xiangya 中南大学湘雅三医院
The Third Xiangya Hospital of Central South University

Should Asian low-BMI patients with comorbidities have Metabolic and Bariatric Surgery?

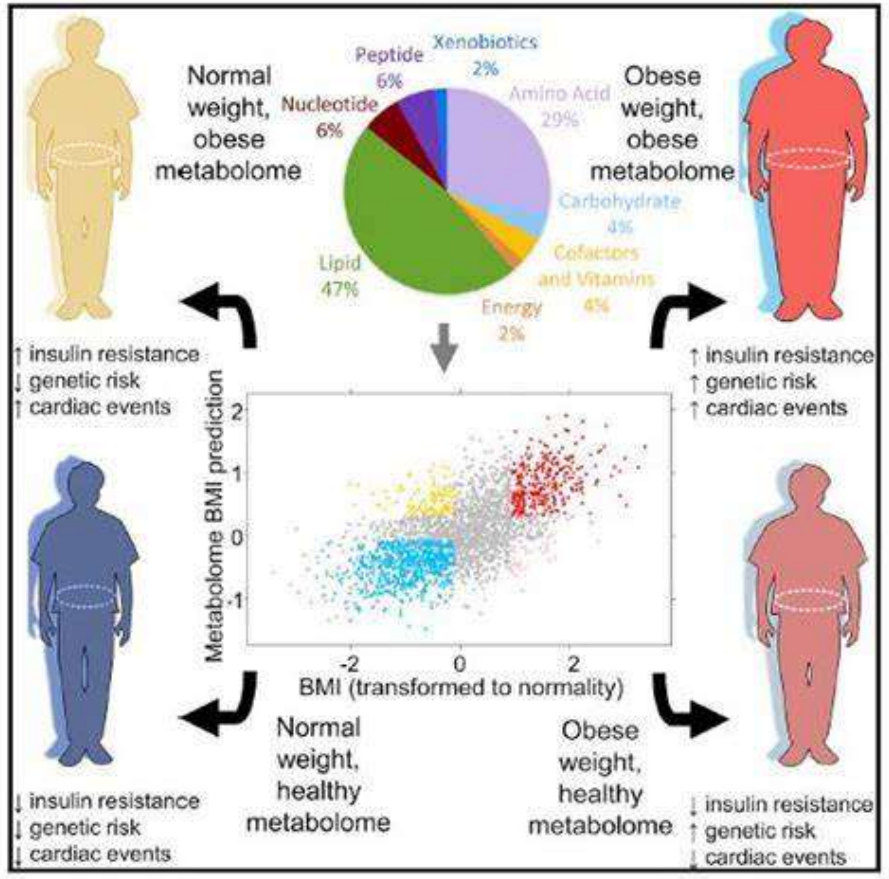
Jingge Yang, Liyong Zhu, Shaihong Zhu

The Third Xiangya Hospital of Central South University
The First Affiliated Hospital of Jinan University

Contents

Characteristics in Chinese Population with Type 2 Diabetes

- Average **BMI was lower** than that of European or American population;
- More than **a two-fold increase** in the risk of developing T2D compared with the Caucasian population with a similar BMI;
- **Early dysfunction and failure** of islet β cells;
- China has a large population of low-BMI T2D patients, with a longer disease duration and more comorbidities.



Lesser IA, et al. Journal of Obesity, 2012
Shai I, et al. Diabetes Care, 2006

ASMBS and IFSO update

ELSEVIER

SURGERY FOR OBESITY AND RELATED DISEASES

Surgery for Obesity and Related Diseases 18 (2022) 1345–1356

Original article

2022 American Society for Metabolic and Bariatric Surgery (ASMBS) and International Federation for the Surgery of Obesity and Metabolic Disorders (IFSO): Indications for Metabolic and Bariatric Surgery

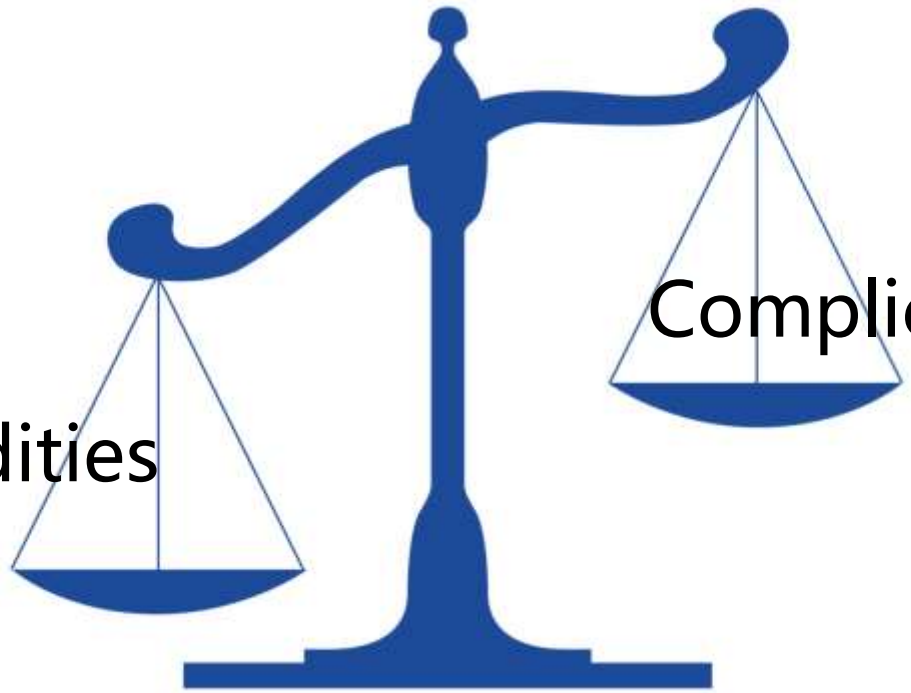
Major updates to 1991 National Institutes of Health guidelines for bariatric surgery

