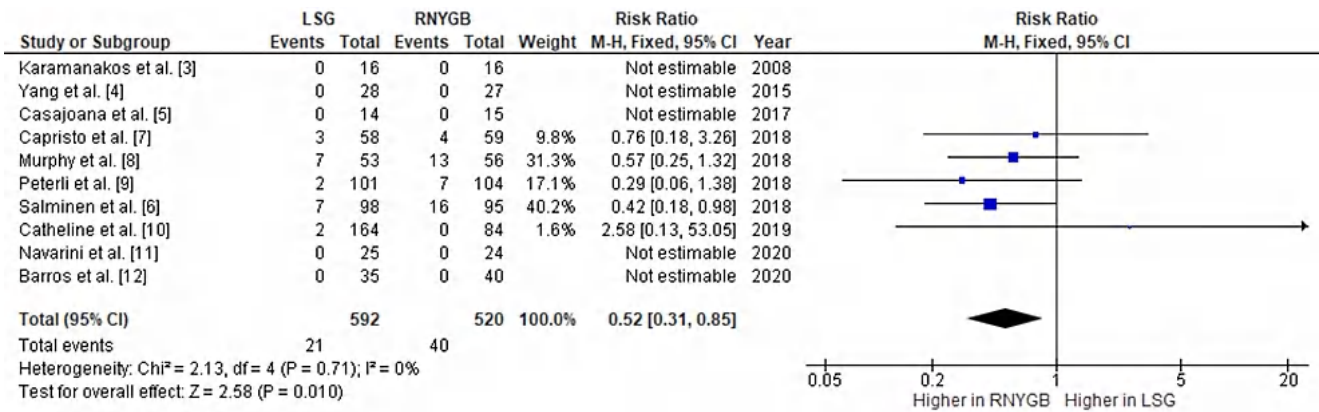


Figure 11: Comparison of other complications between RNYGB and LSG

LSG: laparoscopic sleeve gastrectomy; RNYGB: Roux-en-Y gastric bypass

**Comparison of the Incidence of Mortality Between LSG and RNYGB**

There were no substantial differences in postoperative patient mortality between the two procedures. Out of 1112 patients, two expired, one in each group, and were mentioned because of postoperative complications, with a pooled RR of 0.71 (95% CI: 0.09-5.86; p=0.75) (Figure 12).

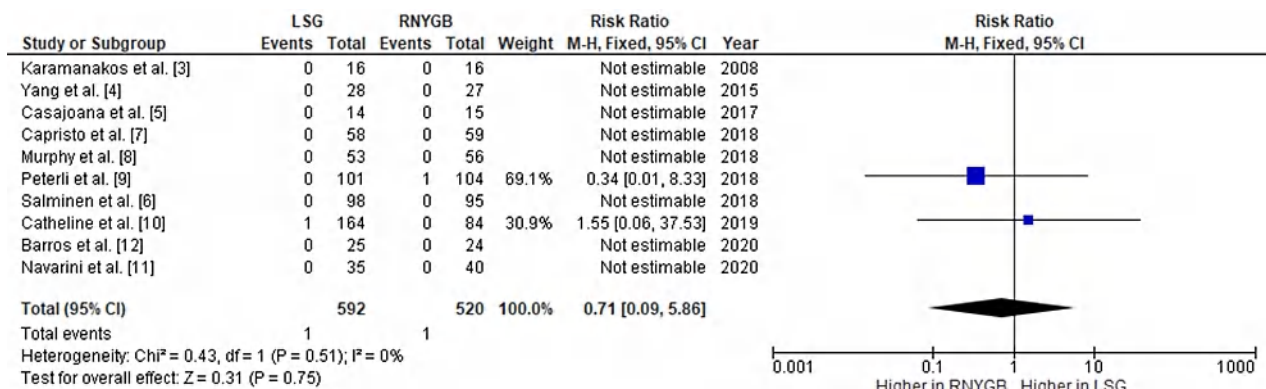


Figure 12: Comparison of mortality rates between RNYGB and LSG

LSG: laparoscopic sleeve gastrectomy; RNYGB: Roux-en-Y gastric bypass

**Conclusion:** This meta-analysis revealed that RNYGB and LSG are comparable in terms of mortality rates. In contrast, patients who underwent LSG had fewer complications after surgery and a lower risk of reoperation compared to those who received RNYGB. However, LSG may exacerbate GERD symptoms and potentially initiate GERD. Based on our overall findings, LSG should be chosen over RNYGB for bariatric surgery. However, this should be decided only after taking the patient's other medical conditions into account.



## ELEVATED SERUM PEPSINOGEN LEVEL PREDICTS POSTOPERATIVE NAUSEA AND VOMITING AND PAIN IN FEMALES WITH OBESITY FOLLOWING LAPAROSCOPIC SLEEVE GASTRECTOMY

Min Hou<sup>1</sup>, Lina Wu<sup>2</sup>, Zhuoqi Wei<sup>2</sup>, Shuwen Jiang<sup>2</sup>, Huaxi Wang<sup>2</sup>, Wenhui Chen<sup>2</sup>, Ruixiang Hu<sup>2</sup>, Bingsheng Guan<sup>2</sup>, Lyujia Cheng<sup>2</sup>, Jianxue Wang<sup>2</sup>, Songhao Hu<sup>2</sup>, Cunchuan Wang<sup>2</sup>, Junchang Zhang<sup>2</sup>, Zhiyong Dong<sup>2</sup>, Jingge Yang<sup>2</sup>, Qingran Lin<sup>3</sup>, Wah Yang<sup>2</sup>

<sup>1</sup>School of Nursing; The First Affiliated Hospital, Jinan University, Guangzhou, Guangdong Province, China.

<sup>2</sup>Department of Metabolic and Bariatric Surgery, The First Affiliated Hospital, Jinan University, Guangzhou, Guangdong Province, China.

<sup>3</sup>Department of Nursing, The First Affiliated Hospital, Jinan University, Guangzhou, Guangdong Province, China.

**Background:** Postoperative nausea and vomiting (PONV) is the most common side effect after laparoscopic sleeve gastrectomy (LSG), affecting patients' postoperative recovery and increasing the medical and economic burden. This study aimed to analyze the relationship between serum pepsinogen and PONV.

**Objectives:** This study aimed to analyze the relationship between preoperative serum pepsinogen and PONV.

**Methods:** Patients with obesity who underwent LSG in our center between January 2021 and December 2022 were divided into PONV and NoPONV groups and analyzed retrospectively. Binary logistic regression analysis was used to determine the independent risk factors for PONV.

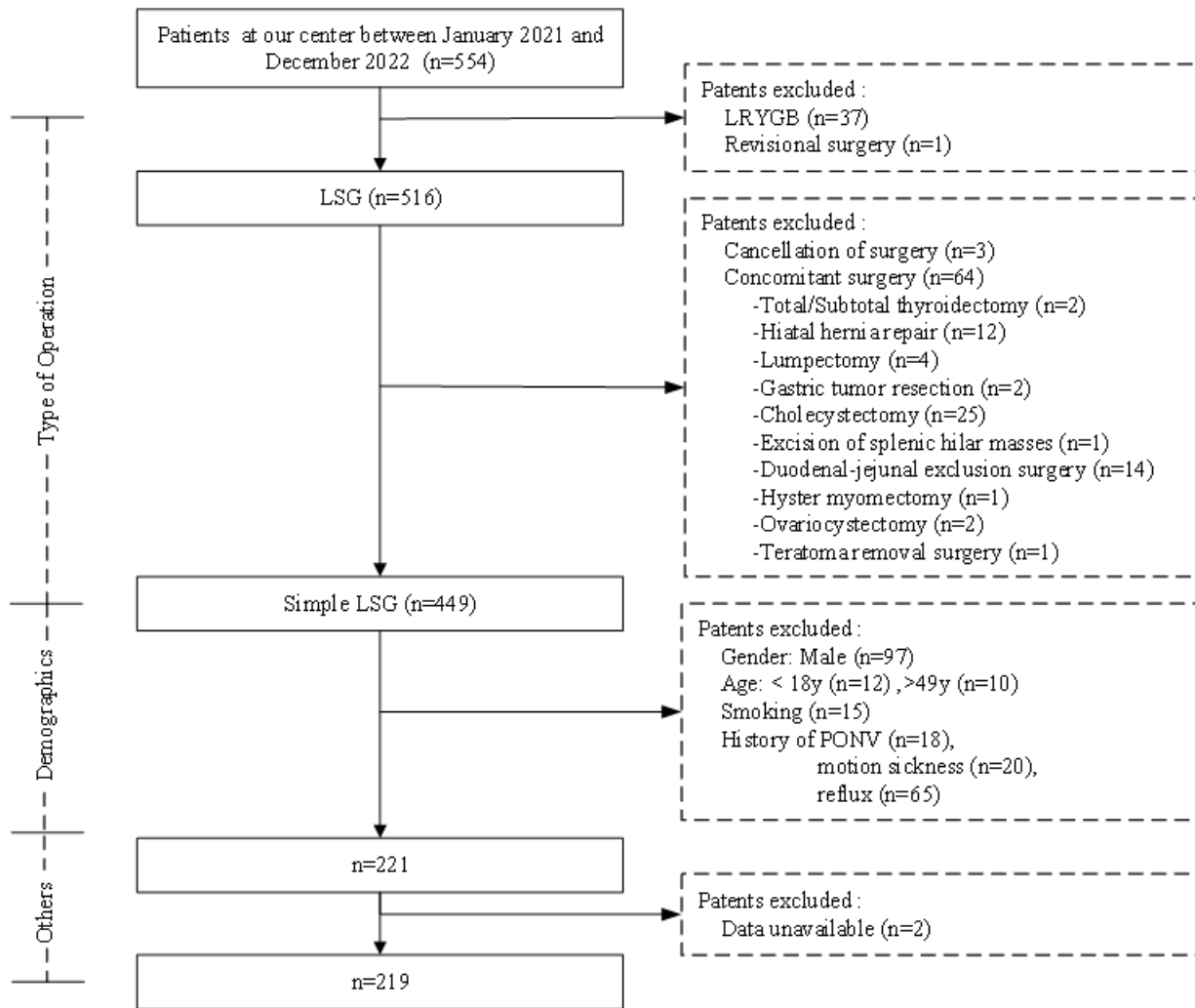
**Results:** 219 female patients were enrolled (Figure 1), with an average BMI of  $36.74 \pm 8.34$  kg/m<sup>2</sup> and aged  $32.61 \pm 6.18$  years. PONV occurred in 157 patients (71.7%). The influencing factors of PONV with different severity were analyzed, and the results showed that the severity of postoperative pain ( $p=0.004$ ), PGI ( $p=0.002$ ), PGII ( $p=0.000$ ), and PGR ( $p=0.001$ ) had statistical significance. Binary logistic regression showed that PGI was a risk factor for PONV with a OR value of 1.013 (95% CI: 1.001-1.024,  $p=0.037$ ), while PGR was a protective factor for PONV with an OR value of 0.952 (95% CI: 0.925-0.979,  $p=0.001$ )

**Conclusion:** The incidence of PONV after LSG is high. Higher PGI may be a risk factor for promoting PONV after LSG. The higher the preoperative PGI, the later the onset of PONV; the longer the duration, the more serious the degree (Figure 2).



## O-24

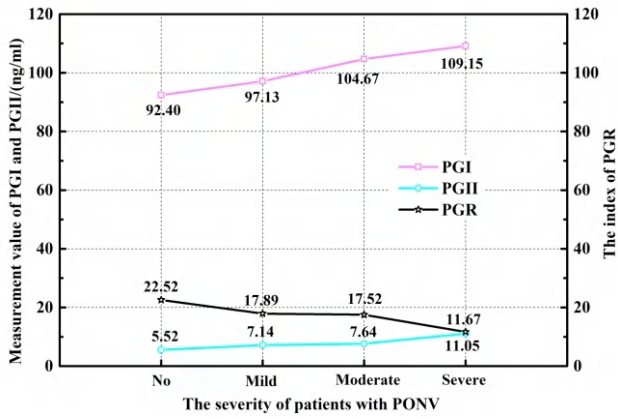
Figure 1 Flow chart of patient screening



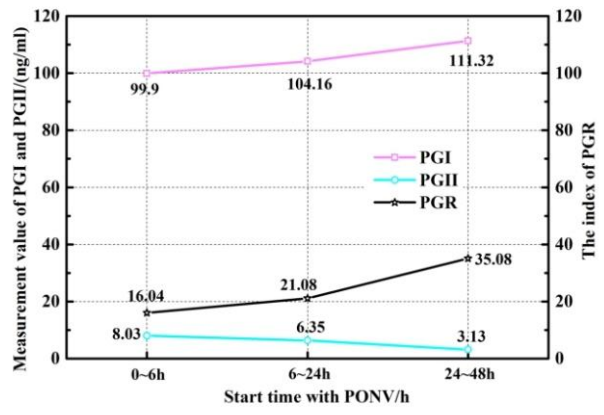


# O-24

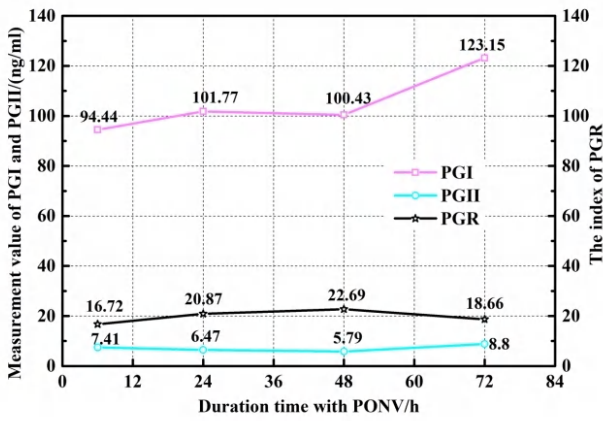
Figure 2 PGI, PGII, PGR and PONV, postoperative pain



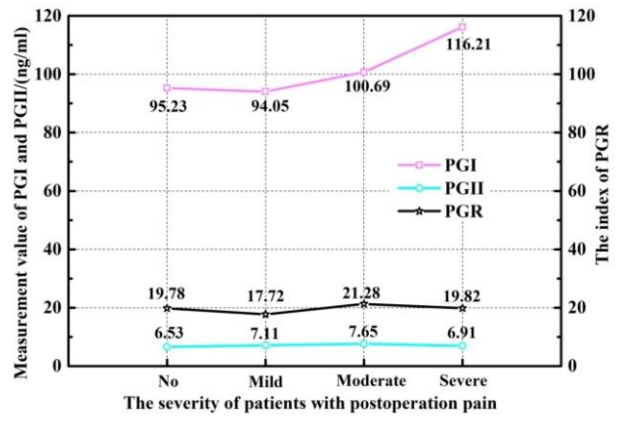
(a)



(b)



(c)



(d)



O-25

## UTILITY OF ELF IN DIAGNOSING PRESENCE AND SEVERITY OF ADVANCED LIVER FIBROSIS IN PATIENTS WITH MORBID OBESITY UNDERGOING BARIATRIC SURGERY

**Chekuri Ritwik<sup>1</sup>, Sandeep Aggarwal<sup>2</sup>, Shalimar Shalimar<sup>3</sup>, Vitish Singla<sup>4</sup>**

*India Institute of Medical Sciences*

**Introduction:** Non Alcoholic Fatty Liver Disease (NAFLD) is present in up to 90% of patients with morbid obesity. Patients with advanced fibrosis require continuous monitoring for progression. A non-invasive test, which can accurately predict advanced fibrosis, is the need of the hour for such patients.

**Methods:** This prospective observational study conducted at a tertiary care academic institute from March 2020 to November 2021 aimed to determine the best non-invasive marker of NAFLD in correlation with liver biopsy in morbidly patients with obesity. Patients with alcohol consumption > 20gm/day, Hepatitis B/C infection, autoimmune and storage disorders were excluded. The non invasive tests included Liver stiffness measurement (LSM), Controlled attenuation parameter (CAP), Enhanced liver fibrosis (ELF), AST to platelet ratio index (APRI) and Fibrosis-4.

**Results:** Out of the 48 patients in the study, 17.9% of the patients had advanced (F3/F4) fibrosis on liver biopsy. Enhanced Liver Fibrosis had an AUROC of 0.8 and 0.85 for significant and advanced fibrosis respectively. The cut off for Significant Fibrosis was 9.1 with a sensitivity of 84.62% and specificity of 78.26%. For advanced Fibrosis, the cut off was 9.33 with a sensitivity of 85.71% and specificity of 82.76%. The best LSM cut-off for significant fibrosis (AUROC 0.85) was 7.5kPa, which had 91.67% sensitivity and specificity of 57.69%. The best LSM cut-off for advanced fibrosis (AUROC 0.80) was 9.2kPa, with 83.33% sensitivity and 71.88% specificity. Out of the clinical scoring tests, APRI had an AUROC of 0.76 for Advanced Fibrosis. At a cut off 0.5952, a sensitivity of 71.4%, specificity of 84.38% and NPV of 93.1% were achieved. FIB4 performed very poorly in predicting any grade of fibrosis.

**Conclusion:** Non invasive markers including ELF, LSM and APRI score correlate well with liver biopsy. ELF was found to have the best predictive value for significant and advanced fibrosis as compared to other non invasive tests.



## PREVALENCE OF ENDOSCOPIC FINDINGS AND RISK FACTORS FOR REFLUX ESOPHAGITIS BEFORE BARIATRIC SURGERY: A SINGLE-CENTER RETROSPECTIVE ANALYSIS

Peirong Tian<sup>1</sup>, Yang Liu<sup>1</sup>, Shibo Bian<sup>1</sup>, Mengyi Li<sup>1</sup>, Zhongtao Zhang<sup>1</sup>, Peng Zhang<sup>1</sup>

<sup>1</sup>Division of Metabolic and Bariatric Surgery, Department of General Surgery, Beijing Friendship Hospital, Capital Medical University, National Clinical Research Center for Digestive Diseases, Beijing, China

**Background/Introduction:** Obesity is closely associated with upper gastrointestinal disorders, but the necessity of routine preoperative esophagogastroduodenoscopy (EGD) for bariatric surgery candidates is debated. This study aims to describe endoscopic findings in individuals eligible for bariatric surgery.

**Objectives:** Our objective was to analyze preoperative gastroscopy reports of bariatric surgery patients, identifying prevalent endoscopic findings and associated risk factors.

**Methods:** We conducted a RETROSPECTIVE ANALYSIS of preoperative EGD reports from patients undergoing bariatric surgery at our hospital between October 2019 and October 2020.

**Results:** Out of 405 patients, the most common endoscopic findings were chronic superficial gastritis (80.5%) and reflux esophagitis (20.2%). Some patients exhibited multiple abnormalities. Patients with reflux esophagitis were predominantly older males with higher BMI, smoking, and drinking habits. Morbid obesity, smoking, and H. pylori infection were significant risk factors for reflux esophagitis in males, while age was the sole risk factor in females. Surgical procedure differences were not statistically significant between LA-A and B groups, but they were observed between nondiabetic and diabetic groups.

**Conclusion:** Preoperative EGD reveals diverse pathologies in patients with obesity advocating for routine examination before bariatric surgery. These findings can inform tailored treatments and procedures, improving prognosis. Routine gastroscopy is recommended for Chinese patients planning bariatric surgery.



Table 1: Clinical Characteristics of the Entire Patient Cohort (N = 405)

Variables	Total Population (N = 405)
Sex(M/F)	82/323
Age(years)	32 (27, 37)
BMI(kg/m <sup>2</sup> )	36.27 (32.70, 41.95)
BMI≥40 kg/m <sup>2</sup> (N, %)	126 (31.3%)
History of Smoking (N, %)	135 (33.3%)
History of Alcohol Consumption (N, %)	177 (43.7%)
Diabetes (N, %)	148 (36.5%)
Infected with <i>Helicobacter pylori</i> (N, %)	57 (14.1%)
Dyslipidemia (N, %)	338 (83.5%)

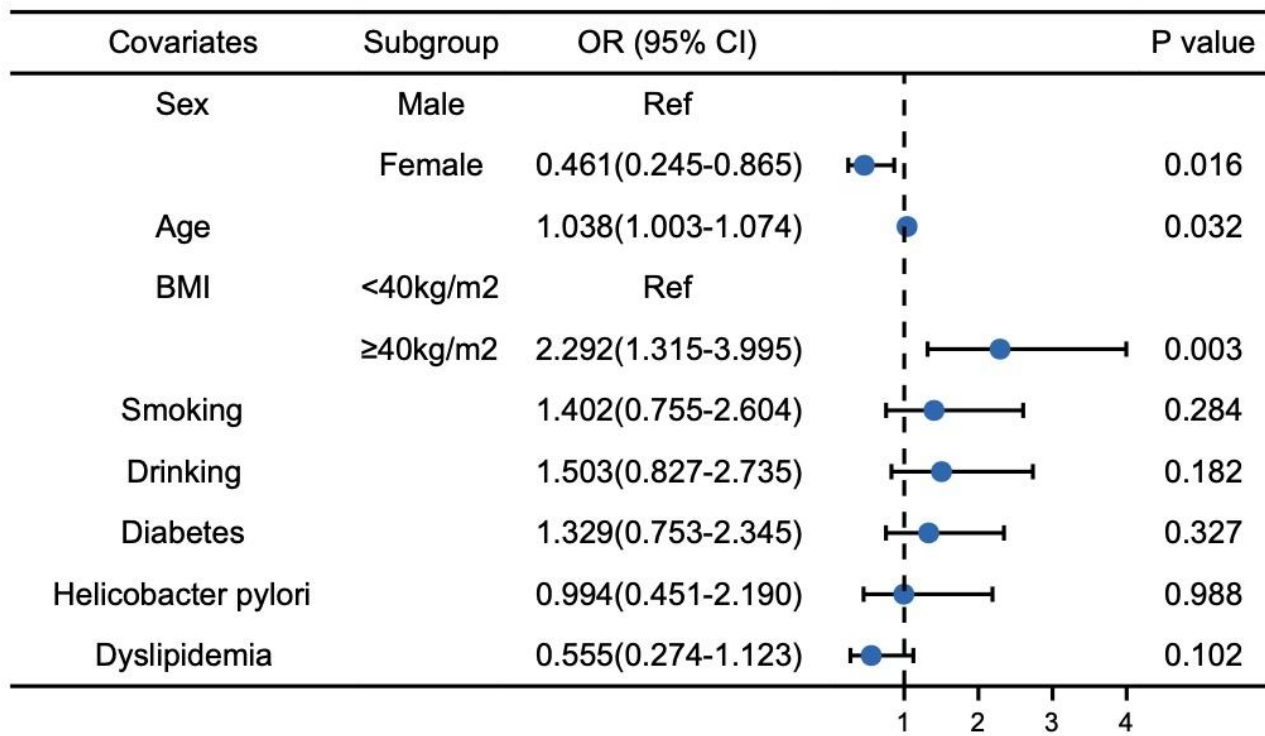


Figure 1: Multivariable Logistic Regression Analysis for Risk Factors of Reflux Esophagitis





## MICRONUTRIENT LEVELS IN PATIENTS FOLLOWING BARIATRIC SURGERY; AN EXPERIENCE FROM A DEVELOPING COUNTRY

Prof. Dr Mohammad Zarin<sup>1</sup>, Dr Muhammad Ahmad<sup>1</sup>, Dr Zia Ullah<sup>1</sup>,  
Dr Shahzeb Khan<sup>1</sup>, Dr Muhammad Imran Khan<sup>1</sup>, Dr Saeed Sarwar<sup>1</sup>,

<sup>1</sup> Khyber Teaching Hospital.

**Background/Introduction:** The scourge of obesity has plagued the developing world, culminating in an exponential rise in related illnesses including diabetes, hypertension and cardiovascular disease. Bariatric Surgery is the most effective way to achieve substantial weight loss for individuals with obesity but its impact on long term micronutrient status needs to be studied in the population of the developing world, as access to healthy diet remains abysmal.

### Objectives:

- To assess micronutrient status in patients who underwent bariatric surgery.
- Compare the difference in postoperative nutritional complications between Sleeve
- Gastrectomy (SG) and Roux-en-Y gastric bypass (RYGB).

**Methods:** This single center retrospective evaluation included 40 patients who underwent bariatric surgery: 20 each for SG and RYGB. BMI, serum iron, serum calcium, vitamin b12 and 25-OH-vitamin D were measured at 6 months post-op and retrospectively compared with preoperative levels. Deficiencies were defined as follows: Vitamin B12; <197pg/ml, 25-OH-vitamin D; <50 nmol/L and for Iron, ferritin levels <15 ng/mL. Data analysis was done using paired samples-t-test and Wilcoxon signed-rank test for non-parametric variables. Student's-t-test and Mann Whitney U were also used to compare the two procedures. A p value of less than 0.05 was considered to be significant.

**Results:** The mean Excess Weight Loss (EWL) for SG was  $28 \pm 12.6\%$  and  $39.4 \pm 10.6\%$  for RYGB(P=0.004). The incidence of total micronutrient deficiencies increased following bariatric surgery(N=42 preoperatively vs N=61 postoperatively). Bariatric surgery was associated with vitamin D(62.5 % preoperative vs. 85% postoperative, P=0.012) and Iron (42.5% vs. 57.5%, P <0.001)deficiencies. A higher incidence of anemia was reported in RYGB patients as compared to SG(50% vs. 20%, P=0.047). In addition, both hemoglobin ( $12.0 \pm 0.8$  for RYGB vs.  $13.5 \pm 1.3$  for SG, P <0.001) and calcium levels ( $8.5 \pm 0.6$  for RYGB vs.  $8.8 \pm 0.4$  for SG, P=0.030) were lower in patients who underwent RYGB. Furthermore, in comparison to SG, RYGB patients had lower postoperative levels of Vitamin B12 ( $415 \pm 185.4$  for RYGB vs.  $564.7 \pm 192.8$  for SG, P=0.017) and interestingly, B12 levels increased in patients who underwent SG ( $499.0 \pm 170.4$  preoperative vs.  $564.7 \pm 192.8$  postoperative, P= 0.04).

**Conclusion:** This study demonstrates the grave issue of micronutrient deficiencies after bariatric surgeries and the need to tackle them accordingly with appropriate supplements. The high incidence of preoperative deficiencies augments the need to screen bariatric surgery candidates for micronutrient deficiencies. Furthermore, SG may be associated with improved B12 levels and decreased incidence of anemia postoperatively whereas RYGB may have better weight loss outcomes.



## **BODY IMAGE, DEPRESSION, AND QUALITY OF LIFE BEFORE AND ONE YEAR AFTER BARIATRIC SURGERY OF THE CHINESE POPULATION**

**Jing Liao<sup>1</sup> Yue Wen<sup>1</sup> Yiqiong Yin<sup>2</sup> Yanjun Chen<sup>2</sup> Jianhong Yang<sup>1</sup>**

<sup>1</sup>*Department of Gastrointestinal Surgery, West China Hospital, Sichuan University, Chengdu, China;*

<sup>2</sup>*West China School of Nursing, Sichuan University, Chengdu, China*

**Background/Introduction:** Given the importance of body image in bariatric surgery patients and the lack of relevant studies in China, it is necessary to investigate the effect of bariatric surgery on body image.

**Objectives:** Our study attempted to investigate body image, depression, and quality of life in Chinese bariatric surgery patients.

**Methods:** In this prospective, longitudinal cohort study, 97 candidates for bariatric surgery were recruited from gastrointestinal surgery at West China Hospital of Sichuan University who participated in the pre-surgery survey from January 2019 to April 2021. 40 patients completed the 1-year follow-up survey. Body image (the Scale of Satisfaction with the Body Image), depression (the Chinese version of the Beck Depression Inventory), and quality of life (the Chinese version of the Form 36-Item Health Survey) were assessed before and one year after bariatric surgery.

**Results:** A total of 41.2% of patients completed follow-up surveys. Overall mean scores for body image, depression, and the physical component score of quality of life significantly improve ( $p < 0.05$ ) after surgery. Nonetheless, the mental component score of quality of life did not significantly improve following the bariatric surgery ( $p > 0.05$ ). Body image was negatively associated with mental-related quality of life ( $P < 0.01$ ) and positively associated with depression ( $P < 0.01$ ) before and after surgery. Body image partially mediated the relationship between depression and quality of life before surgery and didn't have a significant mediation effect after bariatric surgery.

**Conclusion:** Body image, physical-related quality of life, and depression improved one year after bariatric surgery in the Chinese bariatric population. Bariatric surgery is insufficient to determine the improvement of mental-related quality of life. These results indicate that healthcare professionals should pay more attention to the psychological and mental state of patients after surgery. Body image partially mediated the relationship between depression and mental-related quality of life before surgery, suggesting that therapeutic interventions targeted at improving body image may improve mental-related quality of life.



## PSYCHOLOGICAL STATUS AND COGNITIVE FUNCTION OF PATIENTS UNDERGOING BARIATRIC SURGERY

**Boyu Tao**

<sup>1</sup> *Beijing Friendship Hospital*

**Background/Introduction:** There is increasing evidence suggesting that obesity and its related complications can negatively impact cognitive function. Furthermore, individuals with obesity have a relatively high incidence of anxiety and depression. MBS surgery has shown promise in improving cognitive function and restoring brain structure.

**Objectives:** This study aimed to assess the cognitive and mental health status of patients undergoing bariatric surgery using scales such as SCL-90, HAMD, HAMA, MMSE, and MOCA. Furthermore, the study aimed to explore the impact of factors such as inflammatory markers on cognitive function.

**Methods:** A total of 60 patients undergoing bariatric surgery at Beijing Friendship Hospital between October 2021 and October 2022 were included in this study. The objective was to evaluate the cognitive function and psychological status of patients, while also investigating the influence of inflammatory markers, history of diabetes and other factors on cognitive function and psychological Status.

**Results:** The study included 60 participants with an average age of (33.42±8.08) years. Among them, 43 (71.7%) were females with an average age of (32.77±7.55) years, while 17 (28.3%) were males with an average age of (35.06±9.33) years. The average BMI of the participants was (38.42±5.95) kg/m<sup>2</sup>. Among the 60 patients, 52 (86.7%) did not present with depression, 5 (8.3%) had mild depression, 1 (1.7%) had moderate depression, and 2 (3.3%) had severe depression. Moreover, 51 (85.0%) had no anxiety, 5 (8.3%) had probable anxiety, 2 (3.3%) had confirmed anxiety, and 2 (3.3%) had significant anxiety. Additionally, 57 (95.0%) of the patients exhibited no cognitive impairment, while 3 (5.0%) showed impaired cognitive function. The MoCA score showed a weak negative correlation with patient age ( $r = -0.331$ ,  $P = 0.010$ ) and with CRP levels ( $r = 0.308$ ,  $P = 0.017$ ). The depression level also exhibited a weak negative correlation with age ( $r = -0.304$ ,  $P = 0.018$ ).

**Conclusion:** This study included 60 patients and evaluated their mental and cognitive function. Notably, 11 patients (18.3%) presented with mental health issues such as anxiety and depression. Future postoperative follow-up is necessary to assess the impact of bariatric surgery on psychological status and cognitive function.



## BARIATRIC SURGERY REDUCES FOOD ADDICTION SCORE

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<sup>1</sup>Department of Metabolic & Bariatric Surgery, Shanghai Sixth People's Hospital Affiliated to Shanghai Jiao Tong University School of Medicine, Shanghai 200233, China.

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#Xuyan Ban and Chen Wang contributed equally to this work.

### Abstract

**Background:** There is a growing trend of research showing that food addiction is more prevalent in patients with obesity than in the general population. Bariatric surgery is the most effective form of obesity treatment and it has been shown that symptoms of food addiction can be reduced by bariatric surgery.

**Objectives:** To determine the impact of bariatric surgery on food addiction symptoms.

**Methods:** This study followed 78 bariatric surgery participants for two years using the Yale Food Addiction Scale 2.0 (YFAS 2.0); cluster analysis and mixed linear model (MLM) were used to analysis the data.

**Results:** We found that: (1) Bariatric surgery could significantly reduce food addiction; (2) Bariatric surgery rapidly reduced food addiction scores within one month of surgery and extend to 2 years after surgery; (3) Symptoms in the YFAS 2.0 could be divided into two main categories based on post-operative trends: one category began to improve early in the post-operative period and remained at a low level; the other category improved relatively slowly in the post-operative period.

**Conclusion:** Bariatric surgery could rapidly reduce most of the symptoms of food addiction in the early postoperative period.

**Keywords:** Food addiction, Bariatric surgery, The YFAS 2.0



## REVISIONAL SINGLE ANASTOMOSIS DUODENAL - ILEAL BYPASS WITH SLEEVE GASTRECTOMY (SADI - S) – MEDIUM TERM RESULTS FROM AN AUSTRALIAN BARIATRIC CENTRE

Qiuye Cheng<sup>1</sup>, Mark Magdy<sup>2</sup> and Ken WK Loi<sup>3</sup>

<sup>1,2,3</sup> St George Hospital, Sydney, Australia

**Background/Introduction:** The Single anastomosis duodenal-ileal – sleeve bypass (SADI-S) has gained global traction as a viable alternative to more established forms of bypass including The Roux-en Y gastric bypass (RYGB) and more recently The One anastomosis gastric bypass (OAGB)<sup>1</sup>. Within Australia, the uptake of SADI-S remains slow owing to its technical complexity and relative unfamiliarity amongst bariatric surgeons<sup>2</sup>.

**Objectives:** Through this study, we aim to report our revisional SADI-S experience and medium-term results.

**Methods:** We conducted a retrospective review of a prospectively maintained database from 2017 to 2022 of all patients who had undergone revisional SADI-S between three experienced bariatric surgeons at St. George Private Hospital (Sydney, Australia).

**Results:** 22 patients were included in the study for analysis. The median preoperative BMI was 40.3 (35.0–55.5) kg/m with a median age of 46 (37–60) years. The median percentage of excess body weight loss (EWL%) were 33.4%, 30.8% and 29.1% respectively at 12, 18 and 36 months post-revisional SADI-S. The median overall patient EWL% from prior to any bariatric surgery was 61.5%. All seven patient with type II diabetes demonstrated metabolic improvement with a median HbA1c level correction of -1.6. With respect to complications - 41% (9/22) of patients had evidence of nutritional deficiencies despite regular multi-vitamin use with the most common derangements being vitamin A, D, B12, zinc and iron. Bile reflux remained an issue in one patient, while 14% (3/22) of patients experienced significant diarrhea/ increased flatus. A major early surgical complication (i.e. within 30 days of surgery) occurred in one patient who was found to have an ischemic sleeve requiring sub-total gastrectomy and conversion to Roux-en Y gastric bypass.