- Metabolic and bariatric surgery (MBS) is recommended for individuals with a body mass index (BMI) $\geq$35 kg/m^2, regardless of presence, absence, or severity of co-morbidities.
- MBS should be considered for individuals with metabolic disease and BMI of 30-34.9 kg/m^2.
- BMI thresholds should be adjusted in the Asian population such that a BMI $\geq$25 kg/m^2 suggests clinical obesity, and individuals with BMI $\geq$27.5 kg/m^2 should be offered MBS.
- Long-term results of MBS consistently demonstrate safety and efficacy.
- Appropriately selected children and adolescents should be considered for MBS.

(Surg Obes Relat Dis 2022;18:1345–1356.)

Keywords: Obesity; Metabolic and bariatric surgery; IFSO; ASMBS; Criteria; Indications

An open question



- Some patients with low BMI are increasingly considering surgery
- Since most people who undergo the surgery are evidently obese, a low BMI bariatric surgery remains an open question
- The lower BMI, the more impacts the surgery may have on nutrition

An open question

- Despite all doubts, several studies have come forward to demonstrate the safety and efficacy of bariatric surgery for individuals with low BMIs, especially for patients who are grappling with serious health problems related to obesity, such as **type 2 diabetes, hypertension, sleep apnea, and others**.
- Low BMI people often suffer from mild obesity, which is associated with a heightened risk of a range of health problems, many of which are similar to those associated with morbid obesity, including **CVD, stroke, cancer, OSA, osteoarthritis, and NAFLD**.

Reasons to Have Low-BMI Surgery

- Preventing Dangerous Weight Gain
  - Procrastination could result in less-than-optimal outcomes.
  - Bariatric surgery has emerged as the only known method for effectively addressing the issue of obesity in the long term.
- Treating Obesity-Related Problems
  - Mild obesity was once considered to have a limited impact on overall health.
  - Taking a closer look to see if they are suffering from any obesity-related health
  - Since Asian patients often exhibit symptoms of comorbidities at a lower BMI compared to other races, their criteria for surgery are appropriately adjusted to accommodate this difference.
- Correcting Gastric Band
  - In instances where a patient has recently had a gastric band removed due to a complication

Contents

RYGB Shows A Good Efficacy on Low-BMI T2D Patients

Obesity Surgery
https://doi.org/10.1007/s11695-019-03861-0

ORIGINAL CONTRIBUTIONS

The Effect of Bariatric Surgery on Asian Patients with Type 2 Diabetes Mellitus and Body Mass Index < 30 kg/m^2: a Systematic Review and Meta-analysis

Guangnian Ji[1] · Pengzhou Li[1] · Weizheng Li[1] · Xulong Sun[1] · Zhaomei Yu[1] · Rao Li[1] · Liyong Zhu[1] · Shaihong Zhu[1]

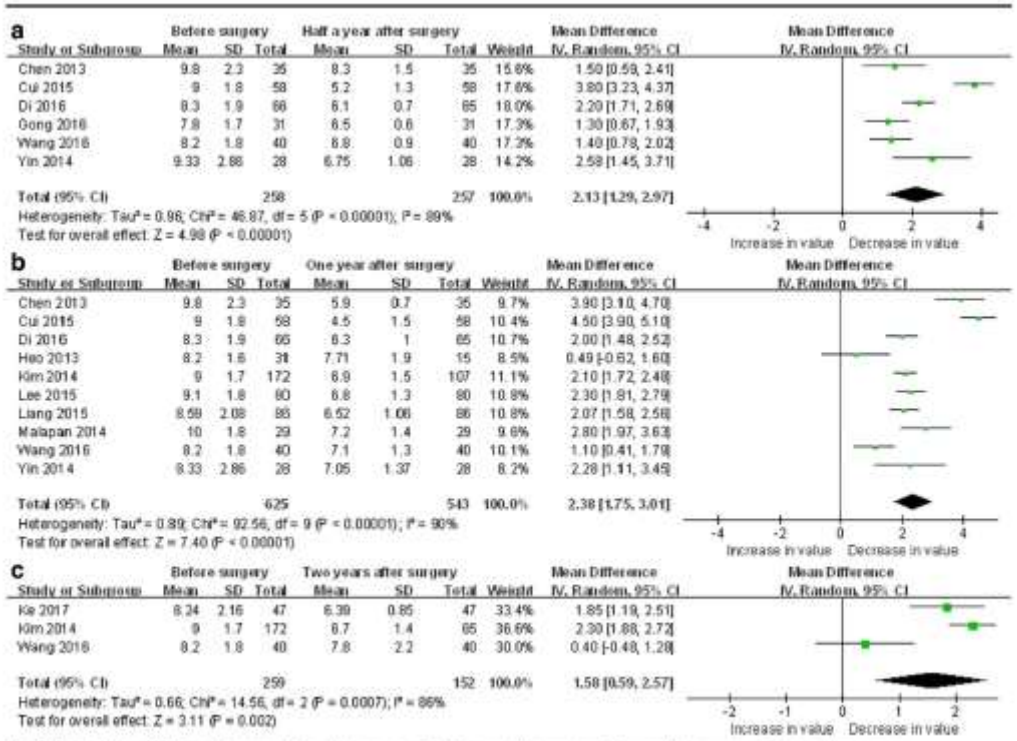


Fig. 6 Forest plots of HbA1c changes after bariatric surgery: **a** half a year after surgery; **b** 1 year after surgery; **c** 2 years after surgery