**Conclusion:** Despite its steep learning curve, SADI-S can be an effective bariatric revisional operation especially in obesity patients with metabolic disease when compared to the revisional results of RYGB and OAGB. Care needs to be placed in selecting suitable patients especially when considering the relatively high rates of nutritional deficiencies and the associated longer bypass sequelae.

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## A NOVEL MACHINE-LEARNING ALGORITHM HELPS TO PREDICT WEIGHT LOSS ONE YEAR AFTER SLEEVE GASTRECTOMY

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**Background:** Although sleeve gastrectomy (SG) is the most commonly performed bariatric surgery, 20-40% of patients fail to achieve successful weight loss after one year. However, no reliable tool has been established to estimate the efficacy of SG preoperatively.

**Objectives:** To develop a machine-learning algorithm (CJFH model) using preoperative clinical and laboratory data for predicting one-year weight loss after SG.

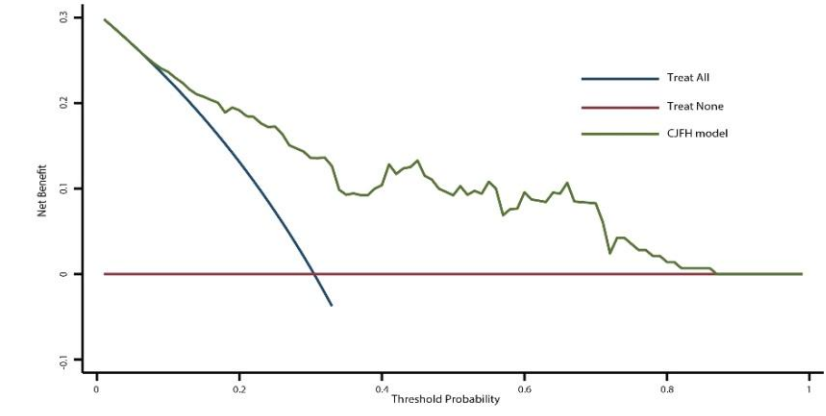
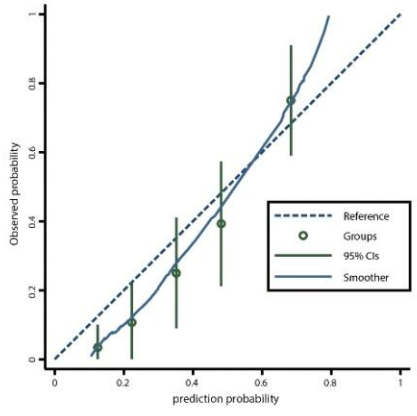
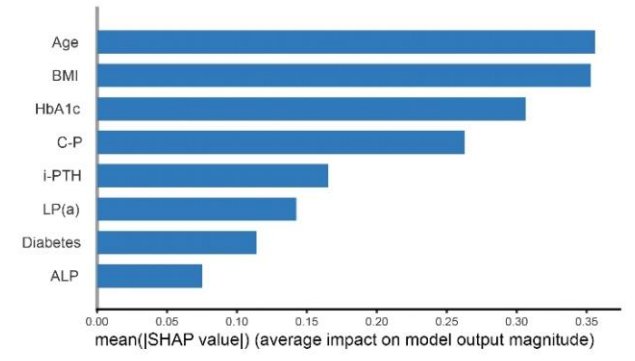
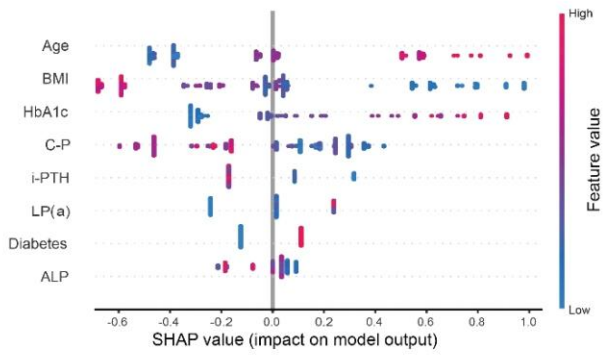
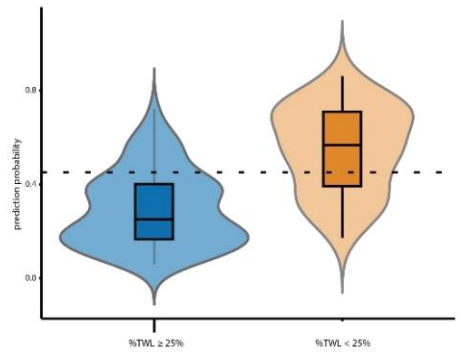
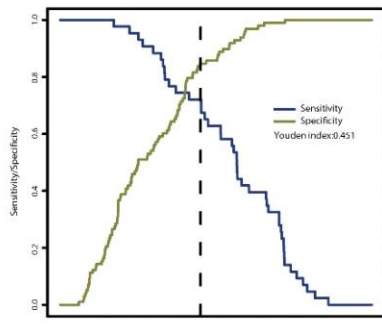
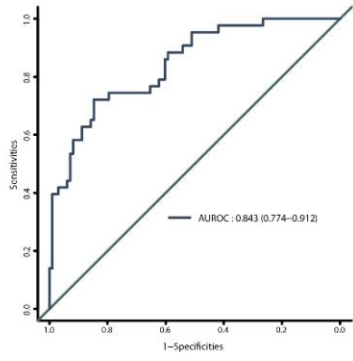
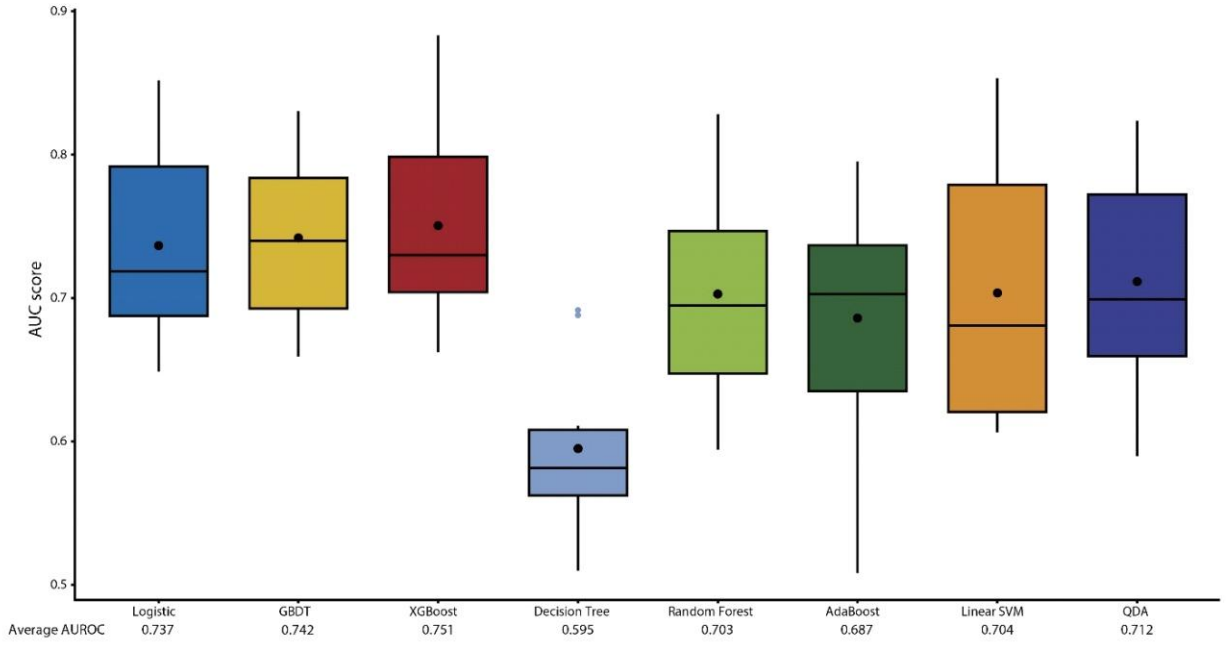
**Methods:** Patients who received SG at China-Japan Friendship Hospital between September 2017 and May 2022 were reviewed. Percentage of total weight loss (%TWL) was calculated one year after surgery and suboptimal weight loss is defined as %TWL less than 25%. All patients were divided randomly into training and validation cohorts in a ratio of 4:1. Following univariate analysis and LASSO regression, 8 of 54 clinical and laboratory variables were chosen for further analysis. Several typical and recent machine learning algorithms were compared on the training cohort without hyperparameter optimization, and finally, the extreme gradient boosting (XGBoost) algorithm performed the best and thus was selected to develop the CJFH model. The hyperparameters were optimized using a genetic algorithm and 5-fold cross-validation. Feature importance was assessed by Shapley Additive Explanations (SHAP) values. The discrimination ability, calibration, and clinical usefulness of the CJFH model were evaluated on the validation cohort.

**Results:** A total of 702 patients who underwent SG were reviewed, with 216 (30.8%) considered weight loss failed. Age, body mass index, glycosylated hemoglobin, fasting C-peptide, intact parathyroid hormone, lipoprotein (a), diabetes, and alkaline phosphatase were included in the CJFH model. The area under the receiver operating characteristic curve (AUROC) was 0.843 (95% CI: 0.774-0.912) in the validation cohort. With a Youden index of 0.451, the sensitivity, specificity, and accuracy were, respectively, 0.721, 0.847, and 0.809. The Brier score of 0.150 indicates good calibration. Furthermore, the decision curve analysis also showed that the CJFH model has an excellent clinical impact at a wide range of probability thresholds.

**Conclusion:** The novel machine-learning algorithm (CJFH model) displayed superior discrimination, calibration, and clinical value. By using preoperative clinical variables, it can accurately predict the efficacy of weight loss one year after SG.



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## LAPAROSCOPIC SLEEVE GASTRECTOMY PLUS DUODENOJEJUNAL BYPASS: LEARNING CURVE ANALYSIS AND TECHNICAL FEASIBILITY OF DUODENOJEJUNOSTOMY USING LINEAR STAPLER

**Dongjae Jeon, Yoona Chung, Bomina Paik, Yong Jin Kim**

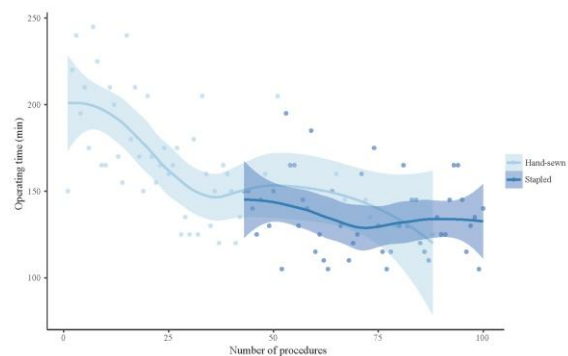
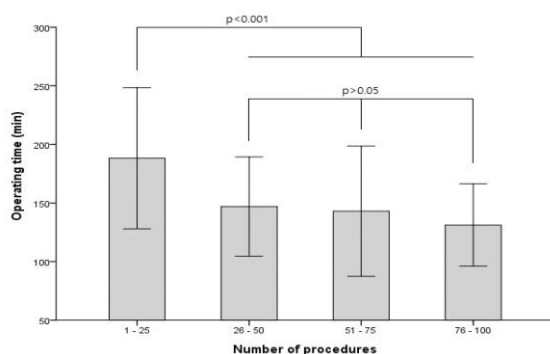
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**Background/Introduction:** Laparoscopic sleeve gastrectomy with duodenojejunal Bypass (LSG-DJB) has emerged as an alternative bypass surgery. Despite its potential benefits, the technical challenges of the procedure have limited its adoption.

**Objectives:** This study aims to present the learning curve for LSG-DJB and explore potentially beneficial technical modifications for the standardization of the procedure.

**Methods:** The study retrospectively analyzed 100 patients who underwent LSG-DJB as a primary procedure from July 2014 through September 2021. Baseline characteristics, weight loss outcomes, remission of metabolic diseases, and perioperative complications were assessed. The operative time was analyzed across both time trends and anastomosis type subgroups.

**Results:** At 1-year follow-up after LSG-DJB, the mean %total weight loss and the mean BMI loss were  $25.38 \pm 8.58$  % and  $9.38 \pm 4.25$  kg/m<sup>2</sup>, respectively. Remission rates for type 2 diabetes, hypertension, dyslipidemia were 72.0% (67/93), 84.1% (37/44) and 70.3% (52/74), respectively. In the analysis of operative time, the learning curve exhibited a plateau after 25 cases. The mean operative time was  $136.00 \pm 21.64$  minutes in the stapled anastomosis group, and  $150.62 \pm 25.42$  minutes in the hand-sewn anastomosis group. e clinical variables, it can accurately predict the efficacy of weight loss one year after SG.



**Conclusion:** The learning curve for LSG-DJB plateaued after 25 cases. In the LSG-DJB procedure, stapled duodenojejunal anastomosis is feasible and achieves similar outcomes to the hand-sewn method.





## COMPARATIVE STUDY OF LAPAROSCOPIC SLEEVE GASTRECTOMY WITH OR WITHOUT JEJUNAL BYPASS

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**Background/Introduction:** In China, the most mainstream weight-loss surgery is LSG and LRYGB, because there are still advantages and disadvantages between the two types of surgery. Bariatric surgeons are eager to explore a combination of the two advantages, and exploring Sleeve + JJB becomes a feasible solution. However, LSG+JJB is relatively rare in terms of the real efficacy and surgical safety of LSG, and there is still controversy in the academic community.

**Objectives:** To evaluate the value of LSG+JJB in the treatment of obesity by analysing and comparing laparoscopic sleeve gastrectomy (LSG) with or without jejunal bypass (JJB) for weight loss.

**Methods:** The data of 150 patients with obesity who underwent weight loss metabolic surgery at Xiaolan People's Hospital in Zhongshan City from October 2014 to April 2019 were retrospectively analyzed. The patients were divided into the LSG group and the LSG+JJB group based on the different surgical procedures. The differences in excess weight loss percentage (%EWL) and total weight loss (TWL) between the two groups were compared and statistically analyzed

**Results:** In the LSG group, the %EWL reached its peak at 18 months after surgery, and decreased slightly at 24 months after surgery. In the LSG+JJB group, the %EWL gradually increased within 2 years after surgery, but there was no significant statistical difference in %EWL between the two groups

Table 1 Comparison of weight loss at 24 months after surgery

Index	LSG	LSG+JJB	t value	P value
Total TWL(kg)	27.35±13.13	35.04±14.05	-2.45	<0.05
Total%EWL	69.59±18.67	70.69±21.17	-0.24	>0.05
Male TWL(kg)	32.75±16.09	37.55±14.71	1.67	<0.05
Male %EWL	69.61±18.68	68.37±22.08	1.81	>0.05
Female TWL(kg)	25.21±11.24	29.68±11.6	-1.03	>0.05
Female%EWL	69.58±18.86	75.59±19.55	-0.83	<0.05

**Conclusion:** Both groups have good effects on reducing excess body weight after surgery. There was no significant difference in excess weight loss rate between the LSG+JJB group and the LSG group within 2 years after surgery.



## EFFICACY AND SAFETY OF TRANSIT BIPARTITION PROCEDURES: SYSTEMATIC REVIEW & META-ANALYSIS

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**Background/Introduction:** Following the profound malabsorption resulting from the initial metabolic bypass procedures of the 1990s/2000s, Santoro et al designed a transit bipartition procedure (cTB) to avoid foregut exclusion. This aimed to reduce the risk of malabsorption, enhance neuroendocrine stimulation whilst retaining all the benefits of maintaining foregut access. Since then, there have been two iterations of sleeve with transit bipartition procedures, single anastomosis sleeve-ileal bypass (SASI) and single anastomosis sleeve-jejunal bypass (SASJ).

**Objectives:** Perform the first known systematic review and meta-analysis of sleeve with transit bipartition procedures (TBP).

**Methods:** Systematic review using Pubmed, Scopus, Web of Science, Cochrane and Google Scholar from 2010-2023 was performed in 2023. Selection criteria includes Series with  $\geq 10$  patients,  $\geq 6$  months follow up studies involving cTB, SASI or SASJ tx obesity, -related comorbidity as primary or revisional surgery, containing 1/more primary end points: weight loss, comorbidity measurements or perioperative features/complications (nutritional deficiencies).

**Results:** 45 patient cohorts who underwent TBP from 43 publications. Total number of patients undergoing surgery: 7335 patients. 6253 TBP procedures were analysed. 18 comparative publications; TBP vs other bariatric procedure/s with the other metabolic procedures in comparison studies involving 1082. Median follow up from all studies was 12 months. Demographic results: Gender: 66.4% Females; Median Age: 41.2; Median Baseline BMI: 43.6.

Median Baseline Co-morbidities:

Diabetes: 55%

HTN: 32.2%

Dyslipidaemia: 34.9%

OSA: 14.2%

GORD: 13%

Total weight loss (TWL) and excess weight loss (EWL) were 36.2 and 79.9%, respectively. BMI change over follow-up was 14.3 kg/m<sup>2</sup>. Remission of diabetes was 85% at 12 months ( $p < 0.01$ ). Incidence of malnutrition and/or early bypass reversal was 56%.

**Conclusion:** TBP are efficacious for weight loss & comorbidity resolution especially diabetes, more so than other commonly utilised bypasses with regards to roux-en-y gastric bypass and one anastomosis bypass. Additionally, its simplicity in construction, easy of reversibility and ability to maintaining access to pylorus, duodenum, ampulla are all appealing factors. However, median follow up is relatively short term and this longer term and more comprehensive studies are needed to clarify its long-term efficacy and safety.



## OMENTOPEXY REDUCES REFLUX SYMPTOMS IN SLEEVE GASTRECTOMY PATIENTS

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**Background/Introduction:** Gastroesophageal Reflux Disease (GERD) is known as the most common long-term complication after laparoscopic sleeve gastrectomy (LSG). The pathophysiology is assumed that the sleeved stomach after LSG is prone to be herniated through the hiatus with high intra-abdominal pressure in patients with obesity. The omentopexy is thought to make the remnant stomach fixed in abdominal cavity to decrease GERD symptom.

**Objectives:** This study aims to compare postoperative GERD after LSG with omentopexy versus LSG without omentopexy as well as to report incidence of peri-operative GERD LSG in East Asian with obesity.

**Methods:** Patient data were collected preoperatively and at postoperative 1 year. At each time point, body weight, laboratory tests and esophagogastroduodenoscopy were assessed. The patients were asked if anti-reflux medication including proton-pump inhibitor was taken and responded to GERD questionnaire. The validated Korean version of GERD-Q questionnaire was utilized. Laparoscopic sleeve gastrectomy was performed in usual manner; with or without omentopexy. Omentopexy was defined as the suturing the stapled stomach to the omentum which must include upper part of the sleeve. Electric medical and surgical records were evaluated by the surgeons who were specialized in gastrointestinal surgery. The primary outcome was GERD incidence evaluated by three criteria; LA classification on esophagogastroduodenoscopy, GERD-Q score and anti-reflux medication history.

**Results:** During the study period, 106 and 62 patients were enrolled in the LSG with omentopexy group (LSGO) and LSG without omentopexy group (LSGWO) respectively. The baseline demographics did not significantly differ from each group. The mean age of LSGO group was 37.8 years (standardized deviation[SD] 11.0 years) and that of LSGWO group was 38.4 years[SD 10.9 years] ( $p=0.959$ ). The LSGO and LSGWO groups were comprised of 34.0% and 35.5% men ( $p=0.868$ ). There were no significant differences in surgical outcomes and postoperative complications between two groups. On GERD, there was no significant difference in LA classification and anti-reflux medication proportion between two groups after postoperative 1 year. However, LSGO group showed significantly less GERD-Q score (mean, SD; 6.57, 1.56) than LSGWO group (mean, SD; 7.91, 3.0) ( $p=0.02$ ), which represented less subjective GERD symptoms in LSGO group.

**Conclusion:** People with obesity who underwent laparoscopic sleeve gastrectomy combined with omentopexy showed less GERD symptoms 1 year after operation than those who without omentopexy.



## **METABOLIC AND BARIATRIC SURGERY IN PATIENTS WITH CLASS-1 OBESITY; A TWO-YEAR FOLLOW UP**

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Masoumeh Shamsavan<sup>4</sup>, MSc, Seyyed Adel Maleknia<sup>4</sup>, MD, Foolad Eghbali<sup>1,2</sup>, MD,  
Abdolreza Pazouki<sup>1,2</sup>, MD, Shahab Shahabi Shahmiri<sup>1,2\*</sup>, MD**

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**Background:** The patients with class- 1 obesity may need metabolic and bariatric surgery (MBS) in presence of obesity associated medical problems, but MBS in this class of obesity is under debate.

**Objects:** This study aimed to investigate the efficacy and safety of MBS in patients with class- 1 obesity.

**Methods:** This study was a historical cohort carried out on 112 patients with class- 1 obesity with body mass index (BMI) of 30-35 kg/m<sup>2</sup> with a 24 months follow up underwent MBS at Rasool e-Akram hospital. The required data were extracted through the Iran National Obesity Surgery Database. The data required for the study consisted of demographic information such as age, gender, obesity associated medical problems like type-2 diabetes mellitus (T2DM), hypertension, obstructive sleep apnea, and dyslipidemia before surgery, 6, 12 and 24-month after surgery.

**Results:** Mean age of the patients was 38.10±10.04 years; mean BMI was 32.96±1.35 kg/m<sup>2</sup> and 83.9% (n=94) of patients were female. Out of 18 patients with T2DM, 11 patients had completely remission and seven patients had partially remission. Obstructive sleep apnea, hypertension, dyslipidemia and gastroesophageal reflux disease were observed in 18, 23, 43 and 9 patients before surgery and totally resolved at 24-month follow up. Post-operative complications during 24-month follows up were checked to assess safety and there were no De novo gastroesophageal reflux disease, intolerance, leakage, pulmonary thromboembolism, deep vein thrombosis, incisional hernia, hypoalbuminemia (Albumin <35 g/dl), excessive weight loss (BMI<18.5 kg/m<sup>2</sup>) and mortality. Early complications were occurred as splenic injury in one case (0.89%), wound infection in one patients (0.89%) and extra-luminal bleeding in 10 (8.92%) after surgery, without any mortality.

**Conclusion:** MBS is safe and effective in class- 1 obesity and can be considered in selected patients with obesity associated medical problems.



## SHORT-TERM FOLLOW-UP RESULTS AFTER SLEEVE GASTRECTOMY WITH TRANSIT BIPARTITION (SG-TB) IN DIABETIC PATIENTS WITH BMI < 32.5KG/M<sup>2</sup>

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**Background:** The effectiveness of sleeve gastrectomy with transit bipartition (SG-TB) in lowering total body mass and treating comorbid diseases has been demonstrated. However, there is still a lack of evidence on the efficacy of SG-TB for the treatment of obesity and type 2 diabetes mellitus (T2DM) in Asian patients with BMI < 32.5 kg/m<sup>2</sup>.

**Objectives:** Our study shows that in addition to treating patients with severe diabetes and obesity, SG-TB procedure is also effective in treating patients with diabetes and obesity with low BMI.

**Methods:** Patients' data from October 2019 to May 2022 that underwent SG-TB as primary surgery at our center were analyzed. Patients with T2DM and BMI < 32.5 kg/m<sup>2</sup> were our main criteria. Preoperative and postoperative parameters were as follows: age, BMI, T2DM duration, anti-diabetic medications, fasting plasma glucose (FPG), glycosylated hemoglobin (HbA1c). Follow-up duration was at 1, 3, 6, and 12 months.

**Results:** 28 patients (7 male and 21 female) were included in this study. The mean age and diabetes duration were 34.9 ± 6.1 and 4.5 ± 4.0 years, respectively. The mean preoperative vs postoperative 12-month assessment was as follows: BMI 30.9 ± 1.1 vs 22.2 ± 1.9 kg/m<sup>2</sup>, FPG 9.0 ± 2.6 vs 5.4 ± 1.0mmol/L, HbA1c 8.3 ± 1.6 vs 5.2 ± 0.6%, all reached statistical significance (p value < 0.05).

**Conclusions:** From the short-term follow-up results, and under strict selection criteria, SG-TB can improve and alleviate T2DM in patients with BMI < 32.5 kg/m<sup>2</sup>. Larger sample size and longer follow-up duration will be needed in the future.

Table 1 Patients' postoperative assessment compared with baseline

	Baseline	1 month	3 month	6 month	12 month
BMI (kg/m <sup>2</sup> )	30.9 ± 1.1	27.0 ± 1.4*	24.4 ± 1.6*	22.8 ± 1.4*	22.2 ± 1.9*
FPG (mmol/L)	9.0 ± 2.6	6.1 ± 1.2*	5.7 ± 1.1*	5.5 ± 0.8*	5.4 ± 1.0*
HbA1c (%)	8.3 ± 1.6	6.5 ± 0.9*	5.7 ± 0.9*	5.3 ± 0.5*	5.2 ± 0.6*
Oral Anti-diabetics	26/28	4/28*	2/28*	2/28*	2 / 28 *

\*Significant difference between the particular value compared with the respective baseline value (p value < 0.05).



## DOCTORS' PERCEPTION REGARDING METABOLIC BARIATRIC SURGERY AND MAJOR BARRIERS IN REFERRAL OF PATIENTS WITH SEVERE OBESITY FOR SURGERY IN KHYBER PAKHTUNKHWA

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**Background/Introduction:** Obesity is on the rise worldwide and has emerged as a global health concern. It has presented itself as the leading cause of morbidity, disability, and healthcare utilization. Bariatric surgery is a viable treatment option that offers sustained weight loss and improvement in comorbidities. The aim of this study is to determine the perception of doctors regarding bariatric surgery and the major barriers to the referral of patients with obesity for surgery.

### Objectives:

- 1) To determine perception of doctors about bariatric surgery.
- 2) To know about major barriers in referral of patients with severe obesity for bariatric surgery.
- 3) To spread awareness about surgical management of obesity and hence to improve life of patients with severe obesity.

**Methods:** This study is a cross-sectional descriptive study conducted from November 1, 2022, to December 31, 2022. It involved prospective data collection through online questionnaires filled by doctors practicing in Peshawar. The sampling technique was non-probability convenience-based sampling. The sample size was 152. Doctors from all age groups and both genders were included in our study. Non-consenting doctors and those who were practicing bariatric surgery were excluded. Data were analyzed using a statistical package for social sciences (SPSS) version 25.0 (IBM Inc., Armonk, NY). Categorical variables have been presented as frequencies and percentages. Numerical variables have been presented as mean  $\pm$  SD.

**Results:** A total of 152 doctors participated in our research study; 92 were physicians and 60 were surgeons. The majority of our study participants' patient load per week was  $>75$ . Around 47% believed bariatric surgery was a valuable tool in the treatment of morbid obesity. The most commonly reported barrier to referral was surgical complications or side effects (28.9%).

**Conclusion:** The study concluded that the awareness regarding bariatric and metabolic surgery remains flimsy among the doctor community. Most of the physicians were unaware of the benefits of the surgical management of obesity. They also had doubts regarding the safety of the procedure. We need proper utilization of awareness strategies to overcome these barriers.



## RELAPSE OF DIABETES AFTER SLEEVE GASTRECTOMY AND ROUX-EN-Y GASTRIC BYPASS: A SYSTEMATIC REVIEW AND META-ANALYSIS

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**Background:** Sleeve gastrectomy (SG) and Roux-en-Y gastric bypass (RYGB) are the most common bariatric surgeries for the treatment of obesity and type 2 diabetes mellitus (T2DM). Unfortunately, approximately 20% of patients experience a relapse of diabetes postoperatively. However, no studies systematically compared the risk of diabetes relapse following SG and RYGB, raising controversy regarding the choice of bariatric surgery procedure.

**Objectives:** To compare the relapse risk of T2DM after SG and RYGB.

**Methods:** A systematic review and meta-analysis was performed regarding the relapse of T2DM after bariatric surgery. A literature search was conducted via Embase, PubMed, Web of Science, and Medline to identify eligible studies published before May 2022. The quality of included studies was evaluated by the Newcastle-Ottawa Scale (NOS). The fixed-effects model was selected to combine all estimations in the study. Hazard ratios (HRs) for the relapse risk of T2DM after SG versus RYGB were synthesized by using the generic inverse-variance method. To determine the source of heterogeneity, subgroup analysis and meta-regression were utilized from the following perspectives: age, sex, BMI, hypertension, and duration of T2DM. The publication bias was assessed using funnel plots and Egger's test.

**Results:** A total of 6 retrospective studies published between 2020 and 2022 including 9077 patients (5691 SGs and 3386 RYGBs) who underwent bariatric surgeries were eligible for analysis. The total relapse rate of T2DM was 15.8%. The pooled HR for the relapse of T2DM after SG versus RYGB was 1.60 (1.41-1.82) ( $P < 0.001$ ), indicating that the relapse risk of T2DM after SG is significantly higher than after RYGB. No significant heterogeneity was found in the subgroup analysis and meta-regression. There was no significant asymmetry in the funnel plot and there was no publication bias in the results of Egger's test ( $p = 0.259$ ) for each group.

**Conclusion:** The relapse risk of T2DM is significantly higher after SG compared to RYGB. RYGB may be more appropriate for diabetic patients to prevent postoperative relapse.



## TIMING OF BARIATRIC SURGERY FOR SURGICAL OUTCOMES AND IMPROVEMENT OF TYPE 2 DIABETES

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**Background:** Bariatric surgery can effectively reduce the weight of patients with obesity, improve the metabolic disorder, has proven to be the most effective and enduring method for morbid obesity. Due to long-term obesity status will cause irreversible damage to tissues and organs, therefore, the timing of bariatric surgery is particularly significant.

**Objectives:** To explore the relationship between the timing of bariatric surgery and the effect of postoperative weight loss and the improvement of type 2 diabetes.

**Methods:** A retrospective cohort study was conducted. A total of 130 patients who underwent LSG at Department of General Surgery from February, 2016 to February, 2022 were enrolled. The time interval from reaching the surgical standard to finally undergoing surgery was counted and the median was calculated, and the patients were divided into the early group and the late group. The changes of various indicators and the improvement of type 2 diabetes before and after surgery were observed and analyzed in the two groups. LASSO regression analysis and multivariate logistic regression analysis were used to construct a prediction model for predicting the remission of diabetes at 12 months after surgery. The model was evaluated by drawing the ROC curve, calibration curve and H-L test. Finally, a nomogram was made to visualize the prediction model.

**Results:** A total of 117 patients completed the postoperative follow-up, the time interval of a median of 5.5 years. Reductions in body weight, BMI, and waist circumference were smaller in the early-surgery group than in the late-surgery group. Reductions in fasting blood glucose, glycated hemoglobin, and triglycerides were greater in the early-surgery group than in the late-surgery group at 12 months after surgery, and the remission rate of type 2 diabetes was also higher in the early-surgery group. Age, operation time interval, BMI, fasting C-peptide level, glycosylated hemoglobin and visceral adiposity index were included in the prediction model. The area under the curve was 0.789, and the P value of H-L test was 0.547, indicating that the model had good predictive ability.

**Conclusion:** Invalid for medical treatment of patients with obesity, it is suggested that early selection bariatric surgery treatment, in order to reduce cause irreversible damage to organs, to obtain a better curative effect.





## DIFFERENTIAL PHENOTYPES OF ADIPOSE TISSUE MACROPHAGES AND ADIPOSE TISSUE T CELL REPERTOIRE IN MORBIDLY OBESITY WITH DIABETES

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**Background/Introduction:** It is well known that adipose tissue inflammation contribute to the development of the obesity-associated metabolic syndrome including type 2 diabetes. Major components to regulate adipose tissue inflammation are immune cells including macrophages and T lymphocytes. Although the phenotypic and functional alteration of adipose tissue immune cell population during obesity-induced metabolic syndrome are very well studied in rodent model, characterization of adipose tissue immune cell population in humans with obesity and metabolic syndromes have not been explored.

**Objectives:** To characterize the phenotype of adipose tissue macrophages and adipose tissue T lymphocyte TCR repertoire in humans in relation to obesity and diabetes.

**Methods:** Visceral adipose tissues from humans with obesity collected during bariatric surgery were studied with QRT-PCR, flow cytometry, next-generation sequencing for expression of inflammatory genes, frequency of macrophages and TCR repertoire analysis. Results were correlated with clinical characteristics including diabetes status.

**Results:** Compared to non-diabetic patients with obesity, expression of pro-inflammatory genes and macrophages accumulation was significantly increased in visceral adipose tissue from patients with obesity and diabetes. Among the adipose tissue macrophage populations, pro-inflammatory CD11c+CD206+ macrophages populations were ~two-folds increased in diabetes patients while CD11c+CD206- and CD11c-CD206+ macrophage populations were similar. Furthermore, T-cell receptor repertoire analysis by next generation sequencing demonstrated that adipose tissue T lymphocyte diversity were restricted compared to blood T lymphocytes. Moreover, adipose tissue T cell repertoires were more skewed in diabetic subject compared to non-diabetic patients with obesity.

**Conclusion:** These data are consistent with the hypothesis that adipose tissue macrophages in the context of human obesity contribute the adipose tissue inflammation and are associated with T cell repertoire, with profound effects on systemic metabolism. These findings suggest adipose tissue macrophages and specific T cell repertoire as a potential target to manipulation of obesity-associated metabolic diseases.



## EFFECTS OF SINGLE-ANASTOMOSIS DUODENAL-ILEAL BYPASS WITH SLEEVE GASTRECTOMY ON GUT MICROBIOTA IN RATS WITH TYPE 2 DIABETES MELLITUS

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### ABSTRACT

**Background:** Bariatric and metabolic surgery often leads to significant changes in gut microbiota composition, indicating that changes in gut microbiota after bariatric and metabolic surgery might play a role in ameliorating type 2 diabetes mellitus (T2DM). However, the effects of single-anastomosis duodenal-ileal bypass with sleeve gastrectomy (SADI-S) on gut microbiota in T2DM remain unclear.

**Objectives:** To investigate the effects of SADI-S on gut microbiota in T2DM rats.

**Methods:** Nineteen T2DM rats were randomly divided into the SADI-S group (n = 10) and the sham operation with pair-feeding group (sham-PF, n = 9). Fecal samples were collected to analyze the gut microbiota composition with 16S ribosomal DNA gene sequencing. The fasting blood glucose and glycated hemoglobin were measured to evaluate the effects of SADI-S on glucose metabolism.

**Results:** The ACE and Chao index values were significantly lower in the SADI-S group than in the sham-PF group, indicating that species richness was significantly lower in the SADI-S group than in the sham-PF group ( $p < 0.05$ ) (Fig.1). Compared with the sham-PF group, the SADI-S group showed significantly lower Shannon index and higher Simpson index values, indicating that the species diversity was significantly lower in the SADI-S group than in the sham-PF group ( $p < 0.05$ ) (Fig.1). At the genus level, SADI-S significantly changed the abundances of 33 bacteria, including the increased anti-inflammatory bacteria (*Akkermansia* and *Bifidobacterium*) and decreased pro-inflammatory bacteria (*Bacteroides*). SADI-S significantly decreased the fasting blood glucose and glycated hemoglobin levels. The blood glucose level of rats was positively correlated with the relative abundances of 12 bacteria, including *Bacteroides*, and negatively correlated with the relative abundances of seven bacteria, including *Bifidobacterium* (Fig.2).

**Conclusions:** SADI-S significantly altered the gut microbiota composition of T2DM rats, including the increased anti-inflammatory bacteria (*Akkermansia* and *Bifidobacterium*) and decreased pro-inflammatory bacteria (*Bacteroides*). The blood glucose level of rats was positively correlated with the abundances of 12 bacteria, including *Bacteroides*, but negatively correlated with the relative abundance of seven bacteria, including *Bifidobacterium*. These alternations in gut microbiota may be the mechanism through which SADI-S improved T2DM. More studies should be performed in the future to validate these effects.



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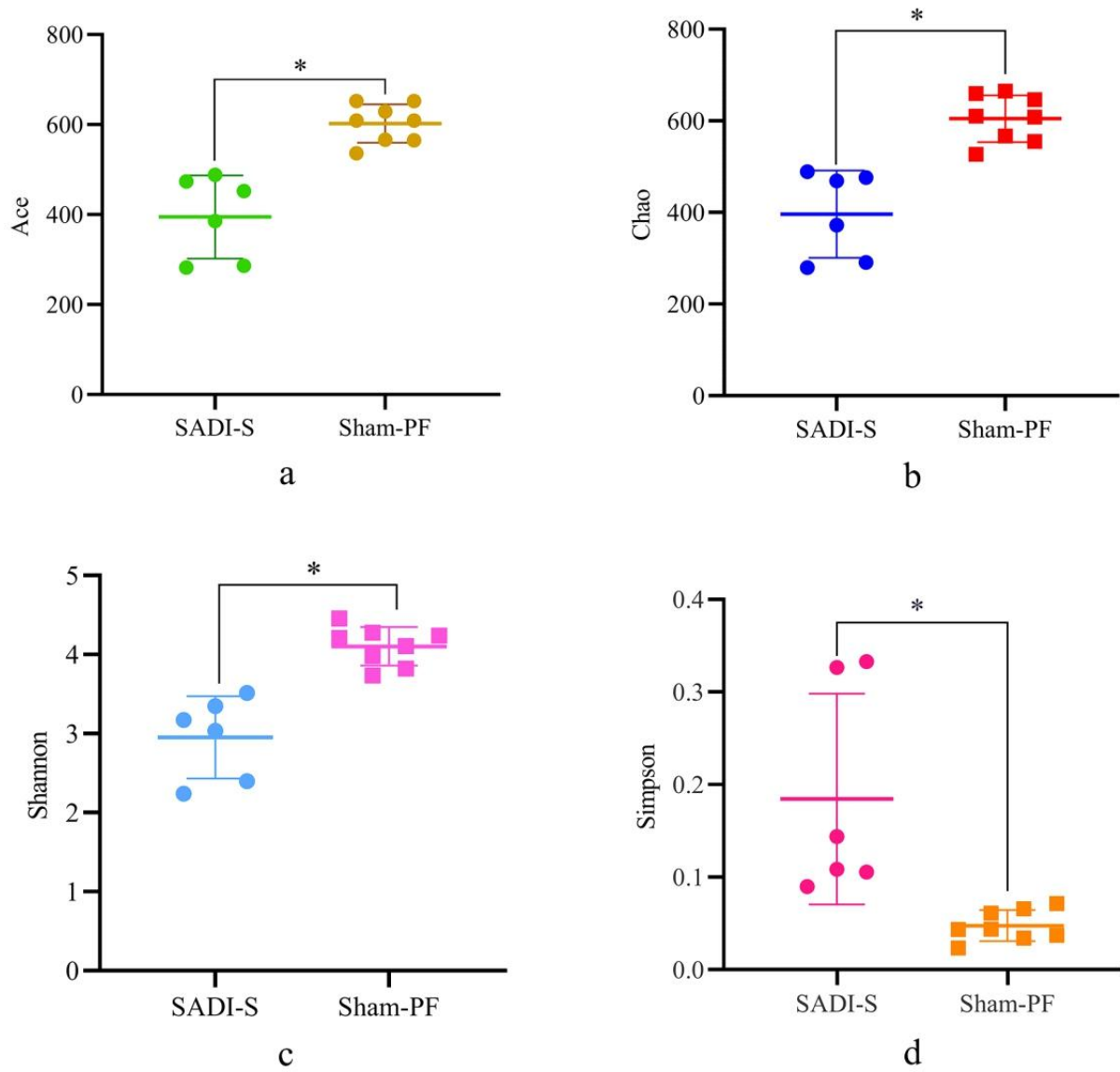


Figure 1. Comparison of the  $\alpha$ -diversity of the gut microbiota. Changes in the ACE (a), Chao (b), Shannon (c), and Simpson (d) indices in the two groups 8 weeks postoperatively.

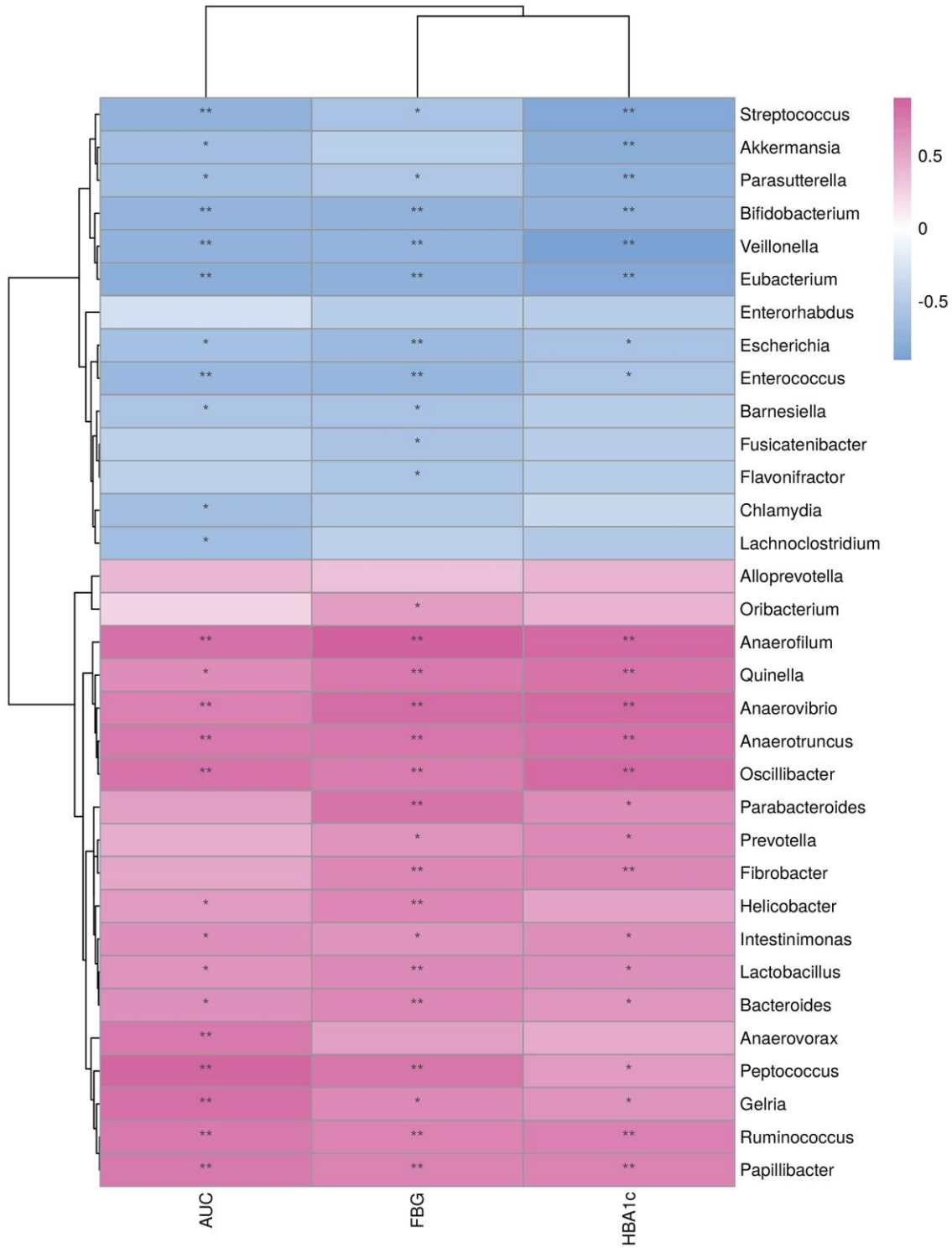


Figure 2. Relationship between the differential genera and metabolic variables. \* $p < 0.05$ . \*\* $p < 0.01$ . FBG, fasting blood glucose; AUC, area under the curve of the blood glucose level in intraperitoneal glucose tolerance test; HBA1c, glycated hemoglobin.



## THE ROLE OF PREOPERATIVE $\beta$ -CELL FUNCTION IN PREDICTING TYPE 2 DIABETES REMISSION AFTER METABOLIC AND BARIATRIC SURGERY

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**Background:** Metabolic and Bariatric surgery (MBS) is more effective than conventional treatment for the short-term control of type 2 diabetes mellitus (T2DM). However, late relapse of T2DM can be seen following the procedures. The determinants of T2DM remission and/or relapse remain unknown.

**Objective:** The insulin resistance and  $\beta$ -cell dysfunction are key features of T2DM. The objective of this study was to evaluate preoperative  $\beta$ -cell function in the prediction of long-term T2DM remission.

**Methods:** Between May 2016 and June 2017, 21 T2DM patients with obesity underwent a 3-hour hyperglycemic clamp study (glucose 5.4nM above basal) before surgery. After that, they received surgery by Roux-en-Y gastric bypass or single-anastomosis duodeno-ileal switch. The participants had 5-year interview. T2DM status was determined by interview and evaluation of the diabetic medications. Patients with complete remission or recurrence of T2DM were identified.

**Results:** Of the 21 patients, 12 (57.1%) had complete remission of T2DM, while 9 patients (42.8%) did not have T2DM relapse 5 years post operation. Compared with the recurrent cases, patients with durable T2DM remission had a higher basal insulin secretion ( $260.9 \pm 217.6$  vs.  $86.5 \pm 30$  pmol/L,  $p < 0.05$ ), first-phase insulin secretion ( $1244 \pm 1057.4$  vs.  $429.4 \pm 136.6$  pmol/L,  $p < 0.05$ ), and second-phase insulin secretion ( $423.7 \pm 294$  vs.  $152.5 \pm 69.2$  pmol/L,  $p < 0.05$ ).

**Conclusions:** Preoperative  $\beta$ -cell function in patients with T2DM is important for the outcome of MBS. Hyperglycemic clamp examination before MBS was useful in determining the prognosis of patients with long duration or poorly controlled diabetes mellitus

**Keywords:**

obesity; Type 2 Diabetes; Metabolic and Bariatric surgery;  $\beta$ -cell dysfunction; Remission



## MACHINE LEARNING FOR PREDICTING FACTORS ON TYPE 2 DIABETES REMISSION AFTER METABOLIC BARIATRIC SURGERY

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**Background:** There are several prediction models for type 2 diabetes remission after bariatric metabolic surgery. However, accurate prediction is still challenging because of the complexity of factors involved in diabetes remission.

**Objectives:** We aimed to reveal the factors for diabetes remission, employing a machine learning model, extreme gradient boosting (XGBoost).

**Methods:** We analyzed 56 feature values (clinical parameters) in 274 Japanese patients with severe obesity and type 2 diabetes who underwent sleeve gastrectomy in our center between January 2007 and December 2020. The feature values include preoperative clinical information, including blood biochemistry findings, obesity-related disorders, and visceral and subcutaneous fat areas derived from computed tomography. SHapley Additive exPlanations (SHAP) values were calculated to show the importance of the values.

**Results:** 87.6% of the patients showed clinical remission, HbA1c<6.5 without medications at one one-year follow-up period. The predicting model using XGBoost demonstrated good discrimination; the area under the receiver operating characteristic curve (AUC) was 1.0. The highest importance variables were duration of diabetes, followed by gamma-glutamyl transpeptidase (GGT), the visceral and subcutaneous fat area ratio, C-peptide index, alkaline phosphatase (ALP), visceral fat area, and age. Of note, higher GGT and higher ALP, known as markers for non-alcoholic fatty liver disease (NAFLD), and lower visceral fat area were positive predictors for diabetes remission.

**Conclusion:** Not only variables related to preserved beta-cell function but also NAFLD and visceral fat were important factors for predicting diabetes remission in our model. Validation in other datasets is needed to ensure universal applicability because the AUC=1.0 suggests overfitting.



## HEALTH-RELATED QUALITY OF LIFE SCORE AT ONE YEAR AFTER BARIATRIC SURGERY: A COMPARISON WITH PUBLISHED POPULATION NORM

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**Background:** Improvement in health-related quality of life (HRQoL) after bariatric surgery is well known. Whether the improved HRQoL is similar to the general population is less widely reported.

**Objectives:** To evaluate one-year HRQoL score in adults received bariatric surgery in a tier two center and compare with published normative value in general population<sup>1</sup> of the same age group.

**Methods:** Consecutive surgical patients from January 2016 to November 2017 were included. Patients were invited to complete SF-36 questionnaire before and at one year after operation. Mean SF-36 score at one year was compared with published age specific normative value in local population. Data were retrieved from a prospectively collected database and expressed as mean with standard deviation. Statistical analysis was done by SPSS 22 using Paired sample T test, Wilcoxon Signed-Rank for non-parametric and One Sample T test for parametric data. A significance level was defined as  $p \leq 0.05$ .

**Results:** Thirty-nine patients were included with slight female predominance (53.8%). Mean age was 45.7 ( $\pm 8.1$ ) years old. Baseline body weight was 106.9 ( $\pm 15.6$ ) Kg. Thirty-seven (94.9%) patients underwent laparoscopic sleeve gastrectomy and two (5.1%) had RY Gastric Bypass. Excess weight loss at one year was 76.0 ( $\pm 25.4$ ) %.

Significant increment in SF-36 score were observed in all health domains (Table 1). In domains measuring General Health, Mental Health and Role Limitation due to Emotional Problem, patients had significantly higher score than the population mean while no significant difference in remaining domains were observed (Figure 1).

**Conclusion:** Patients can achieve similar HRQoL score as the general population at one year after bariatric surgery.

Ref:

1. Lam CLK, Lauder IJ, Lam TP, Gandek B. Population based norming of the Chinese (HK) version of the SF-36 health survey. *Hong Kong Pract.* 1999;21(10):460-470.



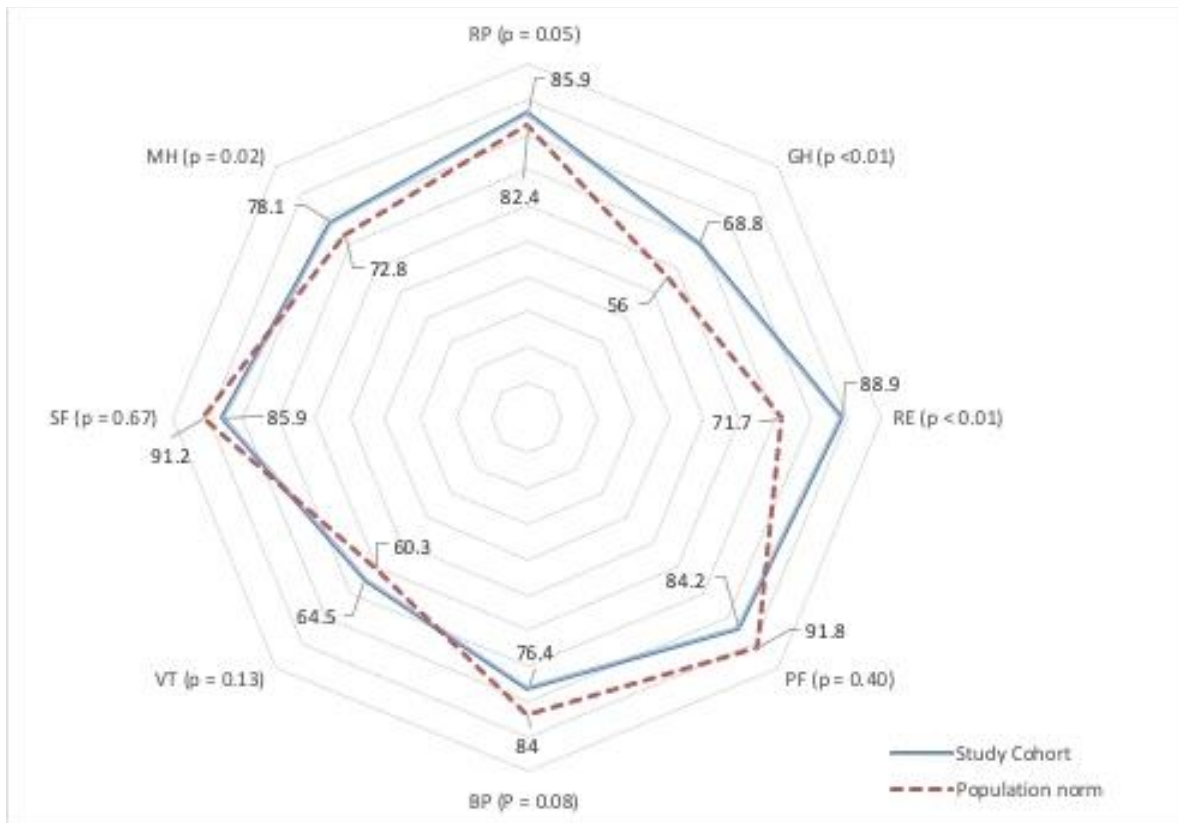
**O-46**

Table 1. Summary of One-year SF-36 score

Health Domain	Baseline	One year	Increment	95% Confidence Interval	Population Mean
Role limitation due to physical health (RP)	42.1 (39.7)	85.9 (28.0)	43.8 (44.3)	29.4 - 58.1	82.4 (31.0)
General health (GH)	36.4 (18.5)	68.8 (22.7)	32.4 (24.8)	24.5 - 40.5	56.0 (20.2)
Role limitation due to emotional problem (RE)	59.8(41.3)	88.9 (23.3)	29.1 (42.7)	15.2 - 42.9	71.7 (38.4)
Physical functioning (PF)	56.0 (28.0)	84.2(20.9)	28.2 (29.3)	29.4 - 58.1	91.8 (12.9)
Bodily Pain (BP)	55.8 (25.2)	76.4(24.0)	20.6 (23.7)	12.9 - 28.	84.0 (21.9)
Vitality (VT)	48.3 (15.7)	64.5 (16.8)	16.2 (19.8)	9.7 - 22.6	60.3 (18.7)
Social functioning (SF)	70.3 (24.8)	85.9 (23.0)	15.6 (24.0)	7.87 - 23.4	91.2 (16.5)
Mental Health (MH)	63.7 (18.2)	78.1 (13.1)	14.4 (19.5)	8.1 - 20.8	72.8 (16.6)

Values expressed as mean (standard deviation)

Figure 1. One-year mean SF-36 score with population norm







## THE ASSOCIATIONS BETWEEN ADVERSE CHILDHOOD EXPERIENCES AND BMI AMONG CHINESE UNIVERSITY STUDENTS: AN ANALYSIS STRATIFIED BY CULTURAL BACKGROUND AND GENDER

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**Background/Introduction:** Experiencing adverse childhood experiences (ACEs) are linked to childhood and adulthood weight status. However, research examining these associations is scarce in Chinese young adults.

**Objectives:** This study aimed to examine the relationships between ACEs subtypes and BMI using an analysis stratified by cultural background and gender among Chinese university students.

**Methods:** A total of 2014 Chinese university students aged 20.38 (SD=2.02) participated in the study. BMI was calculated utilizing self-reported weight and height data, and categorized into four classifications: underweight, normal weight, overweight and obesity. ACEs were measured with Childhood Trauma Questionnaire. Multinomial logistic regression analyses were performed to investigate the association between ACEs and BMI status. Our analyses were stratified by culture background and gender.

**Results:** 518 (25.72%), 187 (9.29%), and 56 (2.78%) participants were categorized as underweight, overweight, and with obesity, respectively. 996 (49.45%) and 346 (17.18%) participants reported 1-2 and 3-5 types of ACEs, respectively. After adjusting for demographic covariates, compared to those in the normal weight category, the finding indicated that the participants from rural areas of mainland China who had experienced ACEs were more prone to report being underweight (OR=1.75, 95%CI: 1.139-2.689) and less likely to develop obesity (OR=0.22, 95%CI: 0.053-0.895); those who had experienced physical neglect were more likely to report being underweight (OR=1.50, 95%CI: 1.005-2.226); those who had experienced 1-2 types of ACEs were more prone to report being underweight (OR=1.91, 95%CI: 1.222-2.985) and less likely to develop obesity (OR=0.15, 95%CI: 0.025-0.906). For participants from urban areas of mainland China experiencing emotion neglect were less likely to develop obesity (OR=0.63, 95%CI: 0.425-0.914). For participants from non-mainland China experiencing sexual abuse were more prone to report being underweight (OR=2.49, 95%CI: 1.36-4.57). Gender stratified analysis further revealed that females with 1-2 types of ACEs were more prone to report being underweight (OR=1.33, 95%CI: 1.026-1.733).

**Conclusion:** ACEs were shown to be directly associated with underweight and inversely associated with obesity among Chinese university students. Longitudinal analyses are recommended to investigate the casual factors and the mechanisms elucidate these associations. Urgent actions in developing effective interventions and providing related prevention counseling for university students are needed.



## TOTAL WEIGHT LOSS INDUCES THE ALTERATION OF THYROID FUNCTION AFTER BARIATRIC SURGERY

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**Background:** Bariatric surgery is one of the most effective strategies for obesity, which may affect thyroid function. However, the postoperative alteration of thyroid hormones and the relationship between thyroid function and weight loss still remain controversial.

**Objectives:** To evaluate the alteration of thyroid hormones 1 year after bariatric surgery and explore the association between thyroid-stimulating hormone (TSH) and percentage of total weight loss (%TWL).

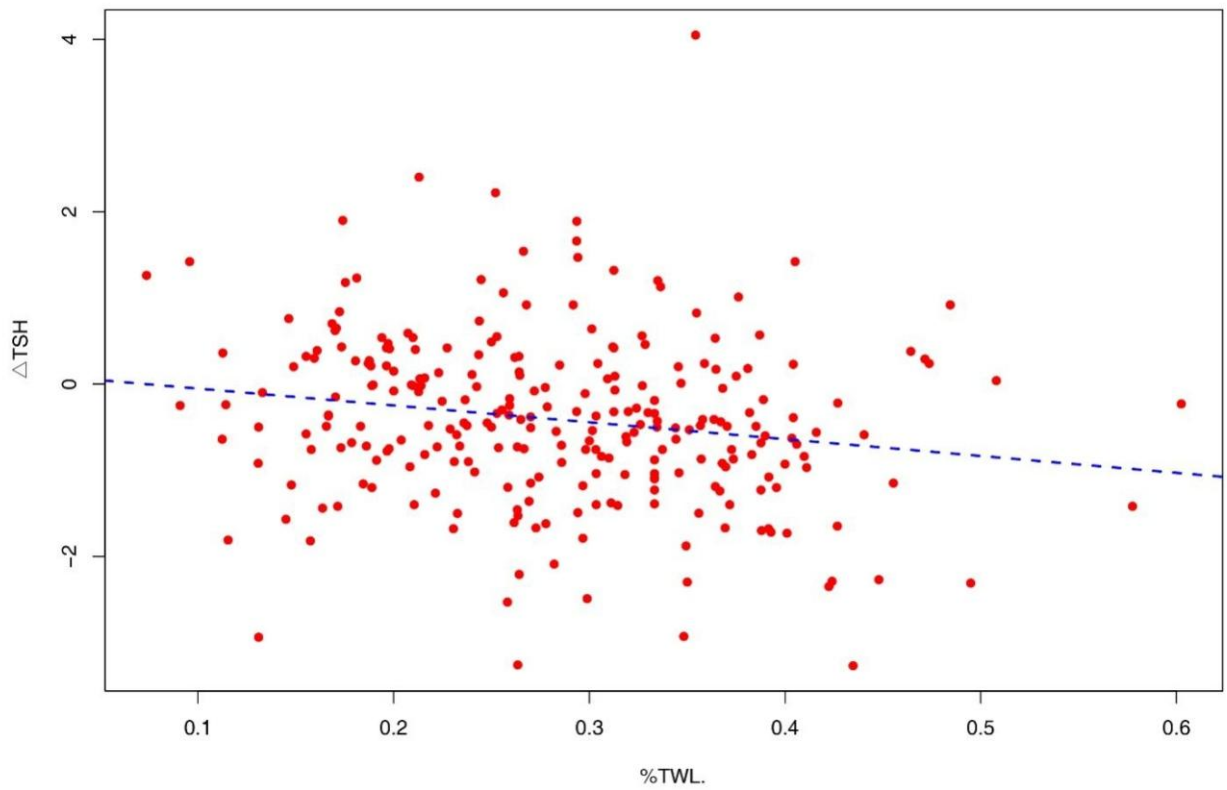
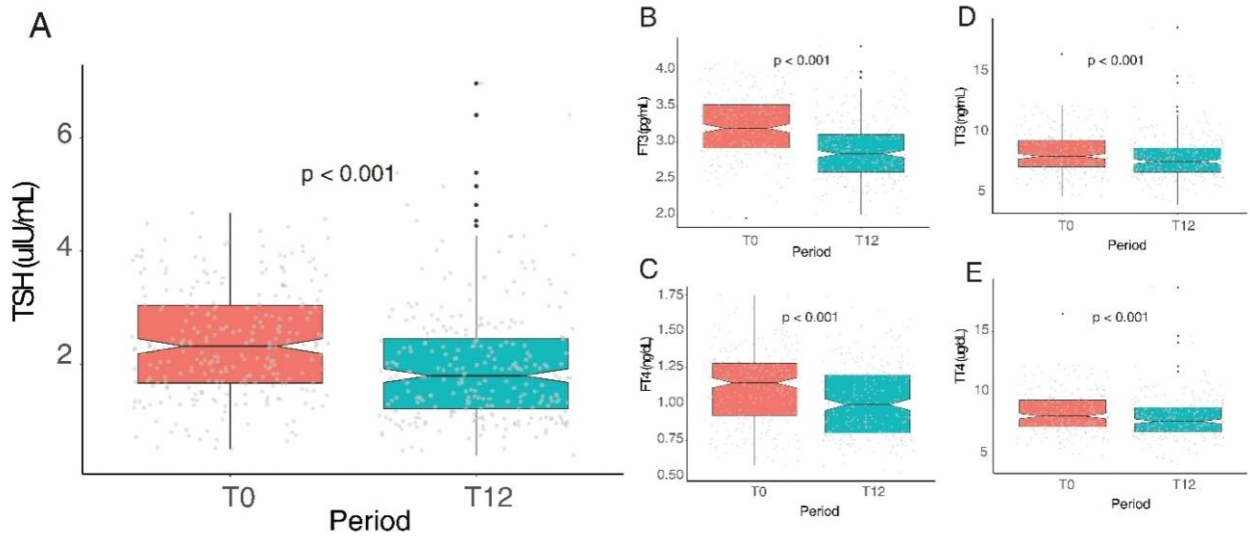
**Methods:** Data was retrospectively collected from euthyroid patients with obesity who underwent sleeve gastrectomy and Roux-en-Y gastric bypass in China-Japan Friendship Hospital between 2017 and 2022. Alterations of free thyroxine (FT4), free triiodothyronine (FT3), total thyroxine (TT4), total triiodothyronine (TT3), and TSH were calculated by subtracting 1-year follow-up data from preoperative data. Pearson correlation coefficients (PCCs) were utilized to assess the relationship between  $\Delta$ TSH and %TWL. The anthropometric data and biochemical parameters were included in the univariate and multivariate linear regression to explore the relationship between  $\Delta$ TSH and %TWL.

**Results:** A total of 262 patients were included in our study. The mean %TWL was 28.3% after 1 year. The TSH decreased from 2.31 [1.66, 3.03] uIU/mL to 1.79 [1.19, 2.46] uIU/mL ( $P < 0.001$ ), FT3 decreased from  $3.23 \pm 0.43$  pg/mL to  $2.88 \pm 0.41$  pg/mL ( $P < 0.001$ ), FT4 decreased from  $1.11 \pm 0.25$  ng/dL to  $1.02 \pm 0.25$  ng/dL ( $P < 0.001$ ), TT3 decreased from 1.13 [0.99, 1.25] ng/mL to 0.89 [0.78, 1.00] ng/mL ( $P < 0.001$ ), and TT4 decreased from  $8.28 \pm 1.68$  ug/mL to  $7.80 \pm 1.69$  ug/mL 1 year postoperatively. %TWL was found to be significantly correlated to the  $\Delta$ TSH (PCC=-0.182,  $P = 0.003$ ), indicated that the more weight loss, the more TSH is declined. In multivariate analysis, %TWL after 1 year was found to be significantly associated with  $\Delta$ TSH ( $\beta = -0.140$ ,  $P = 0.027$ ). After, separate %TWL into 3 categorical groups ( $\%TWL \leq 25\%$ ,  $25\% < \%TWL \leq 35\%$ , and  $\%TWL > 35\%$ ), The %TWL group was also a predictor of  $\Delta$ TSH ( $\beta = -0.119$ ,  $P = 0.034$ ).

**Conclusion:** TSH, FT4, FT3, TT4, and TT3 decrease after bariatric surgery. Total weight loss will induce the alteration of TSH postoperatively.



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# Video Presentations



V-01

## REVISIONAL ENDOSCOPIC SLEEVE GASTROPLASTY FOR INSUFFICIENT WEIGHT LOSS AFTER SLEEVE GASTRECTOMY

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*<sup>1</sup>Department of Surgery, Prince of Wales Hospital*

**Background/Introduction:** Weight gain or insufficient weight loss after laparoscopic sleeve gastrectomy (LSG) can occur in 14-37% patients and is frequently associated with sleeve dilatation. Revisional surgery, including resizing the gastric sleeve or conversion to bypass, carries a significant rate morbidity and is often turned down by patients.

**Objectives:** Here we describe a case of novel revisional procedure by means of endoscopic sleeve gastroplasty for insufficient weight loss after laparoscopic sleeve gastrectomy.

**Methods:** A 61-year-old lady with initial BMI 37.2 and medical comorbidities including DM, HT, dyslipidemia and OSA, received laparoscopic sleeve gastrectomy in 2018. Postoperatively she had insufficient weight loss and gradual recurrent weight gain. At 4 years, her body weight (BW) was 89.4kg and excess weight loss (EWL) after surgery was 26%. Subsequent barium meal and upper endoscopy showed dilated gastric sleeve. Revisional endoscopic sleeve gastroplasty (R-ESG) was chosen by the patient after detailed discussion.

Procedure was performed under general anesthesia in endoscopy center. A therapeutic oesophagogastroduodenoscopy (OGD) equipped with endoscopic suturing device was used. Total 5 stitches, including 3 U-shape stitches and 2 reinforcement stitches were applied to reshape into a narrow gastric sleeve. Total procedure time was 87 mins. Patient recovered well postoperatively and was discharged 3 days after operation. No adverse event occurred.

**Results:** At 6 months after R-ESG, patient achieved the best weight loss since she received laparoscopic sleeve gastrectomy. EWL was 44% from baseline and 24% from R-ESG. No acid reflux was reported.

**Conclusion:** R-ESG is a safe and effective revisional procedure for patients with insufficient weight loss after LSG. Long term outcome is required to assess its durability.



## EMERGENCY DISTAL GASTRECTOMY AND ROUX-EN-Y BYPASS FOR COMPLEX

**Thomas Vu<sup>1</sup>, Baxter Smith<sup>1</sup>, Aaditya Narendra<sup>1</sup>, Richard Chen<sup>1</sup>, Paul Burton<sup>1,2</sup>**

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**Background/Introduction:** The incidence of staple line leak following primary sleeve gastrectomy has been reported to range between 1-4% with a 30-day mortality of 9.7%. The surgical management of sleeve leak often involves drainage of the contamination and staple line oversewing or patching. However, more extensive surgical management may be required for complex sleeve leaks.

We report a case of a 26-year-old male patient with a complex sleeve leak and a concurrent perforated duodenal ulcer. He was successfully managed with a single stage laparoscopic distal gastrectomy, oversew of the duodenal perforation and a Roux-en-Y bypass.

**Methods:** The 26-year-old male patient was transferred to our institution with generalized peritonitis 10 days following a primary sleeve gastrectomy at another hospital.

He had a complex sleeve leak including 2 separate staple line defects at the proximal apex and gastric antrum; a spiral staple line causing incisura stricture; as well as a perforated duodenal ulcer resulting in partial gastric outlet obstruction. He proceeded to a laparoscopic distal gastrectomy, oversew of the duodenal ulcer perforation and a Roux-en-Y bypass.