Obesity Surgery
https://doi.org/10.1007/s11695-020-04534-z

ORIGINAL CONTRIBUTIONS

Effect of Roux-en-Y Gastric Bypass for Patients with Type 2 Diabetes Mellitus and a BMI < 32.5 kg/m2: a 6-Year Study in Chinese Patients

Guangnian Ji[1] · Weizheng Li[1] · Pengzhou Li[1] · Haibo Tang[1] · Zhaomei Yu[1] · Xulong Sun[1] · Rao Li[1] · Liyong Zhu[1] · Shaihong Zhu[1]

Table 4 The remission and improvement of T2DM

	Baseline	3 months	6 months	1 year	2 years	3 years	4 years	5 years	6 years
Follow-up	52	51 (98.1%)	48 (92.3%)	40 (76.9%)	37 (71.2%)	24 (46.2%)	16 (30.8%)	19 (36.5%)	12 (23.1%)
Complete remission	–	20 (39.2%)	19 (39.6%)	12 (30.0%)	10 (27.0%)	5 (20.8%)	5 (31.3%)	4 (21.1%)	2 (16.7%)
Partial remission	–	12 (23.5%)	11 (22.9%)	8 (20.0%)	7 (18.9%)	7 (29.2%)	3 (18.8%)	3 (15.8%)	3 (25.0%)
Improvement	–	13 (25.5%)	9 (18.8%)	10 (25.0%)	8 (21.6%)	5 (20.8%)	4 (25.0%)	5 (26.3%)	3 (25.0%)
Total	–	45 (88.2%)	39 (81.3%)	30 (75.0%)	25 (67.6%)	17 (70.8%)	12 (75.0%)	12 (63.2%)	8 (66.7%)

Our team has proved that T2D patients with a low BMI could benefit from RYGB during a long-term follow-up.

Ji G, et al. Obesity Surgery, 2019.
Ji G, et al. Obesity Surgery, 2020.

Study 1 Early Exploration

ELSEVIER

Surgery for Obesity and Related Diseases ▮ (2016) 00–00

SURGERY FOR OBESITY AND RELATED DISEASES

Original article

Can low BMI Chinese patients with type 2 diabetes benefit from laparoscopic Roux-en-Y gastric bypass surgery?

General demographic data for different body mass index (BMI) groups

Group	Male (n)	Female (n)	Age range (yr)	Mean age (yr)	Duration of diabetes (yr)
BMI ≥27.5	27	11	19–68	44.34 ± 10.82*	6.30 ± 3.38
BMI <27.5	25	15	26–66	49.13 ± 8.15	5.82 ± 2.85

Therapeutic effects in different BMI groups

Group	Improved case (n)	Complete remission case (n)	Total case (n)
BMI ≥27.5	18	20*	38
BMI <27.5	26	14	40
Total case	44	34	78

SOARD 2014

Study 1 Exploration

Pre- and postoperative therapeutic effects in group 2 (BMI <27.5 kg/m^2)

Indicator	Preoperation	1 week postoperative	3 months postoperative	6 months postoperative	1 year postoperative	Postoperative 2-year
Patient (n)	40	40	40	40	40	40
Waist circumference	91.3 ± 7.5	/	85.6 ± 8.5*	88.7 ± 7.2*	88.8 ± 8.0†	87.0 ± 7.1†
Waist-to-hip ratio	.9 ± .1	/	.9 ± .1*	.9 ± .1*	.9 ± .1*	.9 ± .1
TG	2.5 ± 3.1	1.4 ± .6†	1.3 ± .6	1.5 ± 1.2	1.8 ± 1.4	1.9 ± 2.4
CHOL	4.7 ± 1.2	3.9 ± .7†	4.2 ± .7	4.3 ± .7†	4.2 ± .9	4.4 ± 1.0
HDL	1.2 ± .3	1.0 ± .3*	1.2 ± .4	1.2 ± .4	1.9 ± 4.0	1.2 ± .3
LDL	2.5 ± 1.0	2.3 ± .6	2.4 ± .6	2.4 ± .6	2.3 ± .7	2.4 ± .7
FPG	7.6 ± 1.6	6.4 ± 1.4*	6.1 ± 1.4*	6.5 ± 1.5	6.7 ± 1.3†	6.3 ± 1.2*
30 mPG	12.4 ± 2.6	10.5 ± 2.2*	11.4 ± 3.0	12.5 ± 3.0	12.8 ± 2.6	12.0 ± 3.3
2 hPG	17.0 ± 3.8	13.7 ± 3.2*	12.5 ± 3.3*	14.8 ± 9.5	13.9 ± 2.8*	13.3 ± 3.0†
FINS	7.8 ± 8.0	7 ± 12	5.9 ± 10.4	6.5 ± 6.6	7.6 ± 6.5	8.5 ± 5.3
30 mINS	16.3 ± 13.3	18.3 ± 12.5	29.3 ± 35.1*	28.7 ± 28.4	38.8 ± 35.6*	37.7 ± 34.8*
2 hINS	29.0 ± 22.7	26.9 ± 22.3	29.8 ± 32.6	29.5 ± 27.3	33.4 ± 26.5	41.4 ± 41.9
FCp	1.4 ± 1.3	1.2 ± .9	1.2 ± 1.4	1.1 ± .8	1.0 ± .6*	1.0 ± .7
30 mCp	2.5 ± 1.8	3.0 ± 2.3	3.6 ± 3.9	2.8 ± 1.9	3.3 ± 2.3	3.0 ± 2.5
2 hCp	4.6 ± 3.1	4.7 ± 3.2	4.7 ± 2.9	4.9 ± 2.9	13.9 ± 2.8†	4.6 ± 2.9
HOMA-β	40.1 ± 32.9	58.9 ± 115.0	52.o ± 62.4	58.9 ± 75.9	52.5 ± 42.6	73.4 ± 48.6*
HOMA-IR	2.7 ± 3.4	1.9 ± 3.0	1.7 ± 3.3	1.9 ± 1.7	2.4 ± 2.4	2.4 ± 1.7
HbA1C	8.2 ± 1.8	7.1 ± .9†	6.8 ± 1.1†	6.8 ± .9†	7.1 ± 1.3	7.8 ± 2.2