Using video illustration, we aim to describe the presentation, radiological features, and operative findings; as well as highlight the anatomy of the sleeve leak and discuss the decision-making process during surgery.

**Results:** The patient recovered well from the sepsis post-operatively. He underwent a further gastroscopy to place a pigtail drain into the apical defect to form a control fistula. He has since been discharged and attended a subsequent outpatient follow-up review.

**Conclusion:** Staple line leaks following sleeve gastrectomy can be highly complex and more aggressive surgery, including an acute conversion to Roux-en-Y gastric bypass, may be needed for the initial management.



## A NEW TECHNIQUE FOR JEJUNAL TUBE INSERTION DURING LAPAROSCOPIC CONVERSION OF ONE ANASTOMOSIS GASTRIC BYPASS (OAGB) TO ROUX-EN-Y GASTRIC BYPASS (RYGB) DUE TO ANASTOMOSIS LEAKAGE

**Shahab Shahabi Shahmiri<sup>1</sup>, Nariman Mehrnia<sup>1,2</sup>, Fahime Yarigholi<sup>1</sup>, Abdolreza Pazouki<sup>1</sup>, Mohammad Kermansaravi<sup>1</sup>**

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**Key points:** Leakage stands as one of the severe postoperative complications of OAGB. A standardized method for treating leaks in OAGB has not yet been introduced. Conversion to RYGB, insertion of a jejunostomy tube, and drainage have yielded promising results.

**Background:** OAGB has become one of the popular bariatric surgeries due to its technical simplicity and efficacy in promoting both weight loss and the resolution of obesity-related diseases. However, a severe postoperative complication of OAGB is leakage. Many patients with postoperative leakage require surgical management. Despite this, a standard method for treating post-operative OAGB leakage has not yet been introduced.

**Objective:** Conversion to RYGB and jejunostomy tube insertion are among the favored methods to address this issue. One of the primary challenges during jejunostomy placement is the difficulty of delivering the jejunum loop to the abdominal wall due to inflammation and strong adhesions in the peritoneal space. These factors can potentially heighten the risk of leakage around the jejunostomy tube. In this article, we present a novel method that addresses this problem within our high-volume tertiary center.”

**Patient and Method:** A 41-year-old woman (BMI: 42 kg/m<sup>2</sup>) was readmitted with right upper quadrant (RUQ) abdominal pain and tachycardia 12 days after OAGB. An abdominal CT scan revealed moderate free fluid and peritoneal thickening. A decision was made to perform explorative laparoscopy.

First intraperitoneal cavity was washed and all collections were suctioned. The leakage site at the gastrojejunal anastomosis was identified and repaired, with coverage provided by an omental flap. In the previous operation, the length of the biliopancreatic limb was considered to be 165 cm. In the second operation, the length of the biliopancreatic limb changed to 150 cm. The alimentary limb length was measured at 70 cm, and an enterotomy was performed with a longer stump of the biliopancreatic limb for tube jejunostomy insertion. Approximately 15 cm proximal to the gastrojejunal anastomosis, an entero-enterostomy was created at a distance of 150 cm from the ligament of Treitz.

A jejunojejunal anastomosis was fashioned in a side-to-side manner. The afferent limb was horizontally divided close to the gastrojejunal anastomosis, with a longer biliopancreatic limb stump proximal to the jejunojejunal anastomosis. Subsequently, we performed a purse-string suture in the biliopancreatic limb stump using 3/0 Vicryl, and a 22 French Foley catheter was inserted. With this technique, the jejunostomy tube was easily advanced and secured to the abdominal wall without tension.

A tube jejunostomy was inserted into this section of the small bowel through the left subcostal 5 mm port site and guided to the common channel. Finally, three drains were placed (in the pelvic cavity, subhepatic region, and left side of the anastomosis). Our patient was prescribed broad-spectrum antibiotics. She was discharged 10 days after the second operation, and we removed the pelvic drain simultaneously. The other two drains and the jejunostomy tube were removed three weeks after the



## V-03

operation.

**Result:** We managed several patients with leakage after OAGB, all of whom were successfully discharged and treated using this technique. No cases of leakage at the jejunostomy site were observed in patients. Conversion to RYGB and tube jejunostomy insertion is a technically safe and feasible option. However, studies with larger sample sizes should be conducted to confirm the effectiveness of this method.

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## LAPAROSCOPIC REVERSAL OF RYGB DUE TO CHRONIC ROUX LIMB OBSTRUCTION

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**Background/Introduction:** Laparoscopic RYGB reversal is a complex procedure that is usually done for severe malnutrition and intractable hypoglycemia. We describe a video presentation of a patient with severe malnutrition due to chronic Roux limb obstruction.

**Case report:** We describe a video presentation of a patient with severe malnutrition due to chronic Roux limb obstruction. Patient had undergone a laparoscopic gastric bypass (BP limb: 100cm, Roux limb: 120cm) for morbid obesity (BMI: 46, weight:127kg) in January 2019. 1 year postoperatively, her weight significantly dropped to 59kg with a BMI of 21 and had signs and symptoms of malnutrition. She had admissions requiring parenteral nutrition supplementation for her malnutrition. Patient underwent full workup including laboratory, upper gastrointestinal contrast study, upper endoscopy and a diagnostic laparoscopy prior to planned reversal. Reversal of RYGB was carried out fully laparoscopically on March 2023. Postoperative diagnosis was chronic Roux limb obstruction 2<sup>nd</sup> chronic jejunojejunostomy stricture. Patient was discharged well after procedure. Upon follow-up, patient's weight and nutrition significantly improved after the reversal procedure.

**Conclusion:** Reversal of RYGB is indicated in select group of patients. Patients need to be thoroughly worked up and surgery must be carried out in a high-volume center for best outcomes.



## REVERSAL TO NORMAL ANATOMY OF A RYGB FOLLOWING A PRIMARY OAGB PROCEDURE: A VIDEO CASE REPORT

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Reversal of primary gastric bypass procedures to normal anatomy has been reported previously for severe malnutrition, postprandial hypoglycemia or marginal ulcers. This report is the first account of reversal of a revision RYGB (Roux-en Y Gastric bypass) done after a primary OAGB (One-anastomosis Gastric Bypass) procedure. The current case (49 year-old female, BMI = 31.25 kg/m<sup>2</sup>) underwent reversal of revision RYGB in view of inadequate oral intake, recurrent marginal ulcers and chronic abdominal pain. Reversal of revision bypass procedures is associated with greater technical difficulties than encountered for primary bypass procedures; primarily due to increased intra-abdominal adhesions and more dramatic variation from the normal bowel anatomy. The current case underwent a gastrogastic anastomosis with resection of Roux limb of RYGB, so as to leave behind a continuous channel of 600 cm involving the original biliopancreatic limb and the original common channel. At 3-month follow-up, she reports a stable weight profile with complete resolution of the recurrent chronic abdominal pain and a significant decrease in hypoglycemic episodes. orked up and surgery must be carried out in a high-volume center for best outcomes.



V-06

## CONVERSION FROM SLEEVE GASTRECTOMY TO ROUX EN Y GASTRIC BYPASS ASSOCIATED WITH HIATAL HERNIA REPAIR REINFORCED WITH BIOABSORBABLE MESH

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**Introduction:** Gastroesophageal Reflux Disease (GERD) is a late complication of sleeve gastrectomy (SG) that occur in 20 to 30 % of patient, often associated with hiatal hernia (HH) in more than 50 % of the case.

GERD impair oral intake increasing the risk of recurrent weight gain and obesity recurrence.

SG to Roux en Y Gastric Bypass (RYGB) revision surgery is the reference treatment of this condition.

Robotic approach carries a real advantage to undergo this laparoscopic challenging procedure.

**Objectives:** Redo surgery to treat GERD as a complication of bariatric surgery and recurrence of obesity disease

**Methods:** Full robotic redo surgery: Conversion from SG to RYGB and hiatal hernia repair with a bioabsorbable prosthetic mesh.

**Results:** Post operative course went uneventful with no short and long term complication. Successful surgical procedure with total weight loss of 17 % at 3 month and improvement in GERD symptoms with complete cessation of PPI medication.

**Conclusion:** Full robotic Sleeve Gastrectomy to Roux en Y Gastric Bypass associated with hiatal hernia repair with a bio absorbable prosthetic mesh is safe and effective to treat obesity recurrence and GERD.



V-07

## SINGLE PORT SLEEVE WITH GASTRIC SUSPENSION TECHNIQUE IN HIGHER BMI PATIENT

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### **Abstract**

**Background:** Single-port laparoscopic sleeve gastrectomy (SG) is a technique that is exciting as it resulted in less scarring. However, adequate skills are needed as to achieved the intended therapy goal, that is adequate gastric sleeve resection and safety of the operation.

**Objectives:** Here, we share our involvement in performing Single-port SG using a minimally invasive gastric suspension method. We retract the liver as well as the gastric body using a modified T-Tube catheter and suture thread.

**Methods:** The patient was a male, 31 years old, BMI 48 kg/m<sup>2</sup>, and with preoperative diagnosis of Metabolic syndrome, type-2 diabetes mellitus, sleep apnea, hyperinsulinemia, dyslipidemia, and hyperemia.

**Results:** The procedure took approximately 1 hour and 40 minutes, the procedure went well without the need for drainage placement. The patient was discharged at the third postoperative day.

**Conclusions:** The gastric suspension method is easy and feasible. It increases the safety and quality of the single-port laparoscopic SG procedure, without extensive increase in surgical cost. We acknowledged that more study will be needed before promoting this technique.



V-08

## LAPAROSCOPIC REMOVAL OF GASTRIC BANDING, SLEEVE GASTRECTOMY AND DUODENO-JEJUNAL BYPASS

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<sup>1</sup> *Department of Surgery, United Christian Hospital, Hong Kong S.A.R, China*

**Background/Introduction:** Hereby we would like to present our video on a revisional surgery. Our patient was a 55 years old lady with morbid obesity at BMI 37.

She had history of hypertension and severe sleep apnea.

15 years ago she had received laparoscopic gastric banding for weight control, yet the control was suboptimal.

As she prefer more profound and sustainable weight loss, she opted for malabsorptive type bariatric surgery.

We therefore had performed removal of gastric banding and sleeve plus procedure for her.

This video showed the pre op investigation results, intraoperative video on how we performed laparoscopic sleeve gastrectomy and duodeno-jejunal bypass procedure, in a total intracorporal manner using double-loop technique.

We aimed to share our experience on the procedure.cost. We acknowledged that more study will be needed before promoting this technique.



# Poster Presentations



P-01

## COMPARISON OF TYPE 2 DIABETES REMISSION BETWEEN ROUX-EN-Y GASTRIC BYPASS AND SLEEVE GASTRECTOMY PLUS DUODENOJEJUNAL BYPASS

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**Background/Introduction:** Although sleeve gastrectomy has become the most commonly performed bariatric surgery, the clinical significance of procedures that include a “bypass component”, especially for patients with a long duration of diabetes, still remains. While Roux-en-Y gastric bypass (RYGB) has been regarded as a standard procedure for diabetes, there have been concerns about remnant gastric cancer. Therefore, sleeve gastrectomy plus duodenojejunal bypass (SG-DJB) has also gained some popularity.

**Objectives:** This study aims to compare diabetes remission of the RYGB and SG-DJB

**Methods:** A prospectively maintained database was analyzed. Patients who had type 2 diabetes and underwent either RYGB (n=79) or SG-DJB (n=81) were included. Surgical outcomes including weight loss and diabetes control were collected and compared between the two procedures. Modified ABCD score was used to determine diabetes severity at baseline and predictors for complete remission of diabetes at 12-month after surgery were also analyzed.

**Results:** In baseline analysis, preoperative BMI was  $40.2 \pm 6.8$  kg/m<sup>2</sup> in the RYGB group and  $35.9 \pm 4.7$  kg/m<sup>2</sup> in the SG-DJB group ( $p < 0.001$ ). Duration of diabetes was  $2.4 \pm 3.4$  years and  $4.2 \pm 4.2$  years in each group ( $p = 0.002$ ) and ABCD scores were  $7.2 \pm 2.1$  and  $5.7 \pm 2.1$  in the two groups ( $p < 0.001$ ). %TWL at 12-month were  $25.6 \pm 7.6$  % in RYGB group and  $25.4 \pm 9.6$  % in SG-DJB group ( $p = 0.920$ ). Rate of partial or complete remission were 82.9 % and 76 % in each group. Multivariate analysis showed that baseline BMI, duration of diabetes, C-peptide, HbA1c, insulin use were independent predictors of diabetes remission.

**Conclusion:** SG-DJB achieved comparable outcomes of diabetes control at 12-month compared to RYGB in Korean diabetic patients. Factors of the ABCD score, not the type of surgical procedure served as predictors of remission of type 2 diabetes.



## DUODENAL-JEJUNAL BYPASS LINER FOR OBESITY AND TYPE 2 DIABETES: A NOVEL TREATMENT?

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**Purpose:** The duodenal-jejunal bypass liner (DJBL) is a novel endoscopic bariatric therapy for patients with obesity and type 2 diabetes. However, it remains controversial as an alternative bariatric treatment option. The aim of this study is to comprehensively evaluate the efficacy and safety of DJBL.

**Methods:** Web of Science, PubMed, MEDLINE, Embase and the Cochrane Library were searched for studies evaluating DJBL outcomes about its efficacy and safety through May 15, 2023.

**Results:** Thirty studies totaling 1751 patients were included. At 12 months after implantation, body mass index reduction was 4.84 kg/m<sup>2</sup> (95%CI: 4.13, 5.54), with the excess weight loss of 41.28% (95% CI: 33.38%-49.19%) and total weight loss of 13.05 % (95% CI:10.12%, 15.98%); and HbA1c and fasting glucose also had a significant decrease, with a standardized mean difference of -0.72 (95% CI: -0.95, -0.48) and -0.62 (95% CI: -0.82, -0.42), respectively. However, weight loss and glycemic control was only partially sustained at postexplantation. DJBL could significantly improve blood pressure and blood lipid only in situ. The pooled early removal rate was 19%. The incidence of severe adverse events was 17%, including device migration (6%), gastrointestinal hemorrhage (4%), device obstruction (4%), hepatic abscess (2%).

**Conclusions:** DJBL seems to have a promising future in weight loss and glycemic control, but further studies are warranted. DJBL could improve cardiovascular parameters only in situ. High incidence of early removal and severe adverse events are worrisome, so benefits need be weighed against risk in making clinical decisions. e, not the type of surgical procedure served as predictors of remission of type 2 diabetes.





P-03

## A SAFE AND INNOVATIVE LIVER RETRACTION TECHNIQUE FOR SLEEVE GASTRECTOMY WITHOUT HEPATIC TRAUMA

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**Qing Cao<sup>1</sup>,M.M.**

**Mengjie Li<sup>1,2</sup>,B.M.**

**Anning Liu<sup>3</sup>,M.M**

**Xuzhong Ding<sup>4</sup>,M.M.**

**Peng Ma<sup>1</sup>,M.M.**

**Yu Xu and Qing Cao have contributed equally to this work.**

**Background/Introduction:** Liver retraction is essential for optimal exposure in laparoscopic sleeve gastrectomy (LSG). This study aims to describe a novel liver retraction technique using a hernia needle grasper and latex tube during three-port LSG and evaluate its safety, feasibility, and cost-effectiveness.

**Methods:** A retrospective study was conducted between two groups which included 60 cases undergoing LSG from October 2021 to June 2023. 20 patients were included in Group A using the new liver retraction technique in three-port LSG and 40 patients in Group B using the conventional method in five-port LSG. In Group A, a hernia needle grasper was used inserted in a latex tube to retract the liver to ensure an optimal operative field during the operation. The redundant part of the latex tube extending leftward had enough strength to push aside the residue omentum.

**Results:** Demographic data was comparable in both the groups. All cases in Group A achieved optimal exposure during the operation. The time taken to place retractor for Group A was (160.2±37.6) seconds. Comparison of liver enzyme changes (ALT/AST) between the two groups revealed no significant liver function damage associated with the liver retraction technique. Additionally, the use of this technique did not significantly prolong the operation time for three-port surgery.

**Conclusion:** The technique of using a hernia needle grasper inserted into a latex tube for liver retraction is safe, feasible, and cost-effective, making it suitable for three-port LSG.



P-04

## LONG-TERM OUTCOMES OF SLEEVE GASTRECTOMY FOR PATIENTS WITH SEVERE OBESITY (CLASS IV) (> 47.5 BMI) IN KOREA.

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**Introduction:** Recent clinical studies have suggested sleeve gastrectomy is the most performed effective treatment modality for severe obesity. However, long-term data after sleeve gastrectomy has not been investigated for severe obesity in Korea.

**Objectives:** This study aims to evaluate the long-term effects of sleeve gastrectomy in populations with severe obesity. In addition, we evaluate whether weight changes can lead not only to improved co-morbidities but also to the quality of life.

**Methods:** We retrospectively reviewed patients who underwent sleeve gastrectomy from 2007 to 2021. We evaluated long-term ( $\geq 60$  months) outcomes.

**Results:** 42 patients who underwent sleeve gastrectomy from 2007 to 2022 were included. The mean age at the time of surgery was  $32.57 \pm 3.79$  years. The mean weight was  $137.44 \pm 15.15$  kg and the mean body mass index (BMI) was  $49.22 \pm 2.66$  kg/m<sup>2</sup> preoperatively. The BMI in the postoperative first, third, fifth and seventh year was  $31.40 \pm 3.77$ ,  $31.89 \pm 3.40$ ,  $35.39 \pm 3.30$ , and  $30.12 \pm 1.77$ , respectively. The percentage of total weight loss in the postoperative first, third, fifth and seventh year was  $36.36 \pm 6.29$ ,  $35.28 \pm 5.72$ ,  $27.78 \pm 8.99$ , and  $40.17 \pm 6.49$ , respectively. The percentage of excess BMI loss (%EBL) in the postoperative first, third, fifth, and seventh year was  $68.52 \pm 12.72$ ,  $66.49 \pm 11.47$ ,  $51.80 \pm 15.16$ , and  $73.42 \pm 8.85\%$ , respectively. There was no 30-day peri-operative mortality. The complication rates within 30 days were 4.76% including 1 bleeding and 1 wound infection.

**Conclusion:** These findings show that sleeve gastrectomy is a safe and effective long-term bariatric-metabolic surgery option for severe-obesity in Korea. Randomized prospective control studies between sleeve gastrectomy or Roux-en-Y gastric bypass are needed to confirm the long-term bariatric-metabolic effects and safety for Asian populations with severe-obesity.



P-05

## DAY CASE LAPAROSCOPIC CHOLECYSTECTOMY IS SAFE EVEN IN CLASS III (MORBID) OBESITY

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<sup>1,2,3,4,5</sup> Aneurin Bevan University Health Board

### Background/Introduction:

High body mass index (BMI) has generally been associated with increased operative time, increased conversion to open surgery, and poorer perioperative outcomes. Criteria for day-surgery often includes BMI as a factor, with centers excluding patients with BMI >40 kg/m<sup>2</sup>. The purpose of this study is to evaluate outcomes of day-case Laparoscopic Cholecystectomy in patients with morbid obesity.

### Objectives:

To establish whether day-case Laparoscopic Cholecystectomy is safe in patients with increased BMI, particularly when comparing patients with morbid obesity (Class III; BMI >40 kg/m<sup>2</sup>) to those with lower BMI.

### Methods:

Data was collected over 7 months between 01/01/2023 and 31/07/2023 from 3 day-surgery hospitals throughout the Aneurin Bevan University Health Board, South Wales, UK. All patients receiving day case laparoscopic cholecystectomy had data collected on BMI, indication for surgery, duration of surgery, length of hospital stay and 30-day complications, amongst others.

### Results:

A total of 362 patients were included in this study, 74% female 26% male. Patients were placed into 5 BMI categories: BMI <25 (n=35), 25-29 (n=104), 30-34 (n=106), 35-39 (n=74), and >40 (n=43). The median BMI was 32 kg/m<sup>2</sup>. The median duration of surgery was 82 minutes, length of stay 0 day(s) and overall complication rate 4.9%. There were no 30-day mortality.

When comparing patients with BMI > 40 with others, there was no statistically significant difference in duration of surgery (p= 0.1147), and complications including bile leak (p= 0.1991). However, due to existing day-surgery criteria, there was significantly increased length of admission in this group (median 1 vs 0 days; p= 0.011). We also found that patients with BMI 25-29 had a significant risk of subtotal cholecystectomy (n=9, 47%; p=0.0238) and post operative wound infection (n=7, 58%; p=0.0214).

### Conclusion:

Day case laparoscopic cholecystectomy can be safely performed in patients with Class III obesity as there is no increased statistical association with complications, or procedure duration. Criteria for day-surgery based solely on BMI >40 appears inappropriate.



P-06

## COMPARISON OF EFFECTIVENESS OF GLP-1 RECEPTOR AGONISTS AND SLEEVE GASTRECTOMY IN MILD TO MODERATE OBESITY PATIENTS WITH METABOLIC SYNDROME

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**Background/Introduction:** The number of overweight and people with obesity in China is currently the highest in the world, which has seriously affected the health of the people and the development of society.

**Objectives:** This study assessed metabolic syndrome patients undergoing GLP-1 agonists or sleeve gastrectomy, examining weight loss and improvement of metabolic indicators. It explores GLP-1 agonists as potential primary treatment for obesity

**Methods:** Adult male patients receiving sleeve gastrectomy or using semaglutide in our hospital from October 2021 to February 2023 were included, and those without history of acute or chronic pancreatitis and personal or family history of medullary thyroid cancer (MTC). The metabolic indicators before and six months after therapy were assessed by the blood tests.

**Results:** Mean body weight of the patients decreased by 20.17 and 14.05 ( $P < 0.001$ ) at 6 months after sleeve gastrectomy and at 6 months with semaglutide, respectively. There was a significant decrease in fasting insulin regardless of surgical or pharmacologic intervention (10.17 vs. 26.3 after 6 months,  $P < 0.001$ ). In addition, uric acid was significantly reduced in the medication group after 6 months 65.67 whereas it was increased in the postoperative patients ( $P < 0.001$ ), but for cholesterol, the effect was not statistically significant for the surgical and medication groups.

**Conclusion:** The surgical group (sleeve gastrectomy) and the drug group (weekly subcutaneous injections of simethicone) were effective in weight loss and remission of insulin resistance in mildly and people with moderate obesity.

**P-06**

<b>End Point</b>	<b>Medical(N=30)</b>	<b>SG(N=30)</b>	<b>P Value</b>
<b>Weight(Kg)</b>			
Baseline	84.43±10.79	89.03±9.72	0.088
Months 6	70.38±9.75*	68.86±8.39*	0.520
Change from baseline	14.05±4.74	20.17±4.40	<0.001
<b>BMI</b>			
Baseline	30.36±1.83	32.68±2.03	<0.001
Months 6	25.96±2.01*	25.27±1.99*	0.191
Change from baseline	4.40±1.28	7.41±1.51	<0.001
<b>HbA1c(%)</b>			
Baseline	5.59±0.31	5.95±0.86	0.035
Months 6	5.33±0.20*	5.31±0.43*	0.819
Change from baseline	0.26±0.16	0.64±0.76	0.009
<b>FBG(mmol/L)</b>			
Baseline	5.52±0.56	6.21±2.17	0.097
Months 6	5.47±0.59*	4.91±0.50#	<0.001
Change from baseline	0.05±0.06	1.30±1.97	0.001
<b>FIns(μIU/ml)</b>			
Baseline	23.68±10.43	38.54±21.27	0.001
Months 6	13.51±7.47*	12.24±7.79*	0.523
Change from baseline	10.17±10.07	26.30±18.13	<0.001
<b>TG(mmol/L)</b>			
Baseline	1.78±0.73	1.28±0.49	0.003
Months 6	1.74±0.69	0.96±0.25*	<0.001
Change from baseline	0.03±0.09	0.32±0.41	<0.001
<b>TC(mmol/L)</b>			
Baseline	4.81±0.85	4.41±0.85	0.075
Months 6	4.84±0.99	4.47±0.75	0.106
Change from baseline	-0.03±0.39	0.32±0.41	0.001
<b>UA(μmol/L)</b>			
Baseline	435.77±126.12	305.67±73.84	<0.001
Months 6	370.10±87.07*	319.30±72.38	0.017
Change from baseline	65.67±64.69	-13.63±67.42	<0.001

The P values in the footnotes were calculated on the basis of the 6-month data with the baseline data as the comparator.

\*P<0.001

#P<0.01

&P<0.05



P-07

## THE EFFECT OF ANTRALRESECTION START POINT ON POST SLEEVE GASTRECTOMY GASTROESOPHAGEAL REFLUX SYMPTOMS AND WEIGHT LOSS OUTCOMES

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**Background:** Sleeve gastrectomy (SG) has gained worldwide popularity by surgeons due to acceptable results in weight loss and obesity-associated medical problems. Distance from the pylorus during antral resection in SG may be effective in decreasing the occurrence of gastroesophageal reflux disease (GERD)

**Objective:** The aim of this study was to evaluate GERD symptoms and weight loss outcomes in two groups of SG patients with different start points of antral resection.

**Methods:** This is a prospective cohort study on 220 patients who underwent SG between June 2019 and July 2021, aged 18 and above, BMI > 40 kg/m<sup>2</sup>, or BMI > 35 kg/m<sup>2</sup> with at least one obesity associated medical problem. According to the start point of antral resection the patients were divided in two groups (group A: from 2 cm of pylorus and group B: from 4 cm of pylorus). Evaluation of GERD was performed using GERD-Q questionnaire at 12-month follow up.

**Results:** Mean age and BMI of all patients were 37.6±10 year and 44.8±5.7 kg/m<sup>2</sup> at the time of SG. Totally 153 (69.5%) of the patients were female. De novo GERD after 12 months in the groups A and B was found in 18 (20%) and 19 (21%) patients. TWL% at 12-month follow ups, were 33.9% and 32.5% in group A and B, respectively.

**Conclusion:** Antral resection's start point has no statistically significant effect on the excess and total weight loss indices, resolution of the obesity-related medical problems and De novo GERD between 2 and 4 cm start point for antral resection during SG. No increased statistical association with complications, procedure duration or hospital stay.



P-08

## SINGLE PORT SLEEVE GASTRECTOMY WITH GASTRIC SUSPENSION TECHNIQUE VERSUS MULTIPLE PORT SLEEVE GASTRECTOMY

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### Abstract

**Background:** Due to limited technical demand, single-port sleeve gastrectomy (SPSG) is a feasible laparoscopic technique for sleeve gastrectomy (SG). However, compared to the multiple ports technique, additional difficulties exist in the SPSG technique. In this retrospective study, we proposed a slight improvement in the SPSG technique (transumbilical or above the umbilicus approach) by creating a gastric suspension through the greater curvature. This simple maneuver can reduce the difficulties of SPSG.

**Objectives:** In this study, we aim to describe a slight maneuver that can improve the SPSG procedure.

**Methods:** Patients who underwent laparoscopic SG between January 2022 and May 2023 at our hospital were included. The patients were classified into two groups: 1) SPSG and 2) multiple ports SG (MPSG). The parameters for this analysis were the patients' age, gender, weight, body mass index (BMI), conversion rate, drainage placement, 30-day readmission rate, and postoperative complications. Postoperative one-month and three months percentages of total weight loss (%TWL) were calculated and compared.

**Results:** 171 patients were included in this study: 1) the SPSG group (n = 96), and 2) the MPSG group (n = 75). No statistically significant difference was observed within the preoperative (age, gender, height, weight, and BMI) and the perioperative parameters between SPSG and MPSG (operation time, drainage placement, 30-day readmission) ( $p > 0.05$ ). Per Clavien-Dindo's grading, two patients in the SPSG group suffered grade 1 complications; for the MPSG group, one patient sustained grade 2, and another suffered grade 3b complication. No statistical significance was observed on the %TWL between the two groups ( $p > 0.05$ ).

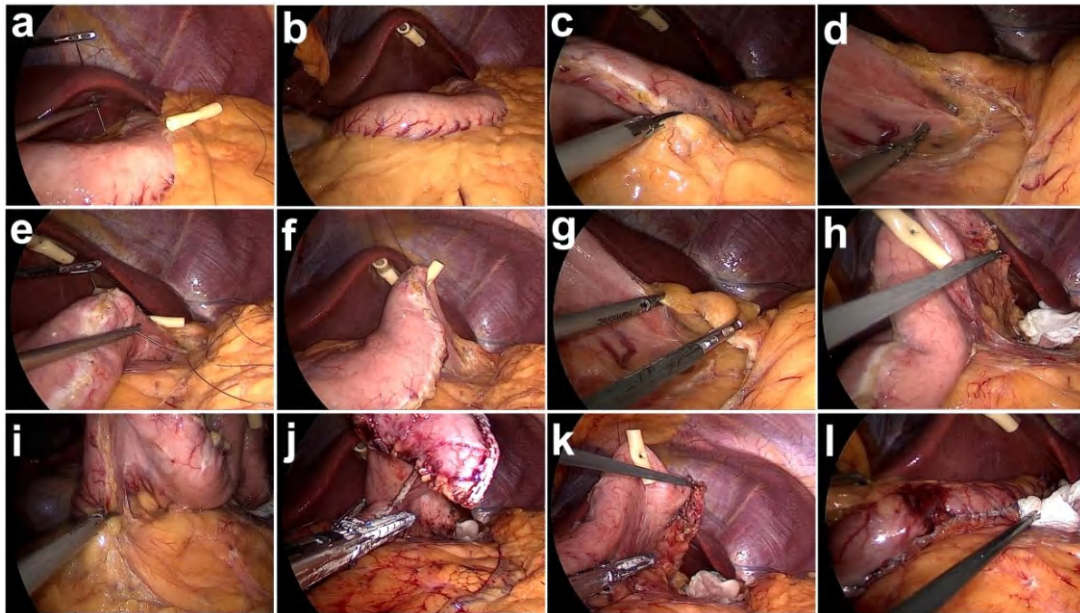
**Conclusion:** It is crucial to better understand the abdominal anatomy of the patient before performing the single-port technique. With better preoperative preparation and intraoperative technique, SPSG can be an excellent choice for many patients and can be promoted further.

**P-08****Table 3.** Perioperative comparison between single-port and multi-port sleeve gastrectomy.

<b>Characteristics</b>	<b>SPSG with Gastric Suspension (n=96)</b>	<b>MPSG (n=75)</b>	<b>P-value</b>
<b>Operation time (min)</b>	92.2 ± 16.2	91.1 ± 14.0	0.641
<b>No. of cases needed additional trocar</b>	2 (2.1%)	-	-
<b>No. of cases needed drainage placement</b>	8 (8.3%)	9 (12.0%)	0.45
<b>Postoperative length of stay (d)</b>	2.8 ± 0.7	2.7 ± 0.8	0.385
<b>30-days readmission</b>	1 (1.0%)	2 (2.7%)	0.426
<b>Clavien-Dindo</b>			
<b>Grade 1</b>	2 (2.1%)	0	0.211
<b>Grade 2</b>	0	1 (1.3%)	0.258
<b>Grade 3a</b>	0	0	1.000
<b>Grade 3b</b>	0	1 (1.3%)	0.258
<b>%TWL</b>			
<b>1 month</b>	12.1 ± 2.9%	12.8 ± 1.8%	0.069
<b>3 months</b>	20.8 ± 4.2%	21.2 ± 6.5%	0.627

Data are shown as mean ± S.D. SPSG, single-port sleeve gastrectomy; MPSG, multiple-port sleeve gastrectomy; %TWL, percentage total weight loss.





**Figure 1.** Graphics illustration of the single-port sleeve gastrectomy technique with gastric suspension. **a.** Performing the liver suspension using a minimally invasive single puncture technique; **b.** The liver suspension was completed; **c.** Mobilization of the stomach; **d.** There was severe adhesion around the fundus area (this patient had a history of pancreatitis preoperatively); **e** and **f.** The gastric suspension was performed and completed using a technique similar to the liver suspension; **g, h,** and **i.** Complete mobilization of the greater curvature; **j** and **k.** Creation of the gastric sleeve through stapling made easy with the gastric suspension technique; **l.** View of the finished procedure following suture reinforcement.



## CLINICAL OUTCOMES OF LAPAROSCOPIC SLEEVE DUODENOJEJUNAL BYPASS VERSUS LAPAROSCOPIC SLEEVE GASTRECTOMY, A PROPENSITY SCORE MATCHING STUDY

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**Background:** Bypass procedure can provide a profound and sustained weight loss, also resolution of comorbidities. Laparoscopic sleeve duodenojejunal bypass (LSG-DJB) is an alternative bypass procedure for people in Asian with high prevalence of gastric cancer.

**Objectives:** To compare perioperative and clinical outcomes of patients with obesity who undergoing LSG-DJB versus LSG.

**Methods:** Our center first started performing LSG-DJB in 2020. All patients who underwent LSG-DJB and LSG at a single institution from 2020-2022 were recruited. Patients were divided into LSG-DJB and LSG groups. A total of 74 patients were recruited, 16 patients were identified in LSG-DJB group. Propensity score matching (1:2) was performed according to patients' age, sex, body mass index (BMI), comorbidities, ASA grading and 38 matched patients were identified in LSG group. Primary outcome was percentage of excessive BMI loss. Secondary outcomes included perioperative outcomes, resolution of comorbidities and nutritional parameters.

**Results:** In the median follow-up duration of almost 2 years (LSG-DJB= 20.7 months, LSG=23.2 months), LSG-DJB group had more excessive BMI loss (82.3% vs.57.5%,  $p=0.053$ ). LSG-DJB group also exhibited excellent comorbidity resolution (Table 1). Concerning safety, although there was longer operation time (328.7mins vs. 155.7mins) and hospital stay (7 days vs. 4 days), there were no significant differences regarding the complication rate (7.7% vs. 9.4%,  $p=0.878$ ), re-operative rate (0% vs. 3.1%,  $p=1.000$ ) and there was no mortality in both groups. There was no nutritional deficiency with standard postoperative supplements (table 2).