- RYGB may be beneficial in T2D patients with **BMI<27.5** in a small samplesize.

Editorial comment

Can low-BMI Chinese patients with type 2 diabetes benefit from laparoscopic Roux-en-Y gastric bypass surgery?

We are truly witnessing an exciting period in the timeline of bariatric and metabolic surgery, as observed metabolic benefits are supported by contemporary studies and the international attention they command (and deserve) [1,2]. Until recently, the inclusion of bariatric procedures in the treatment algorithm for metabolic diseases, such as type 2 diabetes, was relatively confined to those within the specialty and their sympathizers. Several disorders, like cardiac disease, involve an armamentarium of treatment options that may ultimately lead down a pathway to surgery if lifestyle modification and medical management fail to achieve sufficient control as defined by set parameters. However, for a host of reasons that are difficult to define, there has been sluggish acceptance of metabolic surgery as a viable treatment option for type 2 diabetes. That was, until recently. At the Second Diabetes Surgery Summit, international experts provided groundbreaking recommendations on the use of surgery in type 2 diabetes as a supported

While this study as a standalone data set must be interpreted cautiously given the study design and associated limitations, it is quite remarkable to see the safety profile and magnitude of glycemic control they were able to achieve in both retrospective study groups. That being said, it is difficult to draw conclusions on how lower-BMI metabolic surgery in China can be extrapolated to other global populations given the observed differences with respect to BMI and type 2 diabetes predisposition in that region. However, this study will serve as an important piece in the forthcoming body of work that will help to define the complex role of bariatric

fight against metabolic disease and ical intervention to break free from ed constraints.

Christopher Ryan Daigle, M.D.
Cleveland Clinic Akron General, The Bariatric Center, Akron, Ohio

Study 2 Short-term exploration

Obesity Surgery (2019) 29:2492–2502
https://doi.org/10.1007/s11695-019-03861-0

IFSO

ORIGINAL CONTRIBUTIONS

Check for updates

The Effect of Bariatric Surgery on Asian Patients with Type 2 Diabetes Mellitus and Body Mass Index < 30 kg/m^2: a Systematic Review and Meta-analysis

- To explore the effectiveness of bariaric surgery on Asian patients with low BMI and T2D by integrating research data from various Asian studies

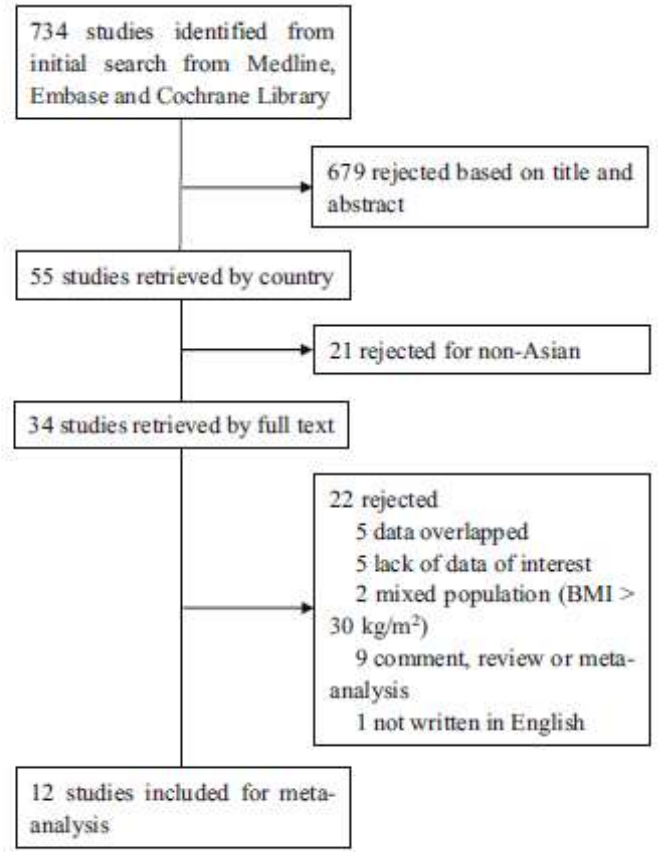
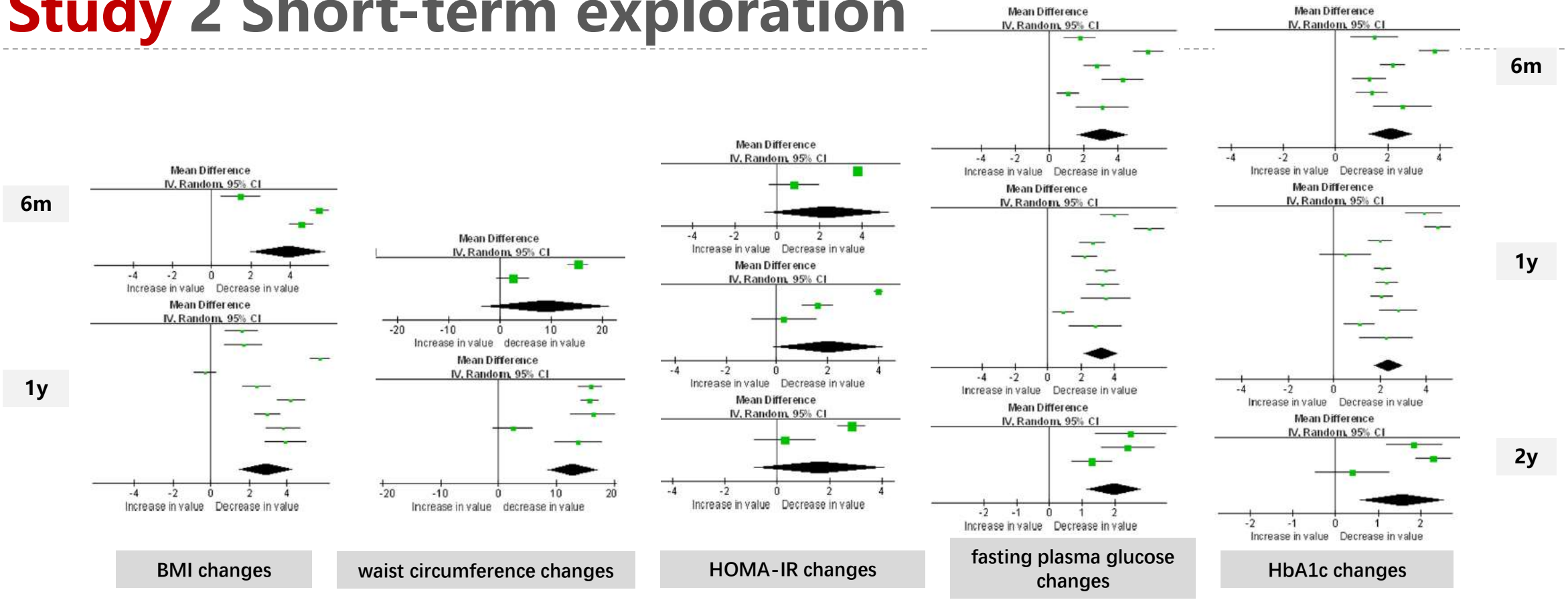


Fig. 1 Study selection

Obesity Surgery 2019

Study 2 Short-term exploration



- Findings: Asian low-BMI patients with T2D can achieve significant weight loss, control blood glucose and lipid levels, and improve β-cell function. However, **long-term follow-up is needed to evaluate its effectiveness**.

Obesity Surgery 2019

Study 3 Long-term exploration

Obesity Surgery
https://doi.org/10.1007/s11695-020-04534-z

ORIGINAL CONTRIBUTIONS

Effect of Roux-en-Y Gastric Bypass for Patients with Type 2 Diabetes Mellitus and a BMI < 32.5 kg/m2: a 6-Year Study in Chinese Patients

Table 1 Weight and BMI in the preoperative and postoperative periods

	Baseline	3 months	6 months	1 year	2 years	3 years	4 years	5 years	6 years
Follow-up	52	51 (98.1%)	48 (92.3%)	40 (76.9%)	37 (71.2%)	24 (46.2%)	16 (30.8%)	19 (36.5%)	12 (23.1%)
Weight (kg)	76.2 ± 11.4	68.3 ± 10.3*	66.6 ± 7.9*	68.5 ± 9.0*	67.4 ± 10.0*	69.3 ± 8.4*	72.0 ± 6.1*	66.7 ± 9.9*	72.5 ± 7.1
BMI (kg/m^2)	27.2 ± 3.2	24.3 ± 2.6*	25.2 ± 6.3	25.2 ± 3.3*	25.0 ± 3.2*	25.8 ± 2.3*	26.0 ± 1.5	25.0 ± 3.4*	26.3 ± 3.3

Table 3 Lipid metabolic parameters in the preoperative and postoperative periods

	Baseline	3 months	6 months	1 year	2 years	3 years	4 years	5 years	6 years
Follow-up	52	51 (98.1%)	48 (92.3%)	40 (76.9%)	37 (71.2%)	24 (46.2%)	16 (30.8%)	19 (36.5%)	12 (23.1%)
TGs (mmol/L)	2.3 ± 1.6	1.4 ± 0.8*	1.5 ± 1.0*	1.6 ± 1.4	1.3 ± 0.7*	1.5 ± 0.8	1.5 ± 0.9*	1.6 ± 0.9	1.9 ± 1.2
TC (mmol/L)	4.7 ± 1.1	4.3 ± 0.9*	4.3 ± 1.0	4.1 ± 1.0	4.7 ± 1.8	3.9 ± 1.2*	4.2 ± 1.3	4.7 ± 1.2	4.0 ± 1.7
HDL (mmol/L)	1.1 ± 0.3	1.2 ± 0.3	1.2 ± 0.4	1.3 ± 0.4	1.3 ± 0.3	1.2 ± 0.5	1.2 ± 0.4*	1.2 ± 0.4	1.1 ± 0.4
LDL (mmol/L)	2.5 ± 0.9	2.4 ± 0.6	2.3 ± 0.7	2.2 ± 0.7	2.4 ± 0.8	2.0 ± 0.8*	1.9 ± 0.8	2.2 ± 0.6	2.0 ± 0.7*

- 52 patients with T2D underwent RYGB between 2008 and 2012. Weight, BMI, OGTT, HbA1c, and lipid metabolic parameters were measured at baseline and 3 and 6 months and 1-6 years after surgery.