<b>Diabetes</b>	13/16
<b>Preoperative insulin use</b>	7
Postoperative off insulin use	100%
Complete remission	92.40%
<b>Hypertension</b>	
Complete remission	53.80%
Reduced dose	38.50%
<b>Hyperlipidemia</b>	
Complete remission	71.40%
Table 1	

<b>Haemoglobin (g/dL)</b>	11.9
<b>Vitamin B12 (mmol/L)</b>	650
<b>Calcium (mmol/L)</b>	2.3
<b>Vitamin D (nmol/L)</b>	71.8
<b>Albumin (g/L)</b>	42.7
<b>Zn (umol/l)</b>	11.9
<b>Copper (umol/l)</b>	15.7
Table 2	

**Conclusion:** LSG-DJB is a feasible and safe bypass procedure. Patients undergoing LSG-DJB compared to LSG had more excessive body weight loss and a good comorbidities resolution rate.



## LEARNING CURVE ANALYSIS OF SARCOPENIC AND NON-SARCOPENIC OBESITY WITH LAPAROSCOPIC SLEEVE GASTRECTOMY

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**Background:** For surgeons initially performing laparoscopic sleeve gastrectomy (LSG), optimizing surgical outcomes and safeguarding surgical safety remain critical. Therefore it is necessary to analyze the learning curve of LSG

**Objective:** To assess the difference in learning curve between sarcopenic obesity (SO) and non-sarcopenic obesity (NSO) patients who underwent LSG.

**Methods:** A total of 240 patients with obesity who underwent LSG from January 2018 to June 2022 in the Department of Gastric Surgery, Fujian Medical University Union Hospital were included, and musculoskeletal parameters at the L3 level on preoperative CT scans were obtained to divide the patients with obesity into SO and NSO groups, and learning curves were analyzed by cumulative sum curves (CUSUM) to explore the surgical outcomes of the two groups before and after learning curves and differences in short-term weight loss outcomes between the two groups before and after the learning curve.

**Results:** Among 240 patients, 97 were in the SO group and 143 in the NSO group. patients in the SO group had significantly longer operative time ( $113.9 \pm 22.9$  vs  $103.1 \pm 22.2$  min) and postoperative hospital days ( $5.7 \pm 2.1$  vs  $4.9 \pm 1.5$  days) than those in the NSO group (both  $P < 0.05$ ). The CUSUM learning curve suggests that the operative time in the SO and NSO groups reached a turning point when the number of surgical cases accumulated to the 81st and 36th cases respectively. Further analysis revealed that the operative time and the postoperative hospital days were shorter in the master stage than in the initial stage in both groups (both  $P < 0.05$ ). In terms of weight loss effect, the NSO group had better weight loss at 6 months postoperatively in the skilled stage than in the initial stage, and had more patients of %EWL up to 100% than those in the initial stage. Multifactorial logistic regression analysis showed that female, FM  $\geq 35$  kg, and sarcopenic obesity were independent risk factors for increased operative time (all  $P < 0.05$ ).

**Conclusion:** Surgeons performing laparoscopic sleeve gastrectomy at the initial stage may prefer the non-sarcopenic population with obesity to ensure surgical safety while crossing the learning curve more quickly.



## EFFECT OF SARCOPENIC OBESITY ON WEIGHT LOSS OUTCOMES AND QUALITY OF LIFE AFTER LAPAROSCOPIC SLEEVE GASTRECTOMY

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**Background:** Sarcopenic obesity may affect the health outcome of people with obesity after laparoscopic sleeve gastrectomy (LSG). To assess the impact of sarcopenic obesity (SO) on weight loss outcomes and improvement of quality of life after LSG.

**Materials and methods:** This retrospective observational study included patients who underwent LSG with SO (99 patients) or without SO (146 patients) from a single center. The primary endpoint was to assess the characteristics of weight loss and disease-specific quality of life in patients with or without SO after surgery. SO was diagnosed if FM/FFM  $\geq 0.80$ . Fat-free mass (FFM) and fat mass (FM) was calculated based on the L3-level images of preoperative CT scans.

**Results:** Operative time and postoperative hospital stay days were longer in the SO group ( $P < 0.001$ ). After LSG, weight, BMI, and EBMI were significantly lower in the NSO group than in the SO group (all  $P < 0.05$ ); while %EWL and the number of patients with % EWL  $\geq 100\%$  were significantly lower in the SO group (both  $P < 0.05$ ). The total BAROS scores of patients in the NSO group were higher than those in the SO group ( $P < 0.05$ ). Additionally, the MA-II questionnaire assessment showed a lower percentage of "Very Good" and "Good" outcomes in the SO group ( $P < 0.05$ ).

**Conclusions:** Patients with SO take a slower rate, a longer time to reach the ideal weight and lower quality of life (QOL) self-ratings than NSO patients after LSG. Thus, preoperative evaluation and tailoring rehabilitation guidance for SO patients should be accounted.



## QUALITY OF LIFE AFTER BARIATRIC SURGERY IN KOREAN PATIENTS WITH OBESITY

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**Background:** Changes in quality of life, along with changes in weight-related outcomes and comorbidities, are important indicators for evaluating the efficacy of bariatric surgery. However, not many studies have been conducted on this in Korea. This study was conducted to evaluate the clinical efficacy of bariatric surgery, especially focusing on changes in the quality of life of Korean patients with obesity who underwent bariatric surgery.

**Methods:** We retrospectively reviewed patients with obesity who underwent bariatric surgery from 2007 to 2021, and conducted an online questionnaire survey to analyze the efficacy of bariatric surgery. To assess the quality of life of the patients, two standardized questionnaires were used: EQ-5D 3L (the three-level version of the EQ-5D) and MA-QoLQII (the Moorehead-Ardelt Quality of Life Questionnaire II). The results were compared according to the patients' postoperative follow-up period.

**Results:** A total of 270 patients responded to the online questionnaire survey. Mean postoperative follow-up time was 44.25 ( $\pm 29.87$ ) months. According to the results of the EQ-5D questionnaires, the preoperative total QoL score was  $0.65 \pm 0.11$ , and the postoperative total QoL score was  $0.81 \pm 0.11$ . According to the MA-QoLQII results, the preoperative overall QoL score was  $23.11 \pm 10.48$ . It changed to  $37.44 \pm 11.58$  postoperatively and remained constant over time.

**Conclusion:** According to the results, it suggests that bariatric surgery may lead to a better quality of life at most follow-up time points and may remain constant over time.



## STAPLE LINE OVER-SEWING OR NOT DURING LAPAROSCOPIC SLEEVE GASTRECTOMY: A RETROSPECTIVE DESCRIPTIVE ANALYSIS

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**Background/Introduction:** Laparoscopic sleeve gastrectomy (LSG) has gained popularity because of its better results in terms of weight loss and comorbidities control as well as its technical simplicity and less complication rate. However, the risk of staple line leak and bleeding still remains one of its challenging complications. Despite there are a large number of studies assessing various methods of making the staple line secure including over-sewing the staple line, buttressing it with specific materials, fibrin glues and even no reinforcement, there is no consensus on which technique is best for reducing the risk of leak and bleeding.

**Objectives:** To assess the possible benefits and safety of LSG without over-sewing the staple line.

**Methods:** A retrospective descriptive analysis was conducted at Wuhan Union Hospital. Consecutive patients undergoing LSG as a treatment for severe obesity from June 2022 to August 2023 were included. Patients (87) were divided into two groups: Group A (SLR)(34) who received staple-line reinforcement by over-sewing and Group B(non-SLR) (53) who not. Both groups were assessed in terms of operating time, post-operative hospital stay, total hospital stay, surgical costs, total hospitalization costs and complications such as staple line leak and bleeding.

**Results:** A total of 87 patients underwent LSG between June 2022 to August 2023, including 54 females (62.1%) and 33 males (37.9%). Both groups were comparable in terms of age, BMI, gender distribution ( $P > 0.05$ ). Mean operating time was 109.47min (50-220min) and no conversion to open surgery. Compared with Group B ( 91.85±25.66min ), Group A (135.40±34.04min) was associated with a longer operating time ( $P < 0.05$ ). There was no significant difference in post-operative hospital stay and total hospital stay between two groups. Group A (\$1290±159.2, \$8848.41±566.3) required more surgical costs and total hospitalization costs than Group B (\$1036±84.72, \$7808±940.3), and the difference was statistically significant( $P < 0.05$ ). There was no staple line leak and bleeding in two groups.

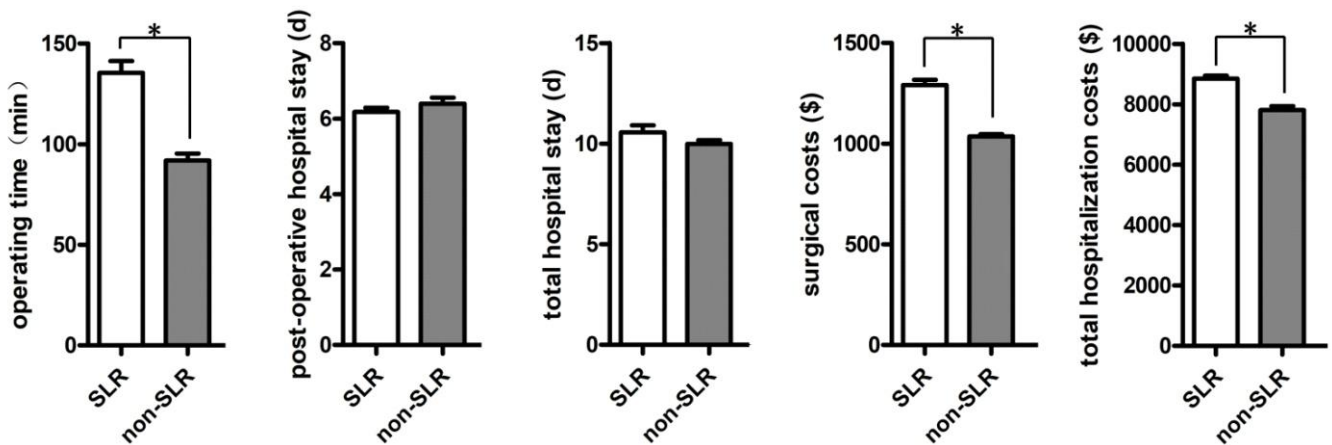


Table 1. Comparison of operation data and medical costs in two groups

Parameter	Group A (SLR)	Group B( non-SLR)	aP value
	n=34	n=53	
operating time (min)	135.40±34.04	91.85±25.66	<0.0001
post-operative hospital stay (d)	6.176±0.6729	6.396±1.182	0.3274
total hospital stay (d)	10.56±2.077	9.981±1.380	0.1224
surgical costs (\$)	1290±159.2	1036±84.72	<0.0001
total hospitalization costs (\$)	8848.41±566.3	7808±940.3	<0.0001
leaks(%)	0	0	-
bleeding(%)	0	0	-

<sup>a</sup>Two-tailed Fisher’s exact test; statistically significant (mean±SD, P<0.05); SLR, staple-line reinforcement; non-SLR, no staple-line reinforcement.

Figure 1. Comparison of operation data and medical costs in two groups



SLR, staple-line reinforcement; non-SLR, no staple-line reinforcement.; \*: P<0.05

**Conclusion:** There is no added benefit of over-sewing the staple line in terms of rate of staple line leak and bleeding but over-sewing the staple line during LSG does prolong the operating time and maybe not cost effective.



## THE RATIO OF COMMON LIMB AND TOTAL BOWEL LENGTH COULD BE USED IN DETERMINATION OF ANASTOMOTIC POSITION IN SINGLE ANASTOMOSIS DUODENAL-ILEAL BYPASS WITH SLEEVE GASTRECTOMY

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**Background:** Single anastomosis duodenal-ileal bypass with sleeve gastrectomy can offer a greater weight loss and improvement of comorbidities, but it has the drawback of inducing a higher rate of nutritional deficiencies and malnutrition. It is necessary to find a balance between sufficient weight loss and low risk of possible nutritional deficiencies.

**Methods:** Two cases of bowel reconstruction after re-sleeve gastrectomy with single anastomosis duodenal ileal bypass (RS-SADI) for recurrent weight gain or unsatisfied weight loss following sleeve gastrectomy (SG) were reported. Bowel reconstructions were performed for these two patients. The related literatures were reviewed.

**Results:** The first patient was a 28 years old female underwent her SG first and achieved a poor BMI loss 18 months postoperatively. Her weight loss was still unsatisfied after her RS-SADI procedure. Her CL was 400 cm measured from the ileocecal valve proximally when she was undergoing her CL shortening surgery. The new anastomosis was made and her CL was shortened 100 cm. Her BMI decreased from 34.2 to 25 kg/m<sup>2</sup> later. Another patient was a 35 years old female who underwent SG first. She underwent a RS-SADI procedure for her unsatisfied weight loss. Her chronic diarrhea was not well controlled with severe hypoproteinemia after the surgery. Her total bowel length was 920 cm found in her CL lengthening surgery. Her CL was lengthened from 300 cm to 420 cm. The patient had normal protein level and nutritional status two months after the surgery.

**Conclusions:** The total bowel length (TBL) is quite different between individuals. If the position of the duodenal-ileal anastomosis is only determined according to a fixed intestinal length without considering the length of TBL, the common limb (CL) could be relatively too short to bring about nutritional deficiency or too long to cause unsatisfied weight loss. The possible approach for achieving the balance between optimal weight loss and malnutrition is to measure the CL/TBL ratio. In our two cases, the CL/TBL ratios were 0.5 and 0.48 respectively after their small bowel reconstructions, which could be an ideal range.





## LAPAROSCOPIC PARTIAL REVISION OF ONE ANASTOMOSIS GASTRIC BYPASS IN A COHORT OF PATIENTS FROM A SINGLE CENTER – TECHNICAL FEASIBILITY AND OUTCOMES

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**Background/Introduction:** One anastomosis gastric bypass is a relatively novel procedure and is gaining popularity as a good metabolic operation in Asia. However, it is vulnerable to the uncommon complications related to malabsorption. Revision of any gastric bypass is a challenge.

**Objectives:** We aim to report our experience and challenges in laparoscopic partial revision of One anastomosis gastric bypass for malabsorption in a single center in South Asia.

**Methods:** A total number of 136 patients underwent One anastomosis gastric bypass from 2015-2021. Four patients had malabsorption leading to macro/micro-nutrient deficiency, excessive weight loss or troublesome loose stools/flatulence not responding to non-surgical management after detailed assessment. All underwent minimally invasive revision surgery.

**Results:** All had a previous uncomplicated laparoscopic procedure. Level of anastomosis ranged from 125-225cm from duodenojejunal flexure. Presentation of patients with above symptoms varied widely; from 8-48 months post-surgery. Proximal gastro-gastric anastomosis (upper part of the gastric tube to the proximal part of the remnant stomach) and distal gastro-gastric anastomosis (distal part of the gastric tube to the antrum) were performed in two each. Anastomosis was performed using a side-to-side endo-GIA linear staplers and defect closure with 4/0 polydioxanone suture. One operation was technically difficult due to dense adhesions of the gastric tube to the left liver lobe (operating time: 200 minutes; needed 2 units of blood transfusion due to hepatic bleeding). Other 3 operations were performed within 120 minutes. None were converted to open procedure. Apart from the excessive bleeding (n=1), there were no other intra/post-operative complications. Intra-Operative Endoscopy and Leak tests were performed in all. All had resolution of hyperosmolar symptoms and weight gain. However, one patient had persistent episodic loose stools for 5-6 months post-surgery despite good weight regains, and this responded pro-biotic preparations.

**Conclusion:** Laparoscopic revision surgery for patients with severe malabsorption following OAGB is a feasible and safe procedure in our series of carefully selected patients. Dense adhesions between the gastric tube and the left liver lobe is the major difficulty encountered. We recommend applying an adhesive barrier or fixation of omentum between the gastric tube and left liver lobe to overcome this difficulty in the event of revision surgery.



## IMPROVEMENT OF DEPRESSIVE SYMPTOMS AND RELATED INFLUENCING FACTORS AFTER BARIATRIC SURGERY: A SINGLE CENTER STUDY

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**Background:** The increasingly serious problem of obesity has brought great troubles to the physical and mental health of many people. There is a close relationship between obesity and symptoms of depression, and weight loss helps to improve symptoms of depression. Bariatric surgery has become a common treatment option for obesity, but the effect of bariatric surgery on improving symptoms of depression and its related influencing factors have not been reported.

**Objectives:** To explore the correlation between bariatric surgery and the improvement of depressive symptoms, and investigate the relevant influencing factors that affect the improvement of depression symptoms after bariatric surgery.

**Methods:** A total of 142 patients with obesity who underwent bariatric surgery at Department of General Surgery, the First Medical Center of Chinese PLA General Hospital from August 2018 to August 2022 were enrolled in this study. A questionnaire for the assessment of depressive symptoms (Hamilton Depression Scale (HAMD)) was completed before surgery and at 1 year after surgery. Each question on the scale was scored on a scale of 0-4 according to the severity. 8 points). The preoperative variables related to depression were analyzed by logistic regression model, and the correlation was further tested by stratified analysis.

**Results:** One hundred and forty patients underwent surgery, 136 of whom completed the follow-up, and the improvement in depression after bariatric surgery was positive (26.8% before surgery vs. 14.5% after surgery). Multivariate logistic regression analysis showed that age, gender, BMI, total cholesterol, type 2 diabetes, and exercise were related to depression. Stratified analysis showed that younger age ( $p=0.027$ ), female ( $p=0.009$ ), high BMI ( $p=0.001$ ), and no exercise ( $p=0.016$ ) were more significantly related to depression.

**Conclusion:** Bariatric surgery, as an effective means of treating obesity, can not only improve patients' physical health but also significantly alleviate their symptoms of depression. For patients with obesity who also suffer from depression and have not seen improvements with conservative treatments, it is recommended that they actively consider bariatric surgery.



## HOW IMPULSIVENESS INFLUENCES OBESITY: THE MEDIATING EFFECT OF RESTING-STATE BRAIN ACTIVITY IN THE DLPFC

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**Background/Introduction:** Impulsiveness is a stable personal characteristic that contributes to obesity and may interact with it. Specifically, obesity is caused by unrestrained impulse eating that is not consciously controlled and leads to a hormonal imbalance that also can impair impulse control. However, the mechanism of this relationship is unclear.

**Objectives:** To explore whether brain activity can mediate the relationship between individual impulsiveness and obesity.

**Methods:** In our study, 35 individuals with obesity (body mass index, BMI > 28) were recruited and matched with 31 healthy controls (BMI < 24) in age and education level. All the participants underwent a resting-state fMRI and completed the Barratt Impulsiveness Scale-11.

**Results:** The results showed that patients with obesity had a significantly lower fractional amplitude of low-frequency fluctuations (fALFF) in the bilateral dorsolateral prefrontal cortex (dlPFC) and higher fALFF in the left fusiform cortex. In addition, non-planning impulsiveness was positively correlated with BMI. Importantly, we found that the right dlPFC completely mediated the relationship between non-planning impulsiveness and BMI.

**Conclusion:** Our findings suggest that impulsivity is statistically more likely to precede obesity than to precede impulsivity and contributes to obesity by downregulating spontaneous activity in the dlPFC. This suggests that the dlPFC, which is associated with executive control, may be able a potential target for treating obesity.



## LITHIUM CARBONATE POISONING AFTER BARIATRIC SURGERY: A CASE REPORT

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**Key words:** obesity; bariatric surgery; bipolar disorder; lithium poisoning

### **Summary:**

**Objective:** to report a case of lithium poisoning after accurate laparoscopic sleeve gastrectomy (Laparoscopic sleeve gastrectomy,LSG).

**Methods:** a clinical case of lithium poisoning after LSG was reported, and the related literatures were collected and summarized.

**Results:** bipolar disorder (BD) is a common mental disorder with both manic and depressive episodes, accompanied by abnormal changes in physiology, psychology, cognition and behavior. Related studies have shown that, compared with the general population, the prevalence of overweight and obesity in patients with bipolar disorder is significantly higher. With the rising prevalence of obesity and the increasing number of people with obesity, weight loss surgery has been proved to be the most effective treatment. At present, the treatment of bipolar disorder includes drug therapy, physiotherapy and psychotherapy, of which drug therapy is the main one. Lithium carbonate is the first choice for the treatment of bipolar disorder and the most commonly used mood stabilizer in psychiatry. Its safety range is narrow and the therapeutic dose is similar to the toxic dose. For patients with obesity complicated with mental illness and taking lithium carbonate regularly, it is necessary to comprehensively evaluate and monitor the concentration of blood lithium before operation, strengthen follow-up and management after operation, identify lithium poisoning early, intervene and treat in time, and prevent patients from turning from mild to severe.

**Conclusion:** obesity patients with bipolar disorder have a higher risk of lithium poisoning after operation. because the early manifestations of lithium poisoning are mainly gastrointestinal reactions such as nausea and vomiting, patients with lithium poisoning after bariatric surgery are prone to misdiagnosis and delay the opportunity of rescue.



## VITAMIN D3 AND IT' S ASSOCIATIONS WITH ADIPOSITY AND METABOLIC PARAMETERS IN WAITING LIST PATIENTS OF BARIATRIC SURGERY

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**Background:** Vitamin D3 deficiency is associated with insulin resistance and metabolic syndrome. Although evidences are not consistent.

**Objectives:** The aim of this study is to investigate the relationship between serum 25-hydroxy vitamin D3 (25(OH)D3) levels with some adiposity and metabolic indices related to metabolic syndrome.

**Methods:** In this cross-sectional study, the anthropometric, body composition information and also, the clinical laboratory tests including fasting blood sugar (FBS), insulin, lipid profile, liver function test and serum 25(OH)D3 of 3750 patients with severe obesity from the obesity clinic are extracted from Iran National Obesity Surgery Database. HOMA-IR and QUICKI was computed based on standard formula. Associations was tested using analysis of variance and Kruskal–Wallis tests.

**Results:** Approximately 69% of patients with severe obesity had sub-optimal vitamin D3 levels (<30 ng/mL). An inverse significant relationship between serum 25(OH)D3 and body weight, body Fat percentage, waist and hip circumference was observed (P-Value <0.05 for all). Low serum 25(OH)D3 levels are significantly associated with higher FBS and A1C, dyslipidemia (higher LDL and TG) and also elevated level of Liver function enzymes (P-Value <0.05 for all).

Moreover, the patient with the higher serum 25(OH)D3 had lower level of HOMA-IR and higher Insulin sensitivity (QUICKI index); although this association was not statistically significant.

**Conclusion:** Vitamin D3 deficiency has been associated with obesity, impaired Glucose metabolism and metabolic disorders related to insulin resistance. So, vitamin D3 supplementation could be a potential approach in treatment or decrees the metabolic complication of obesity before and after bariatric surgery.

**KEY WORD:** Vitamin D3, Severe Obesity, Adiposity, Metabolic syndrome, Bariatric surgery



## VENOUS THROMBO-EMBOLISM (VTE) RISK ASSESSMENT FOLLOWING BARIATRIC SURGERY: IS CHEMOPROPHYLAXIS REQUIRED?

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**Background:** VTE is a significant contributor to post-operative morbidity and chemoprophylaxis is advocated. The symptomatic VTE incidence has been reported to be 0.58% after a general surgical procedure, 0.6% after bariatric surgeries, and as high as 2% in screened VTE studies.

Several VTE risk assessment models have been developed in the literature including Caprini, Padua, Rogers, Wells and Revised Geneva models. However, their validity in bariatric patients has not been established.

The risk benefit profile for VTE chemoprophylaxis is unclear if mechanical prophylaxis and early mobilization are applied.

**Objectives:** To determine the risk of VTE in the absence of chemoprophylaxis and determine the accuracy of composite VTE risk calculators.

**Methods:** This was a prospective multicenter study including Cabrini, Avenue and Alfred Hospital between January 2020 to April 2022. Chemoprophylaxis was not used. Early mobilization, use of pneumatic calf compressors and an ERAS protocol with day 1 discharge was used. All patients' VTE risk scores were calculated using the above-mentioned models(Figure 1).

**Results:** Patients' mean age was 40.53(18-76) years with an average BMI 43.86(30.70-79.80). Sleeve gastrectomy accounted for 84.78% of patients, bypass 7.42%; with the rest being adjustable band-related surgeries.

There were 5 patients in the VTE group and 777 in the control group, resulting in a VTE incidence of 0.6%. There were 3 lower-limb and 1 upper-limb deep vein thrombi requiring therapeutic anticoagulation, and 1 superficial thrombophlebitis that resolved spontaneously. There was no portal vein thrombosis nor pulmonary embolus. The mean time to diagnosis of 9.6 days.

The Wells and Revised Geneva models stratified most patients (95% and 99% respectively) into the low-risk categories and failed to identify any patients from the VTE group. In contrast, the Caprini, Rogers and Padua models were able to identify VTE patients, but they stratified most of the patients (88%, 88% and 61% respectively) into the moderate-high risk categories. Only the Caprini and Padua models showed a difference in risk-score between the two groups(Figure 2).

**Conclusion:** The risk of VTE using mechanical prophylaxis and early mobilization was very low. Risk stratification scores perform variably, and a high proportion of patients are stratified as high risk, reducing their applicability in bariatric patients.

The Caprini and Padua are the most suitable in identifying high-risk patients. Consideration needs to be given to the role of VTE chemoprophylaxis in routine bariatric surgery.



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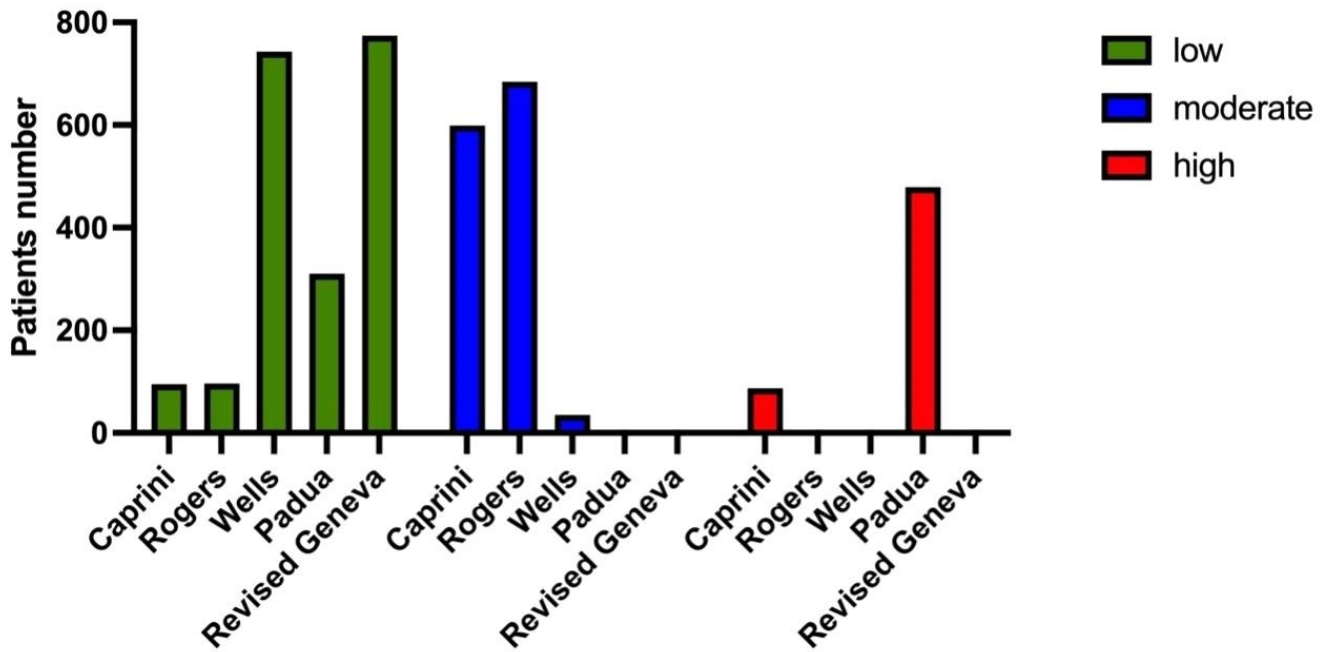
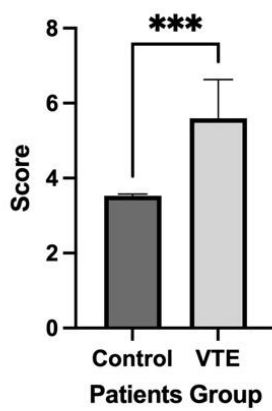
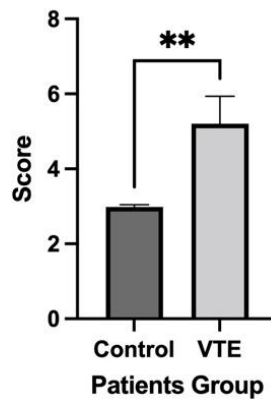


Figure 1. Distribution of patients in each VTE risk group using the different models

Caprini score comparison



Padua score comparison



Rogers score comparison

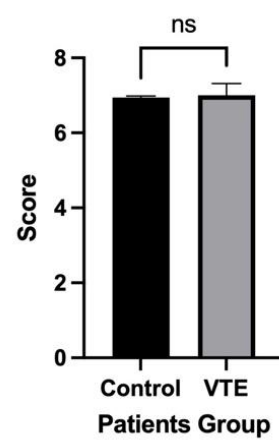


Figure 2. The differences between the mean risk scores of the control and the VTE group using the Caprini, Padua and Rogers models



## EXPERT CONSENSUS ON MANAGEMENT STRATEGIES FOR BARIATRIC SURGERY-RELATED ANEMIA (2023 EDITION)

**Zhiyong Dong on behalf of CSBMS**

*Bariatric surgery, the first affiliated hospital of Jinan university, Guangzhou, China*

**Background/Introduction:** Anemia is a common complication in patients with obesity and individuals who have undergone weight loss surgery.

**Objectives:** The purpose of this study is to achieve consensus on the prevention and management of postoperative anemia following weight loss surgery.

**Methods:** Chinese Society for Metabolic and Bariatric Surgery (CSMBS), in collaboration with experts in the fields of obesity metabolism surgery and hematology, organized discussions on the prevention and management of postoperative anemia following weight loss surgery, based on existing clinical research evidence. The drafting process was led by experts engaged in relevant research, and more than 40 experts from related fields were invited to review the content, resulting in the formation of a consensus opinion.

**Results:** Consensus was reached on the diagnosis, causal analysis, preventive measures, and treatment methods for postoperative anemia following bariatric surgery.

**Conclusion:** The formulation of the "Expert Consensus on Management Strategies for Weight Loss Surgery-Related Anemia (2023 Edition)" aims to enhance the awareness of obesity metabolism surgeons regarding the prevention and management of postoperative anemia after weight loss surgery. It seeks to standardize the management of postoperative anemia, thereby reducing the incidence of anemia, while also driving related research efforts.





## COMPARISON OF FREQUENCY OF ANEMIA BETWEEN SLEEVE GASTRECTOMY VS OAGB IN PATIENT OPERATED IN KHYBER TEACHING HOSPITAL FOR SEVERE OBESITY.

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<sup>2</sup> Department of General Surgery Saidu Group of Teaching Hospitals.

**Background/Introduction:** Bariatric surgery is considered a safe, efficient, and permanent approach for weight loss and reduced incidence of obesity-related diseases and long-term all-cause mortality.

Numerous bariatric surgeries have been developed to obtain optimal outcomes with the most negligible risks. Long-term micronutrient deficiencies are likely associated with the elevated incidence of osteoporotic fractures, secondary hyperparathyroidism, anemias, and other late sequelae of bariatric procedures.

The effective treatment of postoperative anemia and nutritional deficiencies is critical for the successful management of bariatric patients. However, the evidence for nutritional risk or support of bariatric patients remains scarce. The aims of this study were to assess current evidence of the association between 2 methods of bariatric surgery, sleeve gastrectomy (SG) and OAGB and postoperative anemia and nutritional deficiencies.

**Objectives:** To compare of frequency of anaemia between sleeve gastrectomy vs OAGB in patient operated in Khyber teaching hospital for severe obesity.

**Methods:** This was cross sectional prospective study conducted in Khyber teaching hospital Peshawar. Data was collected from patient operated in Khyber teaching hospital. Sample size was 40 in which 20 patient underwent sleeve gastrectomy and 20 were postop OAGB. Upon follow patient hb were checked and compared. Data was collected through performa specifically design for the study. Data collection was done after approval from IRB KMC. Data analysis was done on SPSS 25.

**Results:** Total of 40 patient were included in our study. In which 27 were females and 13 were males. The age group selected for our study was 25 to 40. All the study participants were divided into two equal groups. Frequency of anemia at 3 month post op in group 1 (patient underwent sleeve gastrectomy) was 32.4% And group 2 (patient underwent OAGB) was 57.3%. significantly high incidence in group 2. (P-value of 0.001)

**Conclusion:** Patient whom underwent OAGB should be closely monitored for anemia and related complication post-surgery. And micronutrients supplementation should be continued for long period of time.



## CAN NEUTROPHIL-TO-LYMPHOCYTE RATIO AND PLATELET-TO-LYMPHOCYTE RATIO PREDICT THE COMPLICATIONS AND WEIGHT LOSS AFTER GASTRIC BYPASS SURGERY?

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<sup>1</sup>Affiliation: Xiaolan People's Hospital of Zhongshan

**Background:** Obesity is a chronic disease characterized by an imbalance between energy intake and energy expenditure, resulting in the conversion of excess energy into fat tissue storage and weight gain. Currently, the incidence of obesity is rapidly increasing, and it is associated with a series of related complications such as hypertension, diabetes, cardiovascular and cerebrovascular diseases, which will bring significant health and economic pressure to society. Obesity is considered as a chronic inflammatory response, and its underlying pathological and physiological mechanisms are still unclear.

The neutrophil-to-lymphocyte ratio (NLR) and platelet-to-lymphocyte ratio (PLR) can reflect the inflammatory and immune response of the body, and these ratios can be calculated through a complete blood cell count test. Due to their accessibility and specificity, NLR and PLR can currently be used as predictive indicators for prognosis in autoimmune diseases, metabolic diseases, tumors, and other diseases. Research has confirmed the predictive role of NLR and PLR in the therapeutic efficacy of sleeve gastrectomy, but there are only a few studies on the predictive role of NLR and PLR in gastric bypass surgery. Therefore, this study aims to collect clinical data from patients with obesity who have undergone gastric bypass surgery in our center and analyze the predictive role of NLR and PLR in postoperative complications and weight loss outcomes.

**Objectives:** By analyzing the clinical data of patients with obesity who underwent gastric bypass surgery in our center, and to analyze the predictive role of NLR and PLR in postoperative complications and weight loss after gastric bypass surgery.

**Methods:** The clinical data of patients with obesity who underwent gastric bypass surgery in Xiaolan People's Hospital of Zhongshan from 2015 to 2022 were retrospectively collected. Follow-up visits will be conducted at 1, 3, 6, and 12 months after the surgery. We adopted receiver operating characteristic curve (ROC curve) to find out the cutoff point of NLR and PLR. The differences were analyzed by subgroup analysis using cutoff point grouping. Independent samples t-test and Fisher's exact probability method were used to evaluate the effects of different NLR and PLR groups.

**Results:** A total of 98 patients were collected. There was a statistically significant difference between preoperative and pod3 of NLR and PLR ( $P < 0.001$  and  $P < 0.001$ ). A total of 18 patients occurred complication. The areas under the ROC curve of NLR (pod3) and PLR (pod3) were 0.779 and 0.749 respectively, the differences were statistically significant ( $P < 0.001$  and  $P = 0.001$ ) (Figure 1). There were no statistically significant differences in preoperative NLR and PLR ( $P > 0.05$ ). The cutoff point of NLR (pod3) and PLR (pod3) were 10.97 and 104.18, respectively. According to the cutoff point, they were divided into G1(NLR<10.97), G2(NLR10.97), G3(PLR<104.18) and G4(PLR104.18) (Table 1). There was a statistically significant difference between G1 and G2 in operation time ( $P = 0.049$ ) and hospitalization cost ( $P = 0.003$ ). There was no statistically significant difference in the others ( $P > 0.05$ ). There was no statistically significant difference between G3 and G4 in all of them. A total of complications in G1 was 13(14.3%,13/91), and G2 was 5, (71.4%,5/7). The difference was statistically significant ( $P = 0.002$ ). The number of complications in G3 was 1(4.3%,1/23), and G4 was 17(22.7%,17/75). The difference was not statistically significant ( $P = 0.064$ ).



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**Conclusion:** NLR (pod3) and PLR (pod3) could be used as indicators to predict the incidence of complications after gastric bypass surgery. And NLR (pod3) was more sensitive than PLR (pod3) in predicting the incidence of complications after gastric bypass surgery. The greater the NLR (pod3), the higher the incidence of postoperative complications. NLR and PLR were not currently supported as evaluation indicators for weight loss after gastric bypass surgery.

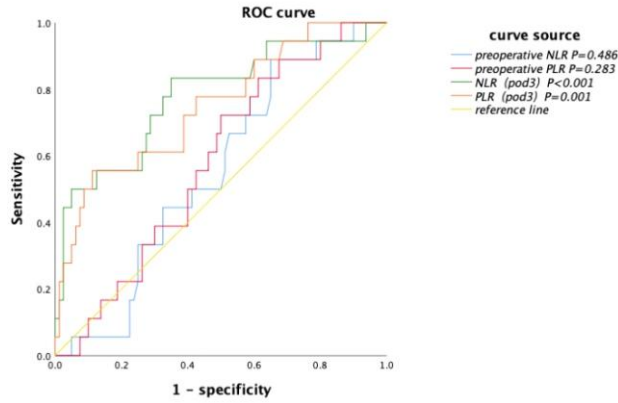


Figure1. The ROC curve of NLR and PLR

Table 1: subgroup analysis according to NLR (pod3) and PLR (pod3)

characteristics	Groups/value or n (%)				$t/\chi^2$		P-value	
	G1	G2	G3	G4	G1 vs G2	G3 vs G4	G1 vs G2	G3 vs G4
TWL (kg)								
POM1	9.72±3.73	8.88±5.66	9.10±2.32	9.83±4.23	0.547	-1.07	0.586	0.288
POM3	17.08±6.80	18.35±7.67	16.88±6.37	17.25±6.99	-0.438	-0.221	0.662	0.825
POM6	23.38±11.28	24.53±14.90	23.49±12.51	23.46±11.26	-0.235	0.01	0.815	0.992
POM12	28.3±16.19	26.47±19.34	27.66±16.65	28.32±16.34	0.264	-0.155	0.793	0.878
TWL%								
POM1	10.45±3.04	9.38±4.49	9.82±1.84	10.54±3.44	0.869	-1.298	0.387	0.199
POM3	18.18±4.80	19.25±3.27	17.97±4.22	18.33±4.88	-0.536	-0.312	0.593	0.756
POM6	24.35±7.17	24.88±8.32	23.65±7.40	24.60±7.19	-0.17	-0.492	0.866	0.624
POM12	28.94±10.67	26.38±11.92	27.89±9.05	29.01±11.23	0.56	-0.395	0.577	0.694
Operative time (min)	141.43±50.64	201.43±51.29	153.70±50.25	143.27±53.58	-3.018	0.828	0.003	0.41
Postoperative hospitalization day of stay (day)	5.49±2.27	14.29±9.64	6.00±2.09	6.16±4.39	-2.408	-0.169	0.052	0.866
Hospitalization cost(yuan)	54870.49±111123.76	93341.96±41461.99	55529.95±12525.54	58258.93±19273.53	-2.448	-0.638	0.049	0.525
complications	13(14.3)	5(71.4)	1(4.3)	17(22.7)	-	-	0.002	0.064



## LAPAROSCOPIC-ENDOSCOPIC MANAGEMENT OF GASTROINTESTINAL BLEEDING AFTER ROUX-EN Y GASTRIC BYPASS - A CASE REPORT

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<sup>1</sup>Prince Of Wales Hospital, The Chinese University of Hong Kong

<sup>2</sup>CUHK Medical Centre

**Background/Introduction:** Gastrointestinal bleeding is a potentially serious complications after Roux-en Y gastric bypass (RYGBP) with a reported incidence of 0.3-3.5%. However, late bleeding occurring more than 30 days postoperatively is extremely uncommon and most of these cases are due to marginal ulcers at the gastrojejunal anastomosis. Rarely, bleeding may occur in the excluded stomach which makes diagnosis and management difficult.

**Objectives:** To report a case of gastrointestinal bleeding due to telangiectasia in the remnant stomach after RYGBP and discuss on the management using laparoscopic-endoscopic method.

**Case Presentation:** A 50-year old male with body mass index (BMI) of 38.2kg/m<sup>2</sup> and multiple obesity-related comorbidities including poorly controlled type 2 diabetes mellitus underwent laparoscopic RYGBP. The procedure was uneventful and he achieved 76.3% of excess weight loss and BMI 28.1 kg/m<sup>2</sup> at 2 years. However, he was admitted for melena and anaemia 2.5 years after operation. Esophagogastroduodenoscopy and colonoscopy were unremarkable. Double balloon enteroscopy was performed but was unable to reach the excluded stomach. Laparoscopic assisted gastrotomy was performed which allowed endoscopic access into the excluded stomach. Multiple telangiectasia with hemorrhagic spots were found and argon plasma coagulation was performed for hemostasis. A gastrotomy tube was placed for subsequent repeated endoscopic ablations for the telangiectasia. Successful hemostasis was achieved and the tube was finally removed at 1 year.

**Conclusion:** Diagnosis and management for gastrointestinal bleeding in the excluded stomach after RYGBP is challenging. Combined laparoscopic-endoscopic approach is a feasible minimally invasive treatment for patients suffering from this rare complication.



## READMISSION TO HOSPITAL FOLLOWING MINIMALLY INVASIVE BARIATRIC SURGERY: A SYSTEMATIC REVIEW

Afiq Anwar<sup>1</sup>, Ke En Oh<sup>1</sup>, Nikhil Vasandani<sup>1</sup>, Satya Chintapalli<sup>1</sup>, Shazly Safian<sup>2</sup>

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<sup>2</sup> Department of Surgery, Pantai Hospital, Kedah,, Malaysia

**Background/Introduction:** The International Federation for the Surgery of Obesity and Metabolic Disorders (IFSO) reported 2,173,444 bariatric surgeries have been performed since the introduction of the global registry of bariatric surgery. Among those surgeries, 507,298 bariatric surgeries were submitted as performed in the latest 2021 global registry report. Despite the ongoing popularity of bariatric surgery, especially minimally invasive techniques, readmission patterns are not well described in the current literature. Therefore, understanding the pattern of readmission and its prevalence would be necessary for improving care delivery for patients undergoing bariatric surgery.

**Objectives:** We aim to conduct a systematic review to understand the pattern and prevalence of readmission to hospitals following the different modalities of minimally invasive bariatric surgery.

**Methods:** A systematic review was done using relevant database to identify studies regarding the readmission of minimally invasive bariatric surgery from 2018 to 2021. Selected studies on the type of procedure, readmission rates and reasons, surgical and preoperative factors were used in this systemic review.

**Results:** Most of the studies were retrospective by study design, and no randomised control studies were identified. There were a totalled 228122(91.7%) laparoscopic and 20734(8.3%) robotic-assisted procedures in eleven studies. Two studies showed mean operative time for all laparoscopic procedures was 101.7 minutes in 130778 patients, while only one study in 2018 showed that the mean operative time for all robotic-assisted procedures was 114.3 minutes in 52 patients. All eleven studies reported readmission rates. Ten of eleven studies reported the readmission rate at 30 days. Among the ten studies, a total of 11516(4.7%) patients were readmitted per 247081 patients for all types of procedures. Roux-en-Y Gastric Bypass had higher rates of readmission for both laparoscopic (5.3%) and robotic procedure (6.8%) compared to other procedures. Nausea/vomiting and headache (34.8%), pain (13.5%), obstruction (7.5%) were the common reasons for readmission.

**Conclusion:** Prospective data and randomised controlled trials are required to identify the factors better and predict the patterns and prevalence of readmission.

**QUANTIFICATION OF LIVER FAT BY MRI BEFORE AND AFTER BARIATRIC SURGERY****Zhaopeng Li***The Affiliated Hospital of Qingdao University*

**Background:** The rising prevalence of obesity has contributed to an increased prevalence of NAFLD. The one of effective measure for NAFLD is bariatric surgery. MRI has allowed for non-invasive evaluation of fat and water composition in tissues.

**Objectives:** To investigate changes before and after bariatric surgery using MRI quantification of liver fat, and found the potential influencing factors.

**Methods:** Twenty-one patients were evaluated by abdominal MRI-scanning before and 1 month after bariatric surgery to measure liver fat content. A paired t-test was applied to investigate the relationship between the major parameters. Univariate and multivariate linear regression analyses were performed to explore factors that influenced the change of liver fat content.

**Results:** There is a decrease in liver fat content (LFC) within one month after bariatric surgery in the MRI-PDFF and MRS. In the multivariate analysis, significant interactions were detected in C peptide (pMRI-PDFF=0.049, pMRS=0.013), insulin (pMRI-PDFF=0.011, pMRS=0.004), HOMA-IR (pMRI-PDFF=0.006, pMRS=0.004). The lymphocytes was only found a risk factor in the LFCMRI-PDFF (p=0.023).

**Conclusions:** LFC was decreased in one month after bariatric surgery. The extent of this decrease is related to baseline BMI, lymphocyte, C peptide, insulin, and HOMA-IR levels. Baseline C peptide, insulin, and HOMA-IR levels were identified as independent risk factors for the change in LFC.

**Table.1:** The independent factors influencing the  $\Delta$ LFC ( MRI-PDFF ) at 1-month postoperative

	Univariable regression		Multivariable regression	
	Standardized $\beta$ coefficient	<i>p</i>	Standardized $\beta$ coefficient	<i>p</i>
BMI (kg/m <sup>2</sup> )	0.493	0.023*	0.296	0.114
Lymphocytes (10 <sup>9</sup> /L)	0.497	0.022*	0.394	0.023*
C peptide(ng/ml)	0.584	0.011*	1.933	0.049*
Insulin(uu/ml)	0.567	0.011*	-2.993	0.011*
HOMA-IR	0.61	0.006*	3.249	0.006*

LFC(MRI-PDFF): Hepat fat content (mm<sup>2</sup>, MRI-PDFF)

$$\Delta\text{LFC} = \text{LFC}_{1\text{-month}} - \text{LFC}_{\text{Baseline}}$$

\*:p<0.05



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**Table.2:** The Independent Factors Influencing The  $\Delta$ LFC(MRS)at 1-month Postoperative

	Univariable regression		Multivariable regression	
	Standardized $\beta$ coefficient	<i>p</i>	Standardized $\beta$ coefficient	<i>p</i>
BMI (kg/m <sup>2</sup> )	0.493	0.023*	0.296	0.114
Lymphocytes (10 <sup>9</sup> /L)	0.497	0.022*	0.394	0.023*
C peptide(ng/ml)	0.584	0.011*	1.933	0.049*
Insulin(uu/ml)	0.567	0.011*	-2.993	0.011*
HOMA-IR	0.61	0.006*	3.249	0.006*

LFC(MRS):Hepat fat content (mm<sup>2</sup>,MRS)

$$\Delta\text{LFC}=\text{LFC}_{1\text{-month}}-\text{LFC}_{\text{Baseline}}$$

\*:p<0.05



## A SINGLE-CENTER RETROSPECTIVE ANALYSIS OF DIABETIC KETOACIDOSIS IN MORE THAN 5000 PATIENTS UNDERGOING BARIATRIC SURGERY

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**Background/Introduction:** Diabetic ketoacidosis (DKA) is one of the life-threatening complications of diabetes. Obesity can lead to type 2 diabetes. With the increasing number of cases of obesity and type 2 diabetes treated by bariatric surgery, The complications of postoperative diabetic ketoacidosis have gradually attracted the attention of clinicians, and it is important to seek effective methods to prevent and treat DKA.

**Objectives:** To retrospectively analyze the data of patients with diabetic ketoacidosis after single-center bariatric metabolic surgery, to study the pathogenesis, clinical manifestations, and treatment methods of DKA induced by surgery, so as to better guide the perioperative management of bariatric metabolic surgery, and to achieve safer and faster postoperative recovery.

**Methods:** The number of DKA cases in more than 5000 bariatric metabolic surgery patients in the First Affiliated Hospital of Jinan University from January 2000 to July 2023 was studied, and the characteristics, causes, clinical manifestations and treatment of the cases were analyzed.

**Results:** A total of 2 patients with DKA were statistically diagnosed, all of them were female, aged 24 years and 36 years, with type 2 diabetes for 4 years and 7 years respectively. The former was treated with metformin and daglizin and stopped the treatment on the day of surgery, while the latter was not treated with specialist treatment. The onset time of DKA was the 3rd and 15th day after surgery, and both patients had elevated blood glucose. After insulin supplement, fluid rehydration and other treatment, recovery.

**Conclusion:** patients with obesity and with type 2 diabetes are prone to DKA under the stress of weight-loss metabolic surgery, and patients who take SGLT2 inhibitors before surgery and do not receive diabetes treatment should be paid attention to. Close monitoring of blood glucose during perioperative period and adequate energy and fluid supplementation after surgery are important measures to prevent DKA.





## INTUSSUSCEPTING ADENOMA POST SLEEVE GASTRECTOMY

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**Background/Introduction:** Gastroduodenal intussusception is an extremely rare incidence following sleeve gastrectomy, and the occurrence of high-grade adenoma as the underlying cause is even rarer.

**Objectives:** This case report emphasizes the importance of considering gastroduodenal intussusception as a potential complication following sleeve gastrectomy, even in the absence of typical bariatric procedure-related symptoms. It highlights the significance of a comprehensive diagnostic workup, including imaging studies and endoscopy, for prompt and accurate diagnosis. Early recognition and timely surgical intervention are crucial to prevent potential complications, such as obstruction or malignancy, associated with gastroduodenal intussusception.

**Methods:** Here, we present a detailed case report of a 47-year-old male patient who developed gastroduodenal intussusception due to a high-grade adenoma after undergoing sleeve gastrectomy. The patient had a history of sleeve gastrectomy performed five years prior and presented with acute episode of upper gastrointestinal bleeding.

**Results:** Radiological imaging, including computed tomography (CT) scans, revealed gastroduodenal intussusception with a protruding mass arising from body of the remnant stomach. Endoscopic examination confirmed the presence of a polypoidal lesion as the lead point causing the intussusception. The patient underwent surgical intervention with a laparoscopic approach, during which the intussusception was successfully reduced, and the polypoidal lesion was resected.

Histopathological analysis of the resected specimen confirmed the presence of a high-grade adenoma with no invasion into muscularis mucosae. The patient had an uneventful postoperative recovery and remained symptom-free during the follow-up period. Regular surveillance endoscopy was recommended to monitor for any recurrence or development of additional lesions.

**Conclusion:** Given the scarcity of reported cases, further research is warranted to better understand the pathophysiology, risk factors, and optimal management strategies for gastroduodenal intussusception in post-sleeve gastrectomy patients. Increased awareness among healthcare providers regarding this rare complication can aid in its early detection and improve patient outcomes.



## SYNCHRONOUS LAPAROSCOPIC EXPLORATION WITH CARDIOPULMONARY RESUSCITATION OF REMEDY FOR DELAYED ABDOMINAL HEMORRHAGE FOLLOWING LAPAROSCOPIC ROUX-EN-Y GASTRIC BYPASS SURGERY

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Tao-tao Zhang and Chang-qing Liu are controlled equally in this work.

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**Introduction:** Postoperative bleeding(POB) is the most frequent postoperative complication after laparoscopic Roux-en-Y gastric bypass surgery (LRYGB).

**Objectives:** To characterize the clinical presentation, therapeutic and sanogenetic process of a case of delayed abdominal hemorrhage following LRYGB.

**Methods:** A 43-year-old woman diagnosed with obesity type 2 diabetes mellitus suffered from acute abdominal pain with a fever of 39 °C on the 13th day after LRYGB, and then admitted to the hospital on the 16th day post-operation with respiratory distress. CT scan showed massive abdominal and pelvic fluid collection, percutaneous abdominal drainage was performed, bloody fluid was drawn out. Intravenous fluids were administered immediately. At the time of blood transfusion, the patient suffered respiratory and circulatory arrest. After 7 minutes of continuous cardiopulmonary resuscitation, the patient returned to the spontaneous rhythm. Laparoscopic exploration was performed immediately. Numerous blood clots were found in the abdominal pelvic cavity, however, active bleeding or gastrointestinal leakage was not found. Three drainage tubes were placed at the subhepatic, splenic fossa, and pelvic cavity respectively. Then the patient was admitted to the intensive care unit (ICU) for further resuscitation. During resuscitation in the ICU, the patient was unconscious for 17 days. During the persistent febrile period, ice blankets were used to control body temperature, and high-grade antibiotics combined with antifungal therapy were used for anti-infection. Nasal feeding with traditional Chinese medicine combined with acupuncture were used to promote recovery of consciousness as adjuvant therapy. Complete weaning was achieved after 34 days of ventilator therapy. After active rehabilitation exercise, the patient gradually transitioned from enteral feeding to oral feeding, and resume daily activities.

**Results:** The patient gradually resumed her activities and was discharged after 99 days of treatment. Language rehabilitation exercise was carried out outside the hospital for eight months.

**Conclusions:** Delayed abdominal hemorrhage following Roux-en-Y gastric bypass surgery is rare and hemorrhagic shock in people with obesity is not easy to detect. Traditional Chinese medicine and acupuncture are helpful for the treatment of hypoxic-ischemic encephalopathy after cardiopulmonary resuscitation.

**Keywords:** Roux-en-Y gastric bypass, Delayed abdominal hemorrhage, Cardiopulmonary resuscitation



## TRACHEAL INJURY AFTER LAPAROSCOPIC SLEEVE GASTRECTOMY: A CASE REPORT

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**Background/Introduction:** Tracheal injury following laparoscopic sleeve gastrectomy is an extremely rare complication which can lead to morbidity and mortality if overlooked.

**Objective:** The purpose of this case report is to share our experience of a rare but potentially lethal complication in order to aid in rapid detection and management in case of future occurrences.

**Methods:** We present a case of a 34 year-old Korean woman with a history of hypertension that was diagnosed with tracheal injury after undergoing laparoscopic sleeve gastrectomy.

**Results:** Laparoscopic sleeve gastrectomy was uneventfully performed on the day of the operation. However, on the same day, the patient developed diffuse swelling around the neck, with the absence of other symptoms. The patient was put under close observation in the surgical ICU. Upon identification of pneumonitis on routine chest PA on the day after the operation, a CT scan of the chest was prompted, where pneumothorax, pneumomediastinum, and pneumopericardium due to tracheal injury was observed. The patient was transferred to a tertiary healthcare facility, where she was put under conservative treatment for 4 days. The patient was discharged without any remaining problems.

**Conclusion:** Tracheal injury can be silent in presentation, which calls for a high index of suspicion. Without early detection and adequate treatment, the patient's condition may deteriorate rapidly; transference to a tertiary healthcare facility must be promptly considered.



## A CASE REPORT OF DEATH DUE TO HEART FAILURE 1 MONTH AFTER BARIATRIC SURGERY

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Xiaocheng Zhu<sup>1</sup>

<sup>1</sup>Affiliated Hospital of Xuzhou Medical University

**Background:** Bariatric surgery is the most effective treatment for severe obesity. For patients with severe obesity and dilated cardiomyopathy, there is no clinical consensus on whether they should accept surgery to reduce cardiac load. There are no relevant guidelines for when surgical treatments are safest for such patients.

**Objectives:** Our center once performed a bariatric surgery for a patient with severe obesity with dilated cardiomyopathy. One month after the operation, the patient came to emergency again for unknown reasons, and ultimately died of heart failure. We would like to share our painful experiences and valuable lessons by reporting this clinical case.

**Methods:** The patient was a 28-year-old male with BMI of 55.2kg/m<sup>2</sup>. The patient was usually poor health with a history of cardiac enlargement for 2 years. He often suffered from hypotension, with the lowest blood pressure being 80/50mmHg. He often had been admitted to the cardiology department of different hospitals. After joint evaluation by the department of cardiology, anesthesiology and bariatric, the patient underwent “laparoscopic sleeve gastrectomy” on November 29, 2021. The surgical process was smooth, and he was discharged 3 days later.

**Results:** One week after discharge, the patient contacted us saying that he recovered well, and he was satisfied with the effect of the operation. However the patient went to the emergency on December 31, 2021 and he was admitted to the department of cardiology due to heart failure. Later he was transferred to the ICU. Ultimately the patient died on January 1, 2022 after the rescue failed.

**Conclusion:** For patients with cardiac insufficiency, even if the patient is successfully operated and discharged from hospital, the organic heart disease is difficult to recover only through surgery, and there are still risks of cardiac death. Although bariatric surgery is satisfactory, it cannot completely improve the cardiac function and the patient still requires multidisciplinary treatment after operation.



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## BIOLOGICAL THERAPY OF BARIATRIC SURGERY COMPLICATIONS (A SERIES OF CLINICAL CASES)

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**Abstract:** In recent years, the number of performed bariatric interventions has increased significantly. Despite the high effectiveness of this method of treatment, the occurrence of complications is not uncommon. The most common complications are stapler line leaks, occurring in 1.5-2.4% of cases; anastomotic leakage after OAGB – in 2.2-8% of cases; long-term non-healing and recurrent ulcers of gastroenteroanastomosis - up to 10% of cases. The aim of the study is to show the effectiveness of methods of biological therapy of bariatric surgery complications.

**Materials and methods:** The study included 12 patients at various times after bariatric bypass surgery (9 after OAGB and 3 after RYGB) with long-term non-healing and recurrent gastroenteroanastomosis ulcers (>6 months); 2 patients with anastomotic leakage after OAGB; 2 patients with the stapler line leakage after LSG. The following types of therapy were used PRP therapy, stromal vascular fraction (SVF) and fibrin glue.

**Results:** After 4 courses of PRP therapy, a patient with a peptic ulcer of gastroenteroanastomosis underwent an endoscopic examination, the results of which showed complete healing of the ulcer. A patient with the failure of the upper third of the stapler line was applied with a two-component fibrin glue "Cryophyte" with a positive effect. In addition, positive dynamics was observed in the patient with the use of three-component therapy of anastomotic leakage.

**Conclusions:** Based on the above facts, it can be concluded, that biological therapy demonstrates great potential value in the treatment of bariatric surgery complications such as long-term healing ulcers and leaks.

**Key words:** bariatric complications, biological therapy, PRP therapy, stromal vascular fraction, fibrin glue, stapler line leakage, gastroenteroanastomosis ulcers, anastomotic leakage.

**Conflict of interest:** The authors declare that there is no conflict of interest.



## A CASE REPORT ON SUCCESSFUL CORRECTION OF MALNUTRITION AFTER SG-TB THROUGH NUTRITIONAL SUPPORT TREATMENT

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**Background/Introduction:** SG+TB surgery has been reported to be effective in the treatment of obesity and diabetes mellitus, but in some cases there are problems with malnutrition and diarrhea, which may be related to surgery and patient compliance.

**Objectives:** To investigate whether malnutrition can be improved by correcting life style, strengthening follow-up and monitoring, and supplementing enough vitamins and nutrients.

**Methods:** This is a clinical case report of a 47-year-old male patient, height: 183cm, weight: 103.7kg with BMI: 30.9kg/m<sup>2</sup>; associated with type 2 Diabetes Mellitus; who had a SG+TB on 2022 July. The patient opted to return to the hospital for a checkup after experiencing diarrhea for 4 months with a frequency of 6 to 8 times a day after being released from the hospital. The examination results after admission showed that the patient was suffering from malnutrition, hypoalbuminemia, hypokalemia, low red blood cell count, and low hemoglobin. After placing the central vein, we administer to him adequate fluid rehydration and better nutritional support with nutrients like vitamin C, B1, B6, and B12, albumin, Chloride of Potassium, Glucose, Calcium, Amino acid and fat emulsion.

**Results:** After following the adequate treatment with the fluid rehydration and better nutritional support, the laboratory tests results shows: Calcium level 2,15mmol/L; Albumin level 39.8g/L; Red blood count 132g/L. The patient's condition improved after two weeks in the hospital and a proper fluid admission and nutritional support, and he was able to leave without experiencing any further issues.

**Conclusion:** Following a SG+TB procedure, a patient must consume enough proteins and maintain a healthy diet to avoid issues like malnutrition. Once malnutrition occurs after surgery, we can correct it through nutritional support, and the patient's prognosis is good. After the patient went home, he should insist on oral vitamins, trace elements and protein powder according to the requirements of the doctor's orders; And healthy diet and exercise. After returning home 6 months later on follow up, the patient is still very stable.



## EVIDENCE FROM THE NHANES ON THE ASSOCIATION BETWEEN BARIATRIC SURGERY AND BONE MINERAL DENSITY REDUCTION

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**Background:** Obesity is a public health challenge worldwide. Bariatric and metabolic surgery has become one of the effective methods for the treatment of obesity. However, some studies suggest that bariatric metabolic surgery may negatively affect bone health. Therefore, a deeper understanding of the relationship between bariatric surgery and bone mineral density (BMD) reduction is warranted.

**Objectives:** The aim of this study was to analyze the association between bariatric surgery and BMD reduction.

**Methods:** Data were obtained from the 2017-2018 National Health and Nutrition Examination Survey (NHANES). A total of 3016 participants aged 18 years or older were included in the analysis. Participants with BMI  $\geq 40$  kg/m<sup>2</sup> or BMI  $\geq 35$ kg/m<sup>2</sup> with comorbidities were considered to be eligible for bariatric surgery. Participants underwent BMD testing with dual-energy X-ray absorptiometry, with osteopenia defined as BMD values that were 1 to 2.5 standard deviations below the mean for male and female participants 20 to 29 years of age and osteoporosis defined as BMD values that were more than 2.5 standard deviations below the younger reference mean, both of which are considered to be BMD reduction. Multivariate logistic regression was used to analyze the related factors of BMD reduction, and further stratified analysis was used to improve the stability of the results.

**Results:** Participants were divided into three groups: (1) patients who underwent bariatric surgery (n=64), (2) eligible patients who did not undergo bariatric surgery (n=834), and (3) ineligible patients (n=2118). A total of 268 participants reported BMD reduction. In the final model, after adjusting for possible potential confounders, compared with eligible patients who did not undergo bariatric surgery, the surgery group (OR: 1.368, 95%CI: 1.202-1.567, P=0.021). Stratified analysis showed that women, older age, and those who did not exercise had an increased risk of BMD reduction in the bariatric surgery group.

**Conclusion:** The present study demonstrated an association between bariatric surgery and BMD reduction. After surgery, oral intake reduction and altered absorption of food in the stomach and small intestine, which can reduce the absorption of multivitamins and trace elements. These results suggest that surgeons should weigh the potential effects on bone health when deciding whether to perform bariatric surgery, and consider appropriate preventive measures for BMD reduction such as vitamin and calcium supplementation after surgery. Further research could help to gain insight into this correlation and provide better guidance and management strategies.



## REDUCTION OF GASTROILEAL ANASTOMOSIS FOR PATIENTS WITH DIARRHEA AFTER SLEEVE GASTRECTOMY WITH TRANSIT BIPARTITION

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**Background:** Sleeve gastrectomy with transit bipartition is an effective bariatric procedure, but some cases have unacceptable diarrhea. There is no easy way to solve the problem so far.

**Objective:** To explore if reduction of gastroileal anastomosis relieve diarrhea after Sleeve gastrectomy with transit bipartition (SG+TB).

**Methods:** Of 500 patients with SG+TB, two patients, one male 45 ys and one female 40 ys, complained unacceptable diarrhea were investigated. Both have SG+TB more than one year with satisfactory weight loss and diabetes remission. After endoscopic exploration, gastroileal anastomosis was identified and confirmed without inflammation. 4 clips with purse-string suture were placed around the anastomosis to decrease the size of anastomosis to half. Bowel movement and fecal condition were evaluated.

**Results:** The duration of procedure time was 20 and 15 minutes. Both patients discharged in 24 hours without procedure related discomfort and complication. After the procedure, for the male patient, his bowel movement was improved from 6 times per day to 3 times per day with soft stool. For the female patient, her bowel movement was improved from 5 times per day to 1 time per day with soft stool.

**Conclusion:** Endoscopic suturing can be technically feasible and safe to reduce gastroileal anastomosis, and this easy method might relieve diarrhea for patients with SG+TB.





## ATTEMPTED OAGB CONVERTED TO A SLEEVE GASTRECTOMY IN AN ADULT PATIENT WITH UNSUSPECTED INTESTINAL MALROTATION

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**Background/Introduction:** Intestinal malrotation is an anatomical anomaly of the positioning of the gastrointestinal tract and vessels. Adult presentation is very rare and only 0.2 to 0.5 % of cases have been reported. The prevalence of asymptomatic malrotation in adults is unknown. Unexpected encounters during surgery for obesity such as midgut malrotation cause specific diagnostic and technical challenges to the operating surgeon.

**Objectives:** We aim to describe a rare case of unexpected finding of complete intestinal malrotation in a 62-year-old male midway during a OAGB procedure for obesity.

**Case Presentation:** A 62-year-old male with hypertension, dyslipidaemia, diabetes mellitus, osteoarthritis and obstructive sleep apnoea with a body mass index of 49 kg/m<sup>2</sup> (weight: 125kg) was planned for a laparoscopic OAGB after routine work up. Owing to the associated metabolic syndrome, a decision was made to perform a laparoscopic OAGB . A long stomach with adhesions to the bulky left hepatic lobe was noted. A gastric tube was created along the lesser curvature using laparoscopic endo-GIA staplers. During the attempt to identify the suitable small bowel loop, an unexpected completely malrotated gut was noted. The ileo-caecal junction and caecum were found in the left iliac fossa while the proximal small bowel was encased into a cocoon in the right iliac fossa region. Due to the intraoperative difficulty in identifying the correct loop to anastomose to the gastric tube an intraoperative decision was taken to convert the procedure to a sleeve gastrectomy. The created gastric tube was re-anastomosed to distal stomach and the redundant stomach along the greater curvature was resected. Post-operatively the patient had an uneventful recovery. Weight loss was satisfactory (15 kg over 6 months) with better control of comorbidities.

**Conclusion:** Midgut malrotation encountered in obesity surgery is a rare and challenging encounter for the surgeon. The surgeon may have performed certain irreversible steps and therefore, may have to modify the procedure to suite the patient's anatomy. Attempted OAGB converted to a sleeve gastrectomy was a successful bailout procedure with good postoperative outcomes.



## ESTIMATING RISK OF METABOLIC DISORDERS BY MENDELIAN RANDOMIZATION ANALYSIS USING GENETICALLY PREDICTED WAIST CIRCUMFERENCE, HIP CIRCUMFERENCE, AND WAIST-TO-HIP RATIO

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**Background:** Obesity index has been reported to be associated with metabolic disorders. To investigate the causal relationship between Waist-to-hip ratio, Hip circumference, Waist circumference and metabolic disorders, we performed Mendelian randomization (MR) analysis.

**Methods:** The study included 21,533 individuals of European origin with metabolic disorders and 197,259 control participants. In addition, data on obesity indices were obtained from six included GWAS studies. The studies primarily used inverse variance weighting to explore the causal relationship between exposure and outcome. In addition, various sensitivity analysis techniques such as MR-Egger, weighted median, simple model, weighted model, and MR-PRESSO were employed to enhance the robustness of the final study results.

**Results:** The obtained data showed that Waist-to-hip ratio [ORIVW: 1.40. 95% CI: 1.14 -1.72; P = .0013], Hip circumference [ORIVW: 0.98. 95% CI: 0.80-0.96; P = .005], Waist circumference [ORIVW: 1.25. 95% CI: 1.04-1.51; P = .002] may be associated with the risk of metabolic disorders.

**Conclusion:** Our findings illustrate the causal, independent effects of waist circumference, hip circumference, and waist-to-hip ratio on metabolic disorders.

**Keywords:** Metabolic Disorders; Biomarkers; Mendelian randomization; GWAS.



## THE POTENTIAL ROLE OF BARIATRIC SURGERY ON WHITE TO BROWN/BEIGE ADIPOSE TISSUE CONVERSION

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**Background:** Bariatric surgery is an effective treatment for obesity causing changes in energy expenditure. Brown adipose tissue (BAT) is an energy-related organ, and the potential effects of bariatric surgery are yet to be investigated. While alterations in gut-brain communication are increasingly implicated in the improved eating behavior, less is known about the mechanistic basis for energy expenditure changes. Brown adipose tissue (BAT) and beige adipose tissue (BeAT) have emerged as major regulators of whole-body energy Expenditure in humans.