Obesity Surgery 2020

Study 3 Long-term exploration

Table 2 HbA1c and OGTT outcomes in the preoperative and postoperative periods

	Baseline	3 months	6 months	1 year	2 years	3 years	4 years	5 years	6 years
Follow-up	52	51 (98.1%)	48 (92.3%)	40 (76.9%)	37 (71.2%)	24 (46.2%)	16 (30.8%)	19 (36.5%)	12 (23.1%)
HbA1c (%)	8.2 ± 1.7	6.5 ± 1.4*	6.5 ± 1.4*	7.3 ± 1.5	7.6 ± 1.5	7.4 ± 1.7	7.2 ± 1.3*	7.6 ± 1.8	7.5 ± 1.4*
OGTT (mmol/L)									
0 min	7.9 ± 2.4	6.0 ± 1.8*	6.6 ± 1.6*	6.7 ± 1.5*	6.4 ± 1.9*	6.7 ± 2.2	6.7 ± 2.0*	7.5 ± 2.1	7.7 ± 2.3
30 min	12.8 ± 3.5	11.5 ± 2.9*	12.4 ± 2.7	12.7 ± 2.1	11.8 ± 4.2	11.0 ± 4.4	12.8 ± 3.5	12.1 ± 2.6*	10.9 ± 2.8
120 min	17.0 ± 4.1	11.4 ± 4.6*	12.8 ± 4.1*	12.6 ± 4.2*	13.1 ± 4.4*	12.6 ± 4.1*	13.1 ± 4.1*	12.0 ± 3.5*	12.5 ± 3.1*
OGTT-IRT (mIU/L)									
0 min	14.4 ± 18.7	8.2 ± 10.8*	7.3 ± 7.8	9.0 ± 7.6	8.4 ± 5.7	8.0 ± 4.1	9.1 ± 6.1	5.9 ± 4.3	6.2 ± 4.2
30 min	23.8 ± 23.7	40.4 ± 52.5*	52.3 ± 71.5	59.6 ± 80.4*	36.8 ± 50.3	30.8 ± 16.4	47.2 ± 40.2*	38.8 ± 43.3	53.8 ± 67.7
120 min	40.9 ± 41.8	32.5 ± 29.3	31.1 ± 29.3	30.1 ± 23.8	27.0 ± 16.1	35.3 ± 29.0	45.9 ± 50.1	32.0 ± 31.0	26.8 ± 18.5
OGTT-CRT (μg/L)									
0 min	1.9 ± 1.6	1.4 ± 1.3	1.4 ± 0.9*	1.2 ± 0.9*	1.3 ± 0.8	1.8 ± 1.2	1.4 ± 0.4	1.4 ± 0.6	1.7 ± 1.0
30 min	3.0 ± 2.2	4.3 ± 4.4	4.4 ± 4.3	4.4 ± 4.8	3.3 ± 3.1	4.5 ± 2.1	3.9 ± 2.5	3.9 ± 2.3	4.3 ± 2.9
120 min	5.2 ± 3.3	4.9 ± 2.9	5.6 ± 3.7	4.8 ± 2.9	5.1 ± 3.2	5.7 ± 3.8	4.5 ± 2.4	4.7 ± 3.0	4.7 ± 2.7

Table 4 The remission and improvement of T2DM

	Baseline	3 months	6 months	1 year	2 years	3 years	4 years	5 years	6 years
Follow-up	52	51 (98.1%)	48 (92.3%)	40 (76.9%)	37 (71.2%)	24 (46.2%)	16 (30.8%)	19 (36.5%)	12 (23.1%)
Complete remission	–	20 (39.2%)	19 (39.6%)	12 (30.0%)	10 (27.0%)	5 (20.8%)	5 (31.3%)	4 (21.1%)	2 (16.7%)
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Improvement	–	13 (25.5%)	9 (18.8%)	10 (25.0%)	8 (21.6%)	5 (20.8%)	4 (25.0%)	5 (26.3%)	3 (25.0%)
Total	–	45 (88.2%)	39 (81.3%)	30 (75.0%)	25 (67.6%)	17 (70.8%)	12 (75.0%)	12 (63.2%)	8 (66.7%)

Findings: RYGB may be a safe and effective treatment for T2D patients with a low BMI in China. However, a long-term study without loss to follow-up is necessary for better evaluation.