**Objective:** The present review aims to understand the possible effects of BS on the main determinants of adipose tissue thermogenesis and present scientific evidence showing the alteration of cellular adipose tissue energy expenditure indicators after bariatric surgery.

**Methods:** This review article summarizes studies that were investigating the influence of different type of bariatric surgeries on volume and/or activity of BAT and BeAT thermogenesis. Scopus and PubMed database were consistently searched up to Feb 2023, for animal and human studies providing knowledge relating to the effects of bariatric surgery on adipose tissue related energy expenditure and BAT and BeAT volume and activity.

**Results:** In this review, we discuss the steadily growing evidence from preclinical and clinical studies suggesting that Roux-en-Y gastric bypass (RYGB) and sleeve gastrectomy (SG), the two most commonly performed bariatric surgeries, enhance BAT/BeAT thermogenesis. The rodent and human studies suggested that RYGB mainly enhances BeAT thermogenesis while SG mainly enhances BAT thermogenesis. RYGB may increase BeAT thermogenesis through a UCP1-independent, PLIN1/2- and UCP2-dependent mechanism involving PLIN1-mediated fatty acid transfer from lipid droplets to UCP2.

**Conclusion:** Bariatric surgery may increase BAT and BeAT volume and activity, thus improving post-op body energy expenditure. These effects may play a role in the improvement of whole-body insulin sensitivity leading to long-term increased overall metabolic health. Further experiments are essential in order to verify these effects.

**Key Words:** Brown adipose tissue, thermogenesis, Basal metabolic rate, Resting energy expenditure, Obesity surgery.



## CAUSALITY OF HYPERTENSION, BLOOD PRESSURE MEDICATIONS, AND THYROIDITIS: UNIVARIATE AND MULTIFACTORIAL MENDELIAN RANDOMIZATION STUDIES

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**Background:** Previous studies have demonstrated that thyroiditis was associated with high blood pressure.

**Objectives:** This study was aimed to investigate the causal relationship between high blood pressure, blood pressure medication and thyroiditis through Mendelian Randomization (MR) analysis.

**Methods:** The ukb-a-437 of high blood pressure, 10,894,596 single nucleotide polymorphisms (SNPs) data from 336,683 samples, ukb-a-450 of blood pressure medication (10,894,596 SNPs from 180,203 samples) and finn-b-THYROIDITIS of thyroiditis (16,380,459 SNPs from 214,649 samples) were acquired from Integrative Epidemiology Unit (IEU) Open genome-wide association study (GWAS) database. The causal effect of high blood pressure, blood pressure medication and thyroiditis was investigated using MR-Egger, Weighted median, Inverse variance weighted (IVW), Simple mode and Weighted mode, and results were primarily referred to IVW. In addition, sensitivity analysis, including heterogeneity test, horizontal pleiotropy and Leave-one-out (LOO) methods were conducted to evaluate stability of univariable MR results.

**Results:** By univariate MR analysis, 146 single nucleotide polymorphisms (SNPs) associated with high blood pressure and 56 SNPs associated with blood pressure medication were obtained as IVs to evaluate the causality with thyroiditis. The results revealed that high blood pressure and blood pressure medication were causally associated with thyroiditis and were risk factors for thyroiditis. Heterogeneity tests ( $Q_{pval} < 0.05$ ) suggested that there both were heterogeneity among the samples, but P-value for IVW was less than 0.05, suggesting that the results were not affected. Meanwhile, there was no horizontal pleiotropy in univariable MR ( $P > 0.05$ ), and LOO analysis verified univariable analysis results were reliable and steady. In addition, a total of 316 SNPs were utilized as instrumental variables for the MVMR analysis. The results indicated that high blood pressure ( $P = 0.176$ ,  $OR = 0.107$ ) was a protective factor for thyroiditis and blood pressure medication ( $P = 0.031$ ,  $OR = 68.929$ ) was a risk factor for thyroiditis.

**Conclusion:** The results suggested that high blood pressure and blood pressure medication were risk factors for thyroiditis and would increase the occurrence of thyroiditis in univariate MR, respectively. But, the effect of high blood pressure was corrected by blood pressure medication after blood pressure normalization would no longer have an effect on thyroiditis in MVMR.



## UNVEILING NOVEL TARGETS INFLUENCING THE EFFICACY OF WEIGHT LOSS INTERVENTIONS THROUGH INTEGRATION OF GENETIC AND BLOOD PROTEOMIC DATA

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**Background:** Dietary interventions for weight loss often exhibit instability and a high likelihood of rebound, yet the underlying mechanisms remain unclear. Genome-wide association studies (GWASs) have identified numerous risk genetic variants for interfering the efficacy of weight loss in individuals with obesity. However, understanding how these genes contribute to the risk of suboptimal weight loss presents a challenging puzzle.

**Methods:** To effectively translate genetic associations into potential targets for weight loss interventions, we employed an integrative analytical approach utilizing blood proteomics. This approach involved the systematic application of proteome-wide association studies (PWAS) and Mendelian randomization (MR).

**Results:** Our analysis identified five genes (GPC5, DEFB1, CHI3L1, CCL25, and GPX7) whose blood protein abundance is causally linked to the effectiveness of weight loss ( $P < 0.05$  for proteins identified in PWAS and MR). After Bonferroni adjustment, a high protein levels of GPC5 were indicative of a favorable response to weight loss, with an odds ratio (95% confidence interval) of 0.87 (0.81-0.93),  $p = 0.044$ . Among these genes, DEFB1, along with its protein abundance, exhibited significant associations in blood-based studies and retained significance at the transcriptomic level.

**Conclusion:** Our current study, integrating genetic, proteomic, and transcriptomic approaches, has unveiled promising genes that may offer new insights for future functional investigations and serve as potential drug targets to enhance the efficacy of weight loss interventions in individuals with obesity

**Key words:** Weight loss, Genemics, Proteome, Mendelian randomization



## PREVALENCE OF NON-ALCOHOLIC FATTY LIVER DISEASE IN PATIENTS WITH SIMULTANEOUS TYPE 2 DIABETES MELLITUS AND OBESITY

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**Background/Introduction:** Non-alcoholic fatty liver disease (NAFLD) had high prevalence in patients with obesity or type 2 diabetes mellitus (T2DM). However, less is known about the prevalence of NAFLD in patients with simultaneous T2DM and obesity.

**Objectives:** The aim of this study is to investigate the prevalence of NAFLD in patients with simultaneous T2DM and obesity.

**Methods:** Patients with obesity receiving bariatric surgery were retrospectively collected between June 2020 and August 2023 in West China Hospital of Sichuan University. All cases of NAFLD and non-alcoholic steatohepatitis (NASH) were diagnosed by pathology.

**Results:** A total of 241 patients were included, where 89 patients had prediabetes and 152 patients had T2DM. The prevalence of NAFLD and NASH was 98.76% and 68.88%, respectively. Besides, the prevalence of NASH was significantly higher in patients with T2DM than in those with prediabetes (78.94% vs. 51.69%,  $P < 0.001$ ). Furthermore, the prevalence of at-risk NASH, which was defined as biopsy-proven NASH with stage 2 or higher fibrosis, was 34.02% in all the included patients. T2DM was associated with a significantly higher prevalence of at-risk NASH than prediabetes (42.76% vs. 19.10%,  $P < 0.001$ ). For patients with different degrees of obesity, T2DM was also associated with a significantly higher prevalence of at-risk NASH than prediabetes in patients with BMI  $< 35$  (36.07% vs. 11.11%,  $P = 0.007$ ) and patients with BMI  $\geq 35$  (47.25% vs. 24.53%,  $P = 0.007$ ).

**Conclusion:** The at-risk NASH had a high prevalence in patients with simultaneous T2DM and obesity, particularly in those with a BMI of  $\geq 35$ . Therefore, great attention should be paid to patients with simultaneous T2DM and severe obesity.



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Table 1. Prevalence of NAFLD and NASH in different population groups

Group	Number of participants	Prevalence of NAFLD	Prevalence of NASH
Overall patients	241	98.76%	68.88%
Men	90	98.89%	77.78%
Women	151	98.68%	63.58%
T2DM	152	99.34%	78.94%
28≤BMI<35	61	100%	77.05%
35≤BMI	91	98.90%	80.22%
Prediabetes	89	97.75%	51.69%
28≤BMI<35	36	94.44%	44.44%
35≤BMI	53	100%	56.60%

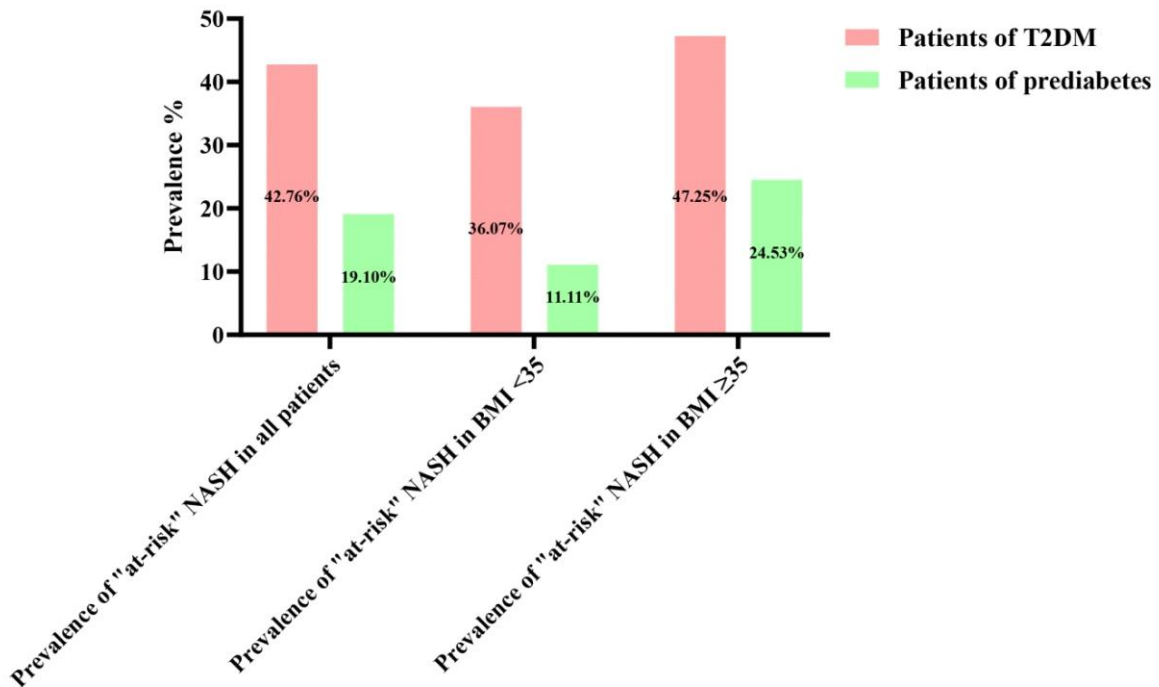


Figure 1. Prevalence of at-risk non-alcoholic steatohepatitis in different population groups.



## A SHORT-TERM STUDY OF ALTERATIONS IN THE SERUM URATE CONCENTRATIONS AND ITS RELATED FACTORS AFTER BARIATRIC SURGERY

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### Abstract

**Objective:** To explore the change rule of serum uric acid value after weight loss, and to find the factors leading to the fluctuation of serum uric acid value, so as to provide clinical basis for the prevention of hyperuricemia after weight loss.

**Methods:** People with obesity who underwent bariatric surgery in Affiliated Hospital of Zunyi Medical University from October 11, 2021 to April 13, 2022 were prospectively collected. Weight data and relevant examination results were collected at four time points before surgery, one day after surgery, one month after surgery and three months after surgery. The statistical difference and significance were sorted out and analyzed, the trend of serum uric acid value in the early postoperative period was found, and the relevant influencing factors of postoperative serum uric acid value were analyzed.

**Results:** A total of 142 patients were included, and patients with oral urico-lowering drugs were excluded. There were 91 patients with hyperuricemia before surgery, 3 patients had gout within 1 month after surgery, and none had gout from 1 to 3 months after surgery. The serum uric acid value was 401.440 μmol/L before operation, the mean value post-op at first day was 343.690 μmol/L (pre-surgery vs post-op at first day,  $p < 0.001$ ), the mean value post-op at 1 month was 443.810 μmol/L (pre-surgery vs post-op at 1 month,  $p < 0.001$ ; post-op at first day vs post-op at 1 month,  $p < 0.001$ ), the mean value post-op at 3 months was 365.980 μmol/L (pre-surgery vs post-op at 3 months,  $p < 0.001$ ; post-op at 1 month vs post-op at 3 months,  $p < 0.001$ ). The mean body mass index (BMI) before surgery was 34.456 kg/m<sup>2</sup>, the mean BMI one month after surgery was 30.408 kg/m<sup>2</sup>, and the mean BMI three months after surgery was 27.193 kg/m<sup>2</sup>. The postoperative BMI of the patients with weight loss showed a significant trend of continuous decline ( $P < 0.05$ ). Postoperative upper arm circumference, chest circumference, waist circumference, hip circumference, thigh circumference, alanine aminotransferase (ALT), aspartate aminotransferase (AST), triglyceride, total cholesterol and fasting blood glucose showed a significantly decreased trend ( $P < 0.05$ ). Correlation analysis indicated that the increase of ALT, cystatin C and triglyceride was positively correlated with the increase of serum uric acid, suggesting that it may be a risk factor for the early postoperative uric acid increase. Average water intake, Women and fasting blood glucose were negatively correlated.

**Conclusion:** Serum uric acid fluctuated after bariatric surgery, decreased slightly on the first day after surgery, increased significantly at 1 month after surgery, but gradually decreased at 3 months after surgery. Short term sleeve gastrectomy has significant effects on weight loss, reduction of body circumference, obesity complications and related test indicators of remission. Average water intake decreased, Male, ALT, cystatin C, and triglyceride may be risk factors for elevated serum uric acid in the early postoperative period.

**Key Words:** Bariatric surgery; Hyperuricemia; Obesity; Uric acid





## TRAINED IMMUNITY IN VISCERAL ADIPOSE TISSUE PROMOTES WEIGHT CYCLING IN MICE

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**Background/Introduction:** Obesity increases the risk of many diseases. While there is a growing interest and approach to weight loss, the high incidence of weight cycling (WC) inhibits the pursuit of health. Clinically, compared to obesity, WC is associated with increased cardiovascular-related risks. However, a limited number of studies have investigated the mechanisms underlying WC.

**Objectives:** Not Applicable.

**Methods:** This multi-omics study involved combining RNA-seq and scRNA-seq datasets downloaded from the Gene Expression Omnibus database, including datasets on visceral adipose tissues (VAT) from lean, with obesity and weight cycling (WC) mice. Candidate genes and ligand receptors that were differentially expressed and their functions in WC were identified via principal component analysis (PCA), gene differential expression analysis, gene set enrichment analysis (GSEA), Gene Ontology (GO), Kyoto Encyclopedia of Genes and Genomes (KEGG) and cell-cell interaction (CCI) analyses.

**Results:** Inflammatory responses were highly activated in VAT of WC mice, compared to mice with obesity, implying the presence of trained immunity. The abundances of macrophages, stromal cells and mast cell subpopulations were found to be high. Functional enrichment analysis revealed a significant state of immune activation in macrophages and stromal cells, confirming the role of trained immunity in WC. Moreover, the CCI analysis revealed enhanced MIF/(CD74+CD44), APP/CD74 and Ccl6/Ccr2 paracrine secretion from macrophages in response to adipose precursor cells (APCs), which may be mediated by trained immunity during WC.

**Conclusion:** Trained immunity is present in macrophages of WC mice VAT, where it promotes the increase in the number and senescence of APCs, leading to WC development.

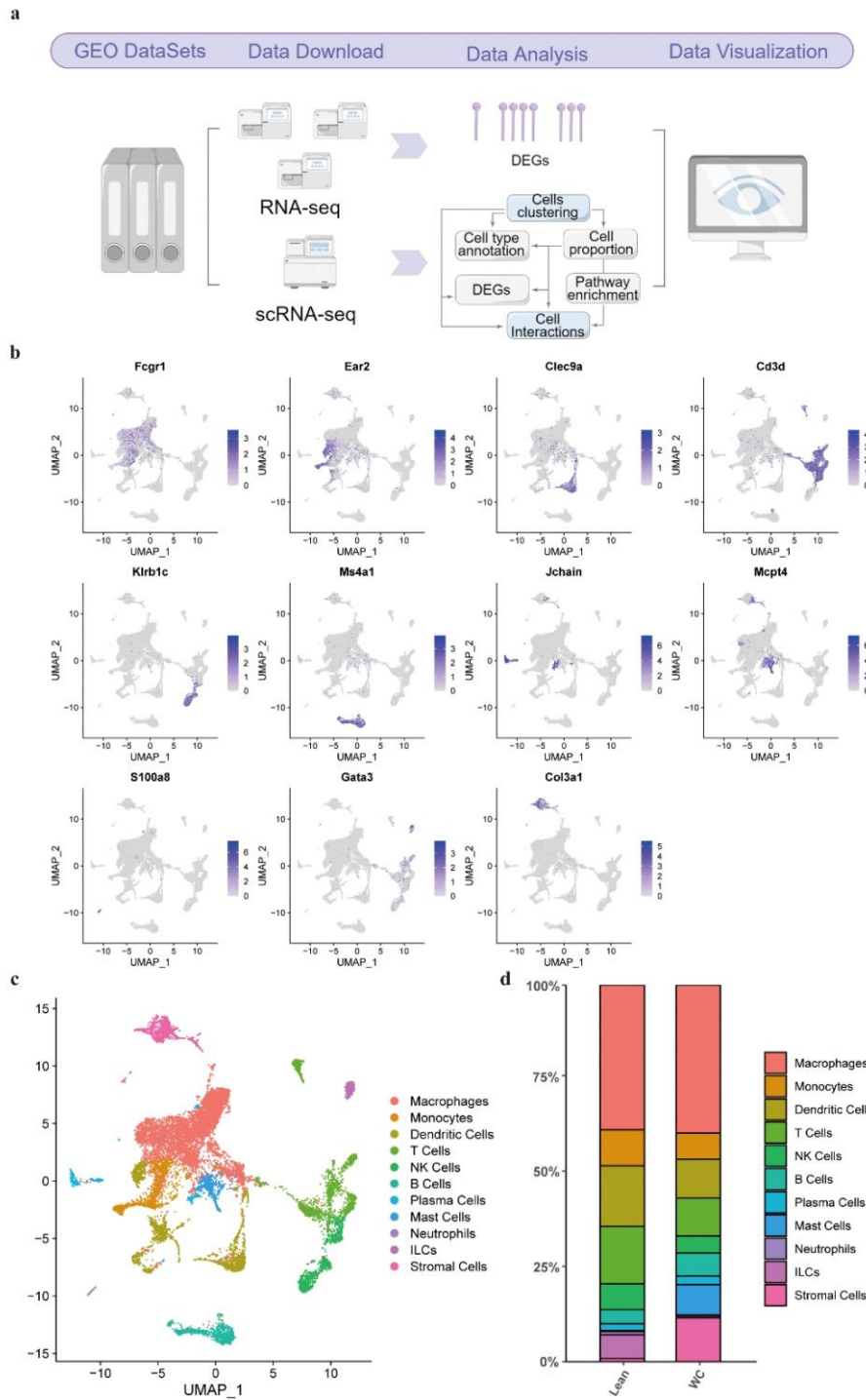


Fig. 1. Public single cell RNA-seq analysis of the adipose tissue cellular composition from lean and weight cycling mice.

**a** Schematic of data mining and analysis. **b** Selected markers of specific cell subsets based on gene expression. **c** Uniform Manifold Approximation and Projection (UMAP) plot of single cell isolated from the epididymal adipose tissue (eAT) of lean and weight cycling (WC) mice. **d** Bar plots showing the proportion of all cell types populations derived from lean and WC mice.

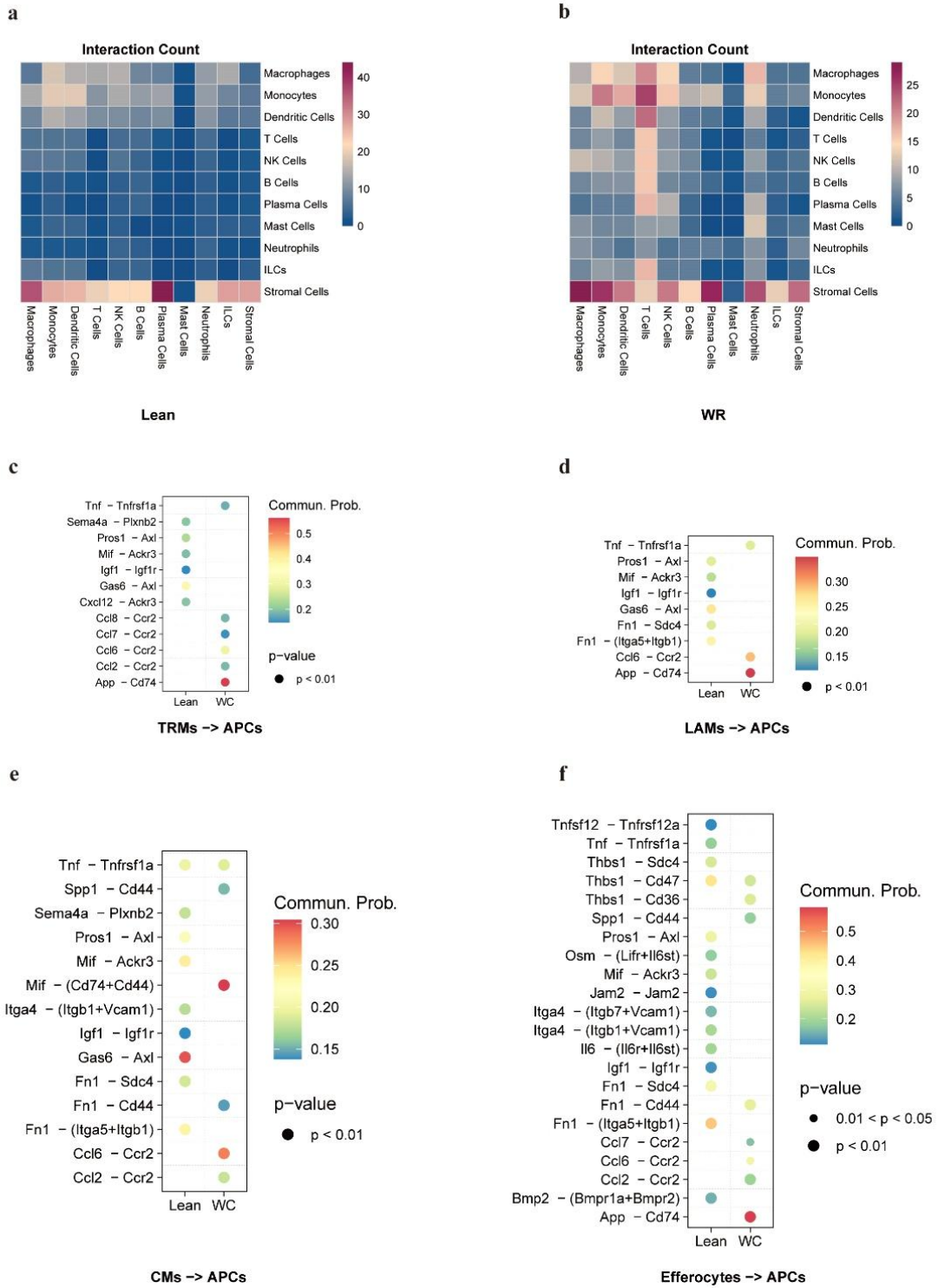


Fig. 2 Inference and analysis of cell-cell communication between macrophages and adipocyte precursor cells.

**a** Interaction heatmap plotting the total number of lean eAT-derived cell receptor (y axis) and ligand (x axis) interactions for all cell types. The color represents the number of interactions between cell types: higher number of interactions (red), lower number of interactions (blue). **b** Interaction heatmap plotting the total number of weight cycling (WC) eAT-derived cell receptor (y axis) and ligand (x axis) interactions for all cell types. **c,d,e,f** Dotplot showing cell-cell interaction(CCI) of tissue resident macrophages(TRMs) to adipocyte precursor cells(APCS), lipid-associated macrophages(LAMs) to APCs, Cycling macrophages (CMs) to APCs, and efferocytes to APCs.



## CLINICAL APPLICATION AND CHALLENGES OF SPECIALIZED BOUGIE IN METABOLIC AND BARIATRIC SURGERY: A NATIONWIDE CROSS-SECTIONAL SURVEY

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**Background:** Bougie is an essential tool for achieving optimal sleeve size or pouch creation in metabolic and bariatric surgery (MBS). The purpose of this study was to investigate the clinical application and associated challenges of specialized Bougie in MBS in China, identify targeted solutions, and guide clinical practice.

**Methods:** A survey questionnaire was developed through a webinar with MBS experts. The questionnaire was distributed online to MBS centers throughout China between March 9 and 15, 2023. Statistical analyses were performed to evaluate the responses.

**Results:** The survey received 183 valid responses from 28 provinces (including autonomous regions and municipalities) in China. Overall, 86.34% of the centers reported using specialized Bougie for MBS, and 79.23% of these centers reported frequent use. Among the frequently used centers, 40.51% reported reusing Bougie after disinfection due to the high cost of purchasing new ones. The most commonly used Bougie tube size was 36Fr in laparoscopic sleeve gastrectomy and laparoscopic gastric bypass, with other centers using sizes ranging from 30-38Fr. However, 41.53% of the centers reported Bougie tube-related complications, with tension rupture and esophageal injury being the most common.

**Conclusions:** This nationwide survey provides an overview of the current clinical application and challenges of specialized Bougie in MBS among centers in China. Further efforts are necessary to improve healthcare professionals' knowledge of Bougie, establish standards, and promote its standardized use through targeted education and training to prevent complications and optimize patient outcomes.



## IS TIRZEPATIDE NOT A THREAT FOR THE BARIATRIC SURGERY?; A PRELIMINARY RETROSPECTIVE STUDY IN REGIONAL HOSPITAL IN JAPAN

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**Background/Introduction:** In April 2023, tirzepatide, the world's first dual glucagon-like peptide-1 (GLP-1) and glucose-dependent insulinotropic polypeptide (GIP) receptor agonist, was launched in Japan. Although the efficacy for reducing appetite and weight loss is expected not only for type 2 diabetes (T2D) but also for obesity, there are only a few reports of the efficacy in clinical practice and comparisons with the bariatric surgery.

**Objectives:** The objectives of this study were to examine the effect of tirzepatide on people with T2D and obesity, and to compare the efficacy with those of bariatric surgery.

**Methods:** We conducted a retrospective cohort study for Japanese people with T2D and obesity, who were administered tirzepatide (TZP group) or conducted the bariatric surgery (surgical group). Eligible people with T2D were those with body mass index (BMI)  $\geq 35 \text{ kg/m}^2$  or those with BMI  $\geq 32 \text{ kg/m}^2$  and glycated hemoglobin (HbA1c)  $\geq 8.0\%$ . People were evaluated for the changes of HbA1c and BMI in each group three months after initiation of medication, or surgery. Additionally, the differences of change in HbA1c and BMI between the two groups were investigated.

**Results:** 11 individuals were eligible and 2 individuals discontinued administration of tirzepatide, thus 9 individuals were finally analyzed (TZP group; N=4, surgical group; N=5). Background characteristics showed no significant differences in HbA1c and BMI between two groups. In TZP group, HbA1c significantly reduced ( $8.3 \pm 1.4\%$  to  $6.8 \pm 0.8\%$ , N=3,  $P < 0.05$ ) and BMI tended to decrease ( $37.1 \pm 3.9 \text{ kg/m}^2$  to  $36.1 \pm 3.1 \text{ kg/m}^2$ , N=4,  $P = 0.13$ ). In surgical group, HbA1c tended to reduce ( $8.4 \pm 2.5\%$  to  $6.6 \pm 1.0\%$ , N=5,  $P = 0.18$ ) and BMI significantly decreased ( $36.3 \pm 3.5 \text{ kg/m}^2$  to  $31.7 \pm 2.5 \text{ kg/m}^2$ , N=5,  $P < 0.01$ ). At three months after the treatment, the change of BMI was higher in surgical group and the change of HbA1c showed no differences between the two groups.

**Conclusion:** Though the investigation was very preliminary in many respects, tirzepatide might reduce HbA1c compared with the bariatric surgery. Additional studies with long-term, large-scale, and high-dose administration are desirable.



## A RAPID VERY-LOW-CALORIE DIET (VLCD) DIET IS EFFECTIVE FOR PREOPERATIVE WEIGHT LOSS IN BARIATRIC SURGERY

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**Background:** Pre-operative weight loss with a very-low-calorie diet (VLCD) is commonly used to be beneficial for bariatric surgery. Few studies have investigated how long will the rapid VLCD take effect.

**Objective:** The objective of this study is to evaluate body composition changes in patients undergoing a rapid VLCD before bariatric surgery.

**Methods:** Body composition assessments were performed between March 2022 and October 2022 using Bioimpedance immediately before and after a rapid VLCD at China-Japan Friendship Hospital. Patients were divided into three groups according to the days of undergoing VLCD: Group A≤5days, 5days< Group B≤10days, 10days< Group C≤15days. Data collected prospectively pre- and post-VLCD included total body weight, %total weight loss(%TWL), fat free mass (FFM), fat mass (FM). Data were compared between three groups. Nonlinear regression model was used to analyses the days with which wight loss changes.

**Results:** Seventy-two patients completed both the rapid VLCD and body composition assessments with 45.8% in female. VLCD diet in every group were take 2.84±1.37days (Group A), 6.57±0.88days (Group B) and 13.08±2.72days (Group C), respectively. Following a rapid VLCD, patients in each group lost 2.15±1.62kg, 4.72±2.17kg and 4.79±3.20kg in body weight (p<0.001), respectively. And loss of FFM was 1.21±1.87kg, 2.72±1.95kg and 2.98±1.98kg in each group (p=0.003). Loss of FM was 1.31±1.55kg, 1.88±2.16kg and 2.08±1.59kg (p=0.326), respectively. There was no significance in the changes of wight loss, %TWL, BMI, FFM and FM between Group B and Group C. The c-point day was 7.4 days.

**Conclusion:** A seven days VLCD diet is an effective way for pre-operation weight loss, with which can get a mean of 3.52% in %TWL.

Table1. Patient demographics

Sample size (n)	72
Age (years)	33.63±10.01
Weight (kg)	126.93±24.70
Female, incidence (%)	33, (45.8%)
Albumin (g/L)	41.67±2.6
Pre-operative fasting insulin (pmol/L)	26.2±11.74
Total cholesterol (mmol/L)	4.8±1.05
Triglyceride (mmol/L)	2.17±0.94
Diabetes mellitus type 2 (%)	33, (45.8%)
Hypertension, incidence (%)	25, (34.72%)
NAFLD, incidence (%)	67, (93.06%)
OSAS, incidence (%)	8, (11.11%)



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Table2. Anthropometric measurements of three group patients pre- and post-VLCD

	Group A (31)	Group B (28)	Group C (13)	<i>p</i>
VLCD diet days	2.84±1.37	6.57±0.88	13.08±2.72	
Pre-VLCD				
Weight	120.73±20.68	130.80±26.41	133.38±28.15	0.172
BMI	41.48±4.36	44.34±6.25	44.66±6.39	0.085
FM	56.15±11.11	62.24±14.64	62.95±15.33	0.145
FFM	64.60±12.97	66.63±12.57	70.45±14.66	0.406
Post-VLCD				
Weight	118.58±19.99	126.09±24.86	128.58±26.07	0.31
BMI	40.76±4.30	42.76±5.94	43.06±5.72	0.248
FM	54.94±11.06	59.51±14.35	59.97±14.64	0.321
FFM	63.29±12.37	64.75±11.89	68.36±13.53	0.469
Change				
△W	-2.15±1.62※	-4.72±2.17	-4.79±3.20	0
%TWL	1.73±1.24※	3.52±1.17	3.45±1.90	0
△FM	-1.21±1.87※	-2.72±1.95	-2.98±1.98	0.003
△FFM	-1.31±1.55	-1.88±2.16	-2.08±1.59	0.326
SMI	-0.14±0.20※	-0.49±0.44	-0.35±0.43	0.002



## **SGLT-2-RELATED EUGLYCEMIC DIABETIC KETOACIDOSIS IN T2DM PATIENTS AFTER BARIATRIC SURGERY: A SYSTEMATIC REVIEW AND CASE REPORT**

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**Background/Introduction:** Euglycemic diabetic ketoacidosis(EDKA) is a subtle yet potentially lethal complication of both type 1 and type 2 diabetics. With the use of sodium-glucose cotransporter-2(SGLT-2) inhibitors on the rise owing to their effectiveness in lowering serum glucose as well as renal and cardiovascular benefits, T2DM patients on SGLT-2 inhibitors presenting with EDKA have been increasingly reported. Bariatric surgery is another precipitating factor for EDKA, with perioperative reduction in overall intake also contributing to the risk.

**Objectives:** Through this review and case report we aimed to identify the baseline characteristics, clinical manifestations, precipitating factors and outcomes of SGLT-2 inhibitor-related EDKA in T2DM patients following bariatric surgery.

**Methods:** A systematic review was conducted according to PRISMA guidelines. Medical publications in the English language were searched in PubMed, MEDLINE, Embase, and ScienceDirect up to May 2023. Clinical studies that reported patients with T1DM, DKA with hyperglycemia, EDKA without use of SGLT-2 inhibitors, or those who did not undergo bariatric surgery were excluded. In addition, we report a T2DM patient on an SGLT-2 inhibitor who developed EDKA post-bariatric surgery at our center.

**Results:** Our search identified 13 studies with a total of 16 patients, all of which were either case reports or case series. Of 17 patients, including our case, 10 were female and 7 were male. SGLT-2 inhibitor was stopped 1-2 days before surgery in 7 patients, whereas in eight patients, discontinuation was not mentioned. There was one case where the patient continued to take SGLT-2 inhibitor. All patients, with the exception of our case, had been on a low-calorie diet before surgery.

**Conclusion:** T2DM patients on SGLT-2 inhibitors undergoing bariatric surgery are at risk of EDKA. The subtlety of its presentation and its similarity to postoperative surgical complications necessitates a high index of suspicion to enable timely diagnosis and treatment.





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## A NOMOGRAM FOR PREDICTING SUCCESSFUL WEIGHT LOSS AT 1 YEAR AFTER BARIATRIC SURGERY: A RETROSPECTIVE COHORT STUDY

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**Background:** Whether or not weight loss can reach the standard after bariatric surgery is a matter of great concern to both doctors and patients. Based on this, this paper studies the indicators that affect the effect of weight loss one year after bariatric surgery, and builds a nomogram to predict the effect of weight loss effect.

**Methods:** A total of 546 individuals were included and randomly divided into a training set and a validation set at a ratio of 7:3. A stepwise regression model was used for feature selection. Univariable and Multivariable logistic regression analysis was used to develop the prediction model and construct the nomograms. The performance of the nomograms was assessed and validated by AUC, C-index, calibration curves, DCA, and Hosmer-Lemeshow test.

**Results:** The nomogram was developed with the parameters of HC, Age, T2DM, SP, UA, and Aypnia. The model showed good discrimination, with an area under the ROC curve of 0.786 (95% CI: 0.718-0.854) and good calibration. The nomogram still had good discrimination and good calibration when applied to the validation dataset (area under ROC curve of 0.759, 95% CI: 0.656-0.862). Decision curve analysis demonstrated that the nomogram was clinically useful.

**Conclusions:** Based on a 1-year retrospective cohort study, we constructed a nomogram that could be used to effectively predict the achievement of weight loss after bariatric surgery.

**Keywords:** bariatrical surgery, Nomogram, Weight loss



## REVISION OF COMPLICATIONS AFTER OPEN SLEEVE GASTRECTOMY AND TREATMENT STRATEGY FOR OBESITY WITH ABDOMINAL WALL HERNIA: A RARE CASE REPORT OF MESH REMOVAL AND TENSION-FREE HERNIOPLASTY

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**Background/Introduction:** Only a few studies have reported on cases and treatment strategies for mesh infection and residual stomach leakage after open sleeve gastrectomy. In this report, we describe a rare case of mesh infection and residual stomach leakage that occurred after open sleeve gastrectomy. The patient was successfully treated by removing the mesh and using the transversus abdominis release (TAR) technique and initiative content reduction surgery (ICRS) for reconstruction.

**Objectives:** To study a surgical procedure to treat a residual stomach leakage after obesity surgical with VHR(Ventral Hernia Repaire).

**Methods:** A 30-year-old male, who underwent open sleeve gastrectomy and reconstruction of abdominal incisional hernia by anterior rectus sheath (Polypropylene mesh 15\*15cm) and Intraperitoneal herniorrhaphy (pro-c) 6-mon ago, developed subcutaneous abscess followed by mesh infection and residual stomach leakage. The operation was performed totally excising the infected tissues and mesh, By initiatively and also repaired the residual stomach, simultaneously performing transverse abdominis muscle release, the fascial defect in the rectus sheath was closed. A PFM mesh (30x30) was placed for sublay repair and bridging of the defect of rectus sheath. Postoperative, the patient developed an incision infection.

**Results:** By using antibiotics, wound dressing changes, and negative pressure wound therapy, the incision was reduced to a superficial wound measuring only 1x1cm at the time of discharge.

**Conclusion:** TAR with ICRS is an effective treatment for repairing abdominal wall defects after suboptimal outcomes of obesity surgery of open sleeve surgery with hernioplasty.



## ANALYSIS OF THE LONG-TERM EFFICACY OF GASTRIC BYPASS SURGERY ON PATIENTS WITH TYPE 2 DIABETES MELLITUS

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### Abstract

**Background:** Roux-en-Y gastric bypass (RYGB) is considered the best surgical treatment for type 2 diabetes (T2DM) associated with obesity. However, the number of RYGB operations currently accounts for only 3.1% of the total weight loss and metabolic surgeries in China, which is far lower than the world average. In China, the reports on the efficacy and safety of RYGB for T2DM are mainly based on the results of medium and short-term follow-up after surgery, and there are still few reports on the long-term efficacy.

**Objective:** To investigate the long-term efficacy and safety of RYGB on patients with T2DM.

**Methods:** T2DM patients who received RYGB in Beijing Tiantan Hospital Affiliated to Capital Medical University were retrieved from the Greater China Bariatric and Metabolic Surgery Database. Cases with complete data after 5 years of postoperative follow-up were selected to analyze the preoperative and postoperative weight, blood glucose, and combined changes in indicators such as disease and nutrition, as well as the occurrence of long-term complications of surgery.

**Results:** Thirty-seven patients with T2DM undergoing RYGB were enrolled. The mean follow-up was 6.2 (5.0 ~ 9.0) years. Five years after operation, the body weight was significantly lower than that before operation, and the percentage of total weight loss (TWL%) reached 20.0%, the difference was statistically significant ( $P < 0.05$ ). Five years after operation, fasting blood glucose (FPG) and glycosylated hemoglobin (HbA1c) were all lower than those before operation, and the reduction of HbA1c was more obvious, and the difference was statistically significant ( $P < 0.05$ ). Only 29.7% of the patients used hypoglycemic drugs 5 years after operation, which was significantly lower than that before operation, and the difference was statistically significant ( $P < 0.01$ ). The complete remission rate of T2DM after 5 years was 29.7%. Five years after operation, triglyceride (TG) was significantly lower than that before operation, and high-density lipoprotein (HDL) was significantly higher than that before operation, and the differences were statistically significant (all  $P$  values were less than 0.05). Five years after surgery, the number of people with abnormal lipid metabolism and abnormal liver function were significantly reduced compared with those before surgery, and the differences were statistically significant (all  $P$  values were less than 0.05). In terms of nutrition, the level of ferritin 5 years after operation was significantly lower than that before operation, and the difference was statistically significant ( $P$  value  $< 0.05$ ). Hemoglobin, albumin, folic acid, and vitamin B12 were all lower than those before operation, but the difference was not statistically significant (all  $P$  values were greater than 0.05). Five years after operation, 1 case (3.0%) was accompanied by symptoms of recurrent incomplete intestinal obstruction, 2 cases (6.0%) developed new gallbladder stones, and 6 cases (18.2%) developed iron deficiency anemia.

**Conclusion:** In the long run, RYGB is safe and effective for Chinese T2DM patients.

**Key words:** Laparoscopy, gastric bypass, Type 2, diabetes mellitus, bariatric surgery, long-term outcomes



## IMPLEMENTATION OF ENHANCED RECOVERY PROTOCOL-AN EARLY EXPERIENCE

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**Background/Introduction:** Enhanced recovery protocols for bariatric surgery are implemented in many bariatric centers. The COVID period brought a halt to our bariatric services and required rejuvenation. ERAS protocol was gradually implemented with the aim of reducing postoperative length of stay (LOS).

**Objectives:** Descriptive study of ERAS protocol outcome

**Methods:** ERAS protocol was implemented since July 2022. Our ERAS protocol is based on preoperative optimization, intraoperative standardization and postoperative early ambulation and oral fluid consumption. Retrospective analysis of prospectively maintained database of patients undergoing surgery from January 2022 till August 2023 was performed. Data presented are divided and analyzed into pre-ERAS (January 2022-June 2022), immediate-ERAS implementation (defined as 1st 6 months, July 2022- Dec 2022), post-ERAS implementation (defined as after 6 months, January 2023- August 2023).

**Results:** From January 2022 till August 2023, a total of 74 patients underwent bariatric surgery (45 sleeve gastrectomies, 24 Roux-en-Y gastric bypasses, 4 sleeve plus procedures, and 1 revisional bariatric). One patient was excluded from this data analysis as she required a conversion back to normal anatomy post gastric bypass. During the pre and immediate ERAS implementation, the average LOS was 3 days. However, in the post ERAS implementation period, the average LOS was reduced to 2 days. Also, notably 10 patients were discharged on post-operative day 1 during this period. Throughout the study period, no major Clavien-Dindo Grade III and above complications were observed and only one patient required readmission after 1 week due to dehydration.

**Conclusion:** Implementation of enhanced recovery protocols requires concerted effort from all health personnel involved in bariatric patient care. Protocol adherence will take time and challenges encountered can be further used to improve current practice.



## ASIA AND CHINA'S GROWING CONTRIBUTION TO OBESITY SURGERY RESEARCH: A 40-YEAR BIBLIOMETRIC ANALYSIS

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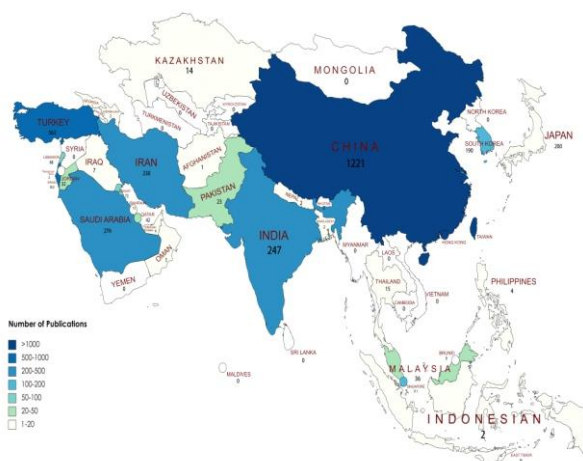
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**Background/Introduction:** Bariatric surgery is increasingly recognized for its role in managing obesity and related health conditions, sparking significant global research interest. Asia, as the most populous continent with soaring obesity rates, becomes a region of significant potential for further investigation in this field.

**Objectives:** This bibliometric study offers a holistic view of the evolution and emerging trends in bariatric surgery research in Asia, with a specific focus on China's role.

**Methods:** Conducting a Bibliometric Analysis, Web of Science served as the primary data source. The study employed descriptive statistics, time-series, and regression analysis, complemented by data visualizations using VOSviewer and R software to synthesize key findings.

### Results:



**Figure 1** Geographical distribution of publications across Asia. We analyzed a total of 3,904 publications from Asia (with 1,221 from China) between 1980 and 2022.

Countries	Number of Articles	Number of Publication per million inhabitants	Start year of bariatric surgery (laparoscopic)
Israel	502	53.61	NA
Singapore	111	20.35	1987(2001)
Kuwait	72	16.94	1997(1999)
Lebanon	88	15.73	NA
Qatar	42	15.62	2011(2011)
Bahrain	13	8.88	NA
Saudi Arabia	276	7.68	1985(1995)
Turkey	562	6.63	1990(1995)
South Korea	190	3.67	2003(2003)
Jordan	32	2.87	NA
Iran	230	2.62	NA
Japan	200	1.59	1982(2000)
Malaysia	36	1.07	1996(2001)
China	1221	0.85	1982(2000)

**Table 1** Countries' publications adjusted for population.

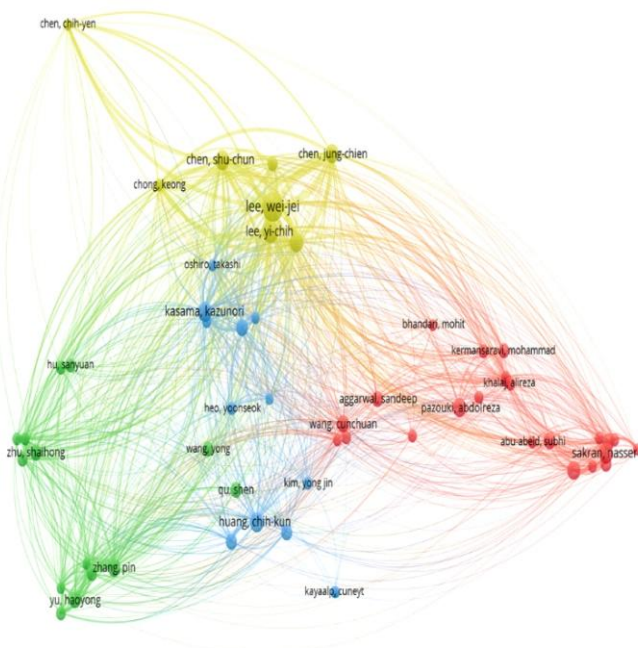


Figure 2 Analysis of Active Author Network in Asia.

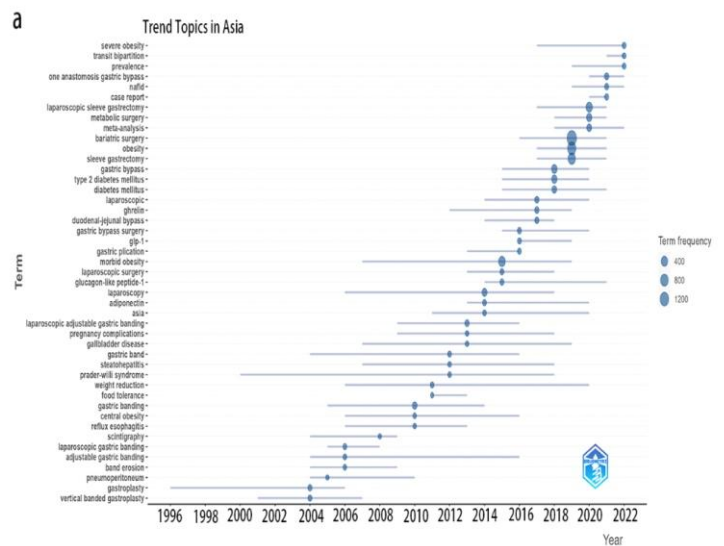


Figure 3 Bubble Heat Map of Trend Topics in Bariatric Surgery Research in Asia.

**Conclusion:** Our findings underscore substantial growth in this research field, driven by notable contributions from populous countries. We’ve observed dynamic shifts in key research topics, reflecting the ever-evolving landscape of bariatric surgery. Despite regional disparities and a current lack of interregional collaborations, increasing research output and improving publication quality suggest a promising future. To enhance the impact of Asia’s, particularly China’s, bariatric surgery research, we recommend intensified collaborative efforts across countries and regions, along with improved standardization of surgical practices.



## EFFECTS OF BARIATRIC SURGERY ON THE MOLECULAR LANDSCAPE OF ADIPOSE, PERIPHERAL BLOOD, MUSCLE AND LIVER TISSUES IN PATIENTS WITH OBESITY

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**Background/Introduction:** In recent years, bariatric surgery has rapidly evolved into an important method for treating obesity and related complications, yielding excellent outcomes. However, the molecular mechanisms by which bariatric surgery exerts its effects, especially for different tissues, remain to be explored. The development of sequencing helps to provide insights into molecular profiling changes in patients with obesity after bariatric surgery.

**Objectives:** To gain a better understanding of the molecular mechanisms underlying the efficacy of bariatric surgery in treating obesity and its comorbidities, as well as changes in response patterns of different types of tissue to bariatric surgery, meanwhile, exploring potential molecular targets that may aid for the treatment of obesity.

**Methods:** The transcriptome datasets including subcutaneous adipose tissue, liver, muscle and whole blood before and after bariatric surgery were obtained from GEO datasets. Differentially expressed genes (DEGs) identification and gene ontology enrichment analysis were conducted by R software.

**Results:** According to the enrichment results of DEGs in different tissues, we obtained 110 common up-regulated pathways including regulation of metabolic process, peptidase activity and germ cell development, and 253 common down-regulated pathways, such as response to xenobiotic stimulus, oxidative stress, steroid hormone and aging. Furthermore, different tissues also exhibit certain differences in the changes of the molecular pathways. Based on the four types of tissue-derived DEGs, we identified a common gene, carnitine palmitoyltransferase 1A (CPT1A), which is involved in mitochondrial fatty acid oxidation and lipid metabolism.

**Conclusion:** Bariatric surgery can achieve weight loss by affecting multiple metabolic pathways of various tissues, and different tissues have great differences in response to bariatric surgery. Moreover, bariatric surgery might achieve other benefits beyond weight loss, such as germ cell development and aging slowing. CPT1A is expected to be an intervention target for the treatment of obesity.



Figure1. The flowchart of the study.

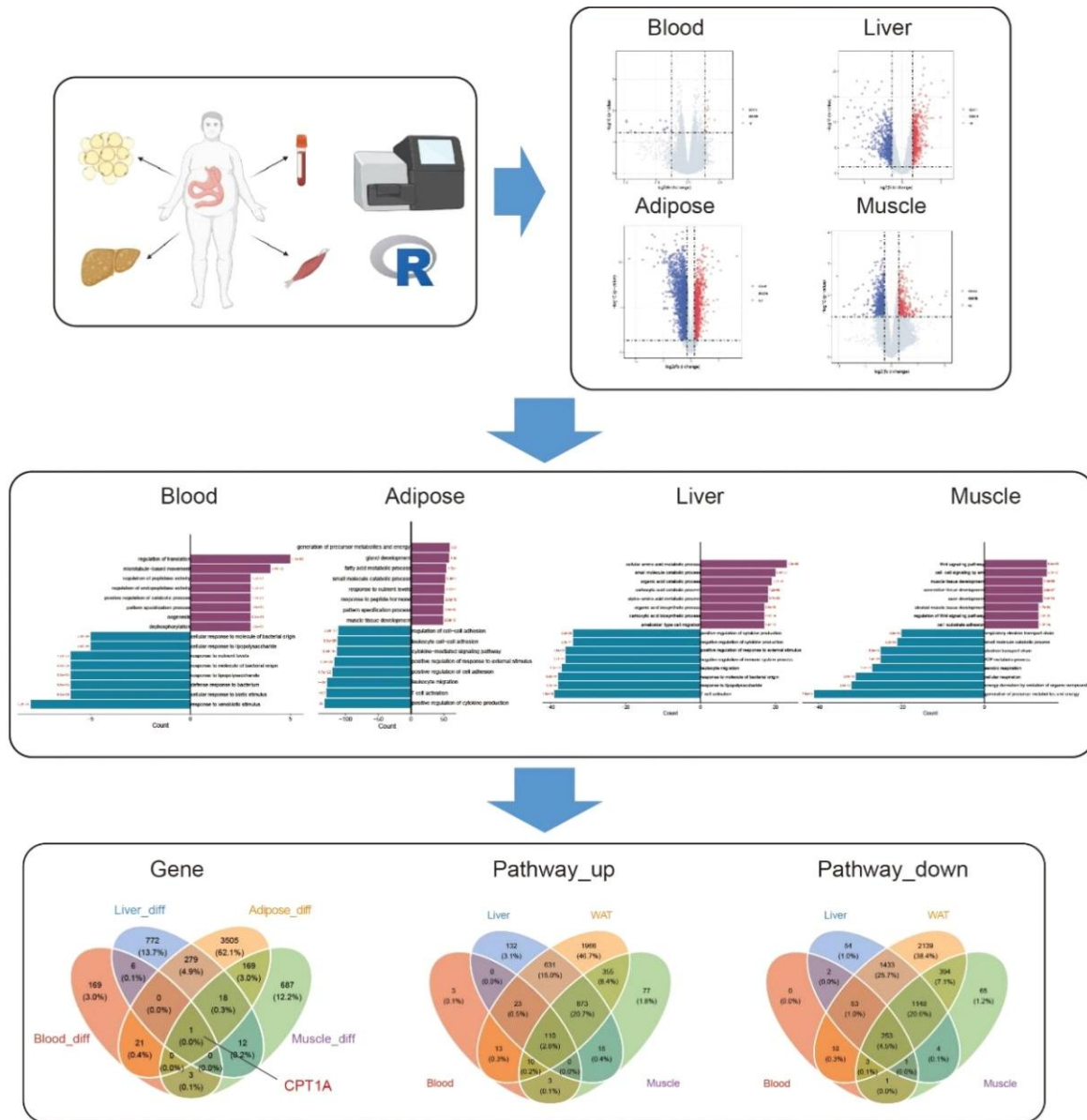


Table1. Examples of common up- and down-regulated biological process.

	ID	Description
up-regulated	GO:0006417	regulation of translation
	GO:0009896	positive regulation of catabolic process
	GO:0052547	regulation of peptidase activity
	GO:0006066	alcohol metabolic process
	GO:0031667	response to nutrient levels
	GO:0031647	regulation of protein stability
	GO:0007281	germ cell development
down-regulated	GO:0009410	response to xenobiotic stimulus
	GO:0048545	response to steroid hormone
	GO:0006979	response to oxidative stress
	GO:0019730	antimicrobial humoral response
	GO:0001906	cell killing
	GO:1901605	alpha-amino acid metabolic process
	GO:0007568	aging





## COULD PERSONALIZED MEDICINE PREDICT BARIATRIC SURGERY OUTCOMES?

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**Background:** Bariatric surgery recognized as the best therapy for severe obesity. Weight loss after surgery is, however, extremely variable and genetically influenced. Genome-wide association studies (GWAS) have identified many single nucleotide polymorphisms (SNP) related to weight, body fat proportion and additionally feeding behaviors.

**Objectives:** The aim of this study was to research the effects of sequence variants and determined SNP on patient's responses to bariatric surgery.

**Methods:** This review article summarizes studies that were investigating the influence of genetic polymorphisms in different effectiveness of bariatric surgery and weight loss pathways. Scopus and PubMed database were consistently searched up to January 2021, for GWAS studies providing knowledge relating to the genetic factors that have an effect on the bariatric surgery outcomes.

**Results:** The evidences from GWAS studies showed that many genes and SNPs affected the individual responses to bariatric surgery. the most of these SNPs is associated to genes that regulate the lipolysis/lipogenesis pathways, adipose cell metabolism, metabolic process chain, insulin resistance, insulin/glucagon metabolism, feeding behavior and appetite-sensing state. At this regard, rs16945088 SNP of FTO (fat mass and obesity-associated) sequence, MC4R (melanocortin 4 receptor), rs660339 (Ala55Val) SNP of uncoupling proteins 2 (UCP2), leptin receptor gene (Lys656Asn and Asn656Asn), glucagon-like peptide 1 receptor gene (rs6923761) and INSIG2 (insulin induced gene 2) are the most studied and affecting polymorphisms that have influence on bariatric surgery outcomes.

**Conclusion:** Genetic background encompasses an important impact on weight loss after bariatric surgery. within the future, genetic testing could probably be employed in the pre-surgical assessment of patients with severe obesity for selecting the best surgery procedure for patients, avoiding supernumerary adverse effects and prices.

**KEY WORDS:** obesity Surgery, gastric Bypass, Single nucleotide Polymorphisms, Genome-Wide Association Studies, GWAS, SNP



## EFFECT OF BARIATRIC SURGERY ON THE CLINICAL COURSE OF MULTIPLE SCLEROSIS IN PATIENTS WITH SEVERE OBESITY: A SYSTEMATIC REVIEW

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**Background:** Multiple sclerosis (MS) is an autoimmune inflammatory condition affecting the central nervous system (CNS).

**Objectives:** A systematic review following the PRISMA guidelines was performed to explore the effect of metabolic and bariatric surgery (MBS) on the clinical course and outcomes in patients with multiple sclerosis.

**Methods:** This review was performed as per the guidelines for systematic review provided by the Cochrane Cooperation and the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) guidelines.

**Results:** Eleven articles examining 394 patients were included in the final analysis. The mean MS duration at the time of surgery was  $7.6 \pm 4.6$  years, and the mean postoperative follow-up was  $35.5 \pm 5.3$  months. MBS leads to the same weight loss with the same complication rate as inpatients without MS. Most of patients experienced improvement in clinical course of MS after MBS, compared to non-surgical group.

**Conclusion:** However, there is a risk for MS exacerbation in a number of patients after MBS; they should not be disadvantaged from having MBS, since surgery leads to the same weight loss outcomes with the same complication rate as inpatients without MS.



## SERUM LCN2 ELEVATED IN PATIENTS WITH BARIATRIC SURGERY IN POST-6 MONTH

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### Abstract

**Introduction:** LCN2 plays multiple roles in physiological process including antibacterial, proinflammatory, protection against cell and tissue stress, and metabolic disease. Many previous studies have found that LCN2 is increased with fat accumulation in human and animals, but LCN2 can also be an appetite suppressant in recent studies, which made us wonder the change of LCN2 before and after weight loss surgery. The aim of this study is to investigate on the level of LCN2 in a 6-month follow-up after weight loss surgery and the correlation with improvement of metabolic dysregulation.

**Method and material:** There are 28 volunteers in normal weight and 34 patients with obesity included in the study. Patients with obesity were received bariatric surgery in the study and the serum LCN2 was detected before the surgery, 1month post-op(post-operatively), 3 months post-op and 6 months post-op. The weight, BMI, and some biochemical indexes are also included in the follow up.

**Results:** In our study, the serum LCN2 was higher in patient with obesity than that in volunteers of normal weight. (Normal  $19.85 \pm 15.38$  ng/ml vs Obesity  $31.39 \pm 17.72$  ng/ml). However, we found the LCN2 increased after bariatric surgery in 1month post-op and keep stable in 3 months post-op and 6 months post-op. (before  $31.39 \pm 17.72$  ng/ml vs 1month post-op  $43.61 \pm 27.90$  vs 3 months post-op  $42.49 \pm 24.45$  vs 6 months post-op  $48.28 \pm 33.56$   $p=0.313$ ). The liver function, serum lipid level and fast glucose also have improved after the surgery. However, with the elevated serum LCN2, inflammation marker IL-6 and TNF significantly declined after bariatric surgery.

**Conclusion:** Lipocalin-2 paly a multiple role in obesity and metabolic disease. The serum Lipocalin-2 is increased after bariatric surgery in a 6 months follow-up.



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## LAPAROSCOPIC SLEEVE GASTRECTOMY IN A 13-YEAR-OLD CHINESE PATIENT WITH 251KG

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**Introduction:** According to the latest data from the Chinese Center for Disease Control and Prevention, the prevalence of overweight and obesity in Chinese children and adolescents aged 6-17 years is 11.1% and 7.9% respectively. Bariatric and metabolic surgery has been proven to be an effective weight reduction and metabolic improvement treatment. However, current guidelines in China recommend the minimum age for such surgeries to be 16 years.

**Objectives:** To explore the indications for bariatric surgery in Chinese adolescents.

**Methods:** The patient in this case study was a 13-year-old Chinese male, measuring 187cm in height, weighing 251kg, with a Body Mass Index (BMI) of 71.78kg/m<sup>2</sup> upon admission. He was diagnosed with metabolic syndrome, type 2 diabetes mellitus (T2DM), hyperlipidemia, and other obesity-related complications. A multidisciplinary team was formed to manage his condition. The patient received nutritional counseling, medications, and continuous positive airway pressure support, and ultimately underwent a successful laparoscopic sleeve gastrectomy procedure.

**Results:** One year post-surgery, the patient's height remained at 187cm, but his weight decreased to 154kg, resulting in a BMI of 44.04 kg/m<sup>2</sup>. The patient achieved a percentage of excess weight loss (%EWL) of 59.30% and a percentage of total weight loss (%TWL) of 38.65%. Additionally, his blood glucose and lipid levels returned to normal. However, a post-operative increase in serum uric acid level and small gallstones were observed.

**Conclusions:** The increasing prevalence of obesity in China necessitates effective treatments for adolescents. Sleeve gastrectomy has demonstrated significant therapeutic effects on adolescents with obesity. This case study contributes to the understanding of perioperative management in adolescent and explores suitable surgical indications for the Chinese adolescent population.



## SHORT-TERM OUTCOMES OF BARIATRIC SURGERY IN ADOLESCENTS VERSUS ADULTS: A PROPENSITY SCORE-MATCHED STUDY

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### Abstract

**Objectives:** To compare short-term outcomes of bariatric surgery between adolescents versus adults for obesity person in a single center during a 12-months period.

**Methods:** 253 adolescents who underwent either a sleeve lobectomy (n = 964; 48.7%) or a pneumonectomy (n = 1017; 51.3%) from January 2003 to December 2017 at the Shanghai Pulmonary Hospital, were matched according to a propensity score to produce 2 groups of 665 patients each. The study period was divided into 3 5-year subperiods.

**Results:** Sleeve lobectomy was associated with a lower 30- and 90-day mortality (0.60% and 0.90% vs 1.5% and 3.91%; P = .177 and P = .001, respectively, after matching), lower morbidity (4.36% vs 8.16%; P = .005 before matching, 3.61% vs 8.72%; P < .001 after matching), improved 5-year survival (62.7% vs 43.1%; P < .001 before matching and 61% vs 44.7%; P < .001 after matching), and 5-year disease-free survival after matching (56.6% vs 46.2%; P < .001). The sleeve lobectomy to pneumonectomy ratio increased by 78%, whereas 90-day mortality decreased by 66.81% between the first and the last subperiods.

**Conclusions:** Sleeve lobectomy is associated with improved short- and long-term outcomes and should be the resection of choice for centrally located lung cancers, when feasible.

**Keywords:** Bariatric surgery; Obesity; Adolescents;



## NEW INSIGHT AT THE TREND OF ENERGY EXPENDITURE STATUS BIOMARKERS FOLLOWING BARIATRIC SURGERY

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**Background/Introduction:** The adipose tissue mitochondria is one of the most important determinants of the status of energy expenditure. Mitochondria dysfunction is recognized as the major causes of insulin resistance, and other countless complications of obesity. PGC-1 $\alpha$ , and UCP-2 play key roles in energy expenditure regulation in the mitochondrial thermogenesis. However, the effects of bariatric surgery on the level of PGC-1 $\alpha$  and UCP-2 and their relationships are unclear.

**Objectives:** This study aimed to investigate the effect of bariatric surgery on key pathways in energy homeostasis, and to assess the potential predictive role of body composition and metabolic parameters in this regard.

**Methods:** This prospective cohort study was carried out on 45 patients with severe obesity who underwent Roux-en-Y gastric bypass surgery. The patients have evaluated three-time points at baseline, three, and six months after the surgery. body composition components, the levels of PGC-1 $\alpha$ , UCP-2, and metabolic parameters were measured three times during this study.

**Results:** significant changes in TWL%, EBMIL%, and metabolic lab tests were observed at three- and six months post-surgery ( $P < 0.001$ ). The PGC-1 $\alpha$  and UCP-2 had a significant increase three and then six-month post-operation compared with the baseline ( $P < 0.001$ ). Moreover, multivariate linear regression analysis identified that the changing trend of PGC-1 $\alpha$  was associated with insulin, Uric Acid, HOMA-IR, fat mass (kg) and trunk fat (kg) and UCP-2 was associated with TSH, AST, Fat (kg) and FFM.

**Conclusion:** Bariatric surgery had a beneficial effect on changes in UCP-2 and PGC-1 $\alpha$  levels as well as body composition and metabolic parameters. Accordingly, bariatric surgery possibly could increase thermogenesis and energy expenditure, through its significant effects on the improvement of mitochondrial biogenesis and function.

**Key Words:** Bariatric Surgery, PGC-1 $\alpha$ , UCP-2, Body Composition, Mitochondrial Biogenesis, Energy Expenditure. Thermogenesis



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## MEDIUM-TERM OUTCOME COMPARISON BETWEEN LAPAROSCOPIC SLEEVE GASTRECTOMY AND LAPAROSCOPIC GASTRIC BYPASS: A SINGLE CENTRE EXPERIENCE

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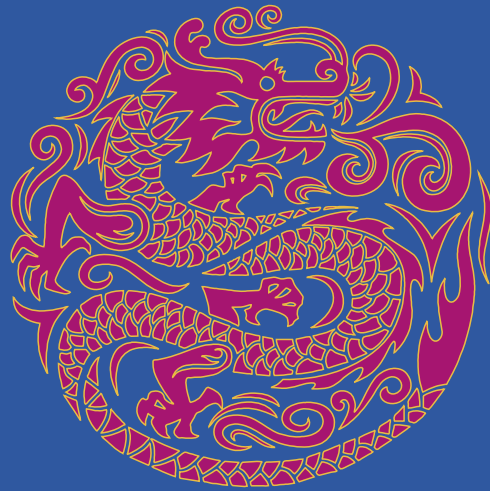
**Background/Introduction:** Laparoscopic sleeve gastrectomy (LSG) and laparoscopic gastric bypass (LGB) have been commonly performed in bariatric surgery. Previous studies have shown their respective safety and effectiveness in weight reduction as well as metabolic syndrome remission in severe obesity, especially in the Western population.

**Objectives:** Our aim is to compare in our centre the medium-term outcomes between LSG and LGB (roux-en-Y) in terms of weight loss, metabolic syndrome remission, as well as surgical outcomes including reoperation, complications and mortality.

**Methods:** Adult patients with severe obesity who underwent LSG or/and LGB in a single centre between January 2016 and October 2022 with follow-up period of minimum 1 year to maximum 6 years were retrospectively reviewed.

**Results:** A total of 94 cases (70 LSG; 22 LGB; 2 LSG convert LGB) were extracted from database encompassing patients with severe obesity who underwent bariatric surgeries in Queen Elizabeth Hospital in Hong Kong from January 2016 to October 2022. Mean age and pre-operative body mass index (BMI) were 46 (45 LSG; 47 LGB;  $p=0.486$ ) and  $40.0\text{kg/m}^2$  ( $39.0$  LSG;  $42.7$  LGB;  $p=0.006$ ) respectively. 54.3% (54% LSG; 83% LGB;  $p=0.007$ ) of patients were diagnosed with diabetes pre-operatively. Median length of stay was 6 days (5 LSG; 6 LGB;  $p=0.01$ ). Mean follow-up was 39 months (40 LSG; 36 LGB;  $p=0.115$ ). Mean decrease in BMI was  $7.5\text{kg/m}^2$  and  $14.3\text{kg/m}^2$  for LSG and LGB at 4 years, whereas mean decrease in percentage of excess weight loss was 67.3% (LSG 65.0%; LGB 78.7%;  $p=0.111$ ). The remission rate for hypertension, diabetes, and hyperlipidaemia were 65.0% (63% LSG; 71% LGB;  $p=0.506$ ), 86.0% (81% LSG; 94% LGB;  $p=0.002$ ), and 38.1% (26% LSG; 73% LGB;  $p=0.051$ ) respectively.

**Conclusion:** LGB was performed significantly more in patients with diabetes or higher BMI. Larger mean decrease in BMI was seen in LGB group at 4 years. Significantly higher remission rate for DM was observed in LGB group.



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