Obesity Surgery 2020

Study 4 Body fat redistribution

Obesity Surgery
https://doi.org/10.1007/s11695-021-05430-w

ORIGINAL CONTRIBUTIONS

Five-year Changes in Body Composition in Type 2 Diabetes Mellitus Patients with a BMI < 32.5 kg/m^2 Undergoing Laparoscopic Roux-en-Y Gastric Bypass Surgery

- Fat mass ↓
- Trunk fat ↓
- Arm and leg fat ↑

Table 2 Body fat mass percentage (%BF) and regional fat proportion (RFP)

	Baseline	Follow-up				
		3 months	6 months	1 year	3 years	5 years
	n = 27	n = 23	n = 23	n = 23	n = 13	n = 10
Total %BF (%)	30.2 ± 6.7	24.4 ± 9.0	23.9 ± 7.8	25.6 ± 8.4	29.9 ± 7.5	31.1 ± 9.7
Trunk %BF (%)	36.3 ± 6.5	29.1 ± 9.4	28.9 ± 9.2	30.7 ± 9.9	33.4 ± 7.4	32.9 ± 9.7
Arms %BF (%)	28.1 ± 8.8	22.2 ± 11.6	21.0 ± 9.6	23.4 ± 10.0	30.9 ± 15.5	35.9 ± 14.1
Legs %BF (%)	22.9 ± 8.1	19.3 ± 8.9	18.0 ± 6.9	19.6 ± 7.5	24.6 ± 8.8	27.7 ± 10.5
Android %BF (%)	40.7 ± 6.8	31.8 ± 10.2	31.0 ± 10.2	33.8 ± 10.9	36.3 ± 7.5	34.2 ± 9.6
Gynoid %BF (%)	29.0 ± 7.6	25.6 ± 10.1	24.1 ± 8.0	25.9 ± 8.0	28.9 ± 7.1	29.4 ± 9.7
A/G Ratio	1.45 ± 0.26	1.29 ± 0.29	1.30 ± 0.30	1.31 ± 0.21	1.29 ± 0.25	1.18 ± 0.11
Trunk RFP (%)	63.6 ± 7.9	63.0 ± 5.5	64.0 ± 6.5	63.1 ± 6.7	58.0 ± 12.3	55.0 ± 4.2
Arms RFP (%)	11.7 ± 8.3	9.8 ± 3.3	8.9 ± 2.2	9.7 ± 2.3	11.4 ± 3.9	12.8 ± 2.0
Legs RFP (%)	21.1 ± 4.1	22.7 ± 3.9	22.2 ± 4.1	22.4 ± 3.9	26.2 ± 9.2	25.9 ± 4.0
Android RFP (%)	11.6 ± 1.8	10.7 ± 1.7	10.3 ± 3.7	11.0 ± 2.1	9.9 ± 2.9	8.5 ± 0.9
Gynoid RFP (%)	13.6 ± 2.1	15.4 ± 2.4	15.1 ± 3.0	14.7 ± 2.0	16.8 ± 10.3	13.0 ± 1.2

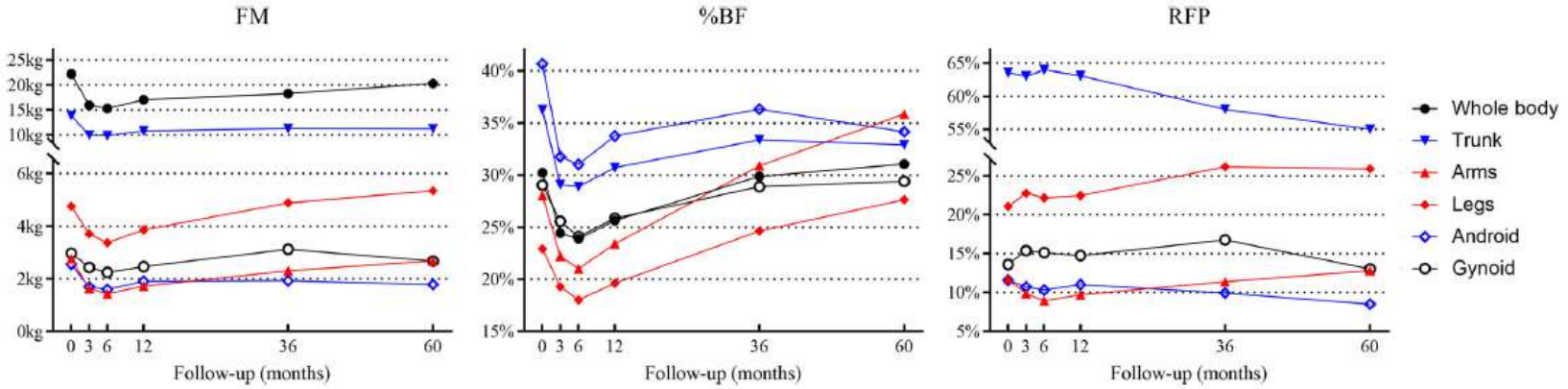


Fig. 1 The modification of fat distribution across 5 years after LRYGB was evaluated from three dimensions, including fat mass (FM), body fat mass percentage (%BF), and regional fat proportion (RFP)

Obesity Surgery 2021

Study 4 Body fat redistribution

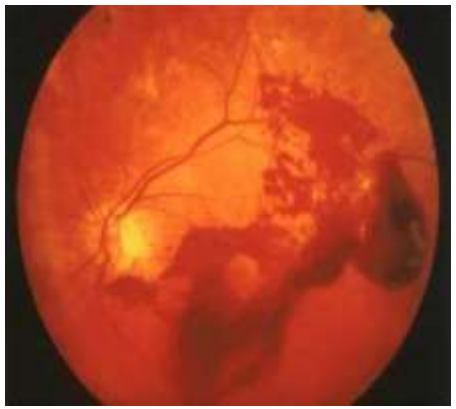
- Findings: For low BMI patients with T2D, RYGB led to a reduction in fat mass. A metabolically healthy fat redistribution occurring 5 years after RYGB might be a promising mechanism to explain the lasting benefits of LRYGB for T2D patients with a low BMI.

Obesity Surgery 2021

Contents

Increased Risk of Bleeding in T2D Patients Underwent RYGB

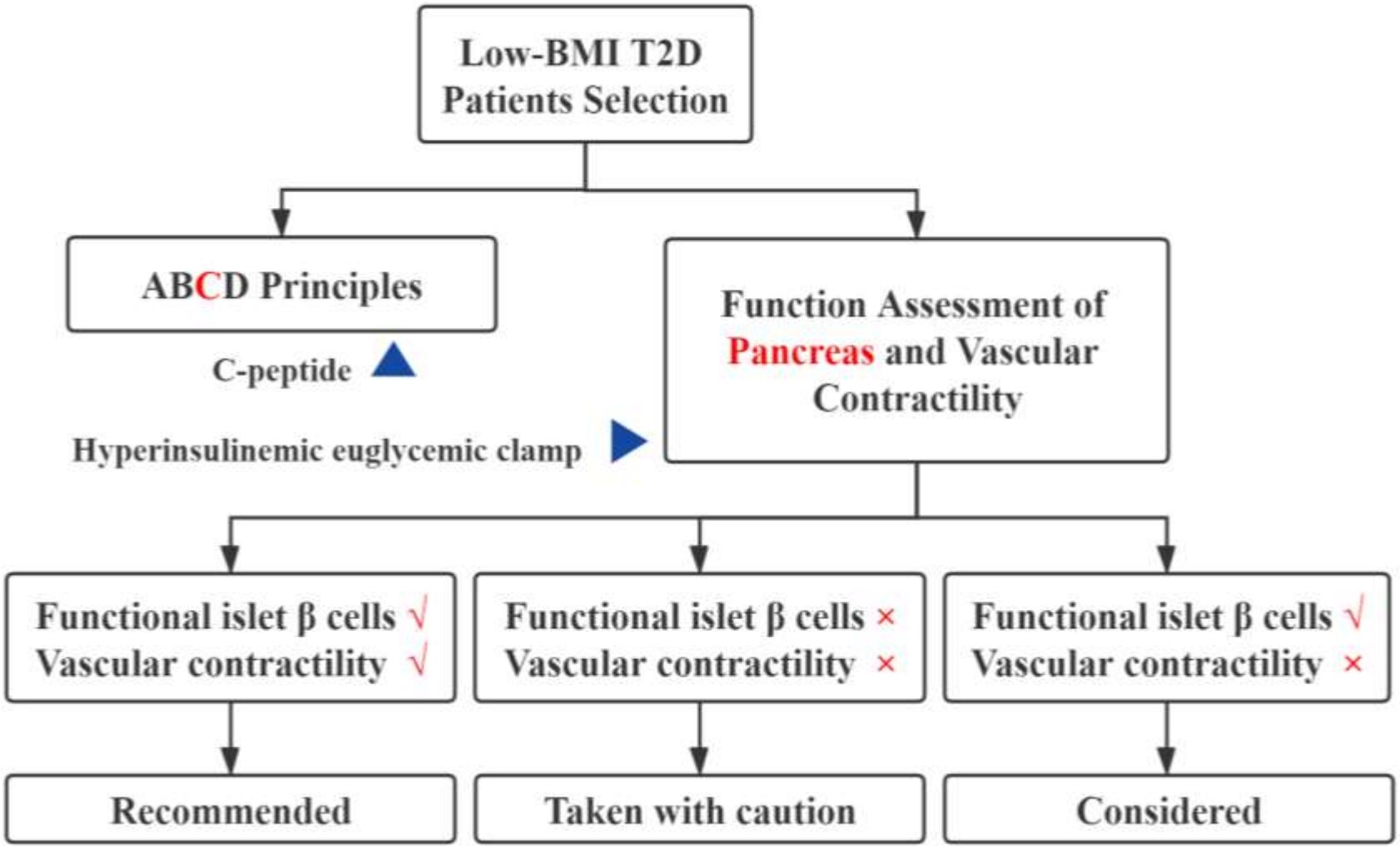
- Bleeding is one of the most common complications in bariatric surgery;
- A retrospective analysis for 8,544 patients:
  - Bleeding: 122 cases (1.3%);
  - RYGB shown the highest bleeding rate (3.05%): intraoperative (20%) and postoperative (80%);
  - Risk factors including hypertension, chronic pulmonary disease, age > 45, T2D, and surgical skill.

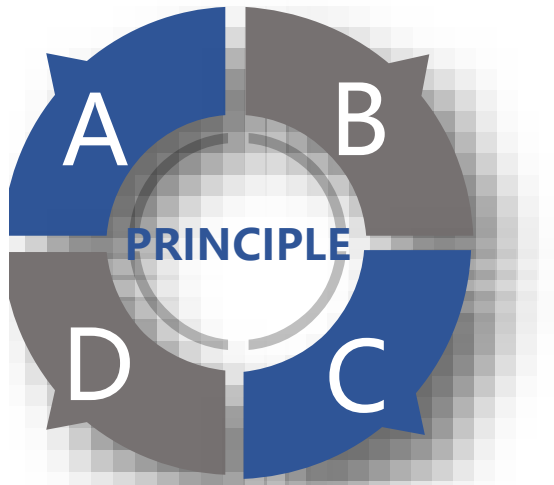


- Diabetic microangiopathy leads to impaired angiogenesis, oxidative stress, and release of pro-inflammatory cytokines, increasing the bleeding risk for RYGB.

Susmallian S, et al. Dig Dis. 2020 Feb 13.

Selection of the Appropriate Patients is A Good Start





Serosal Suture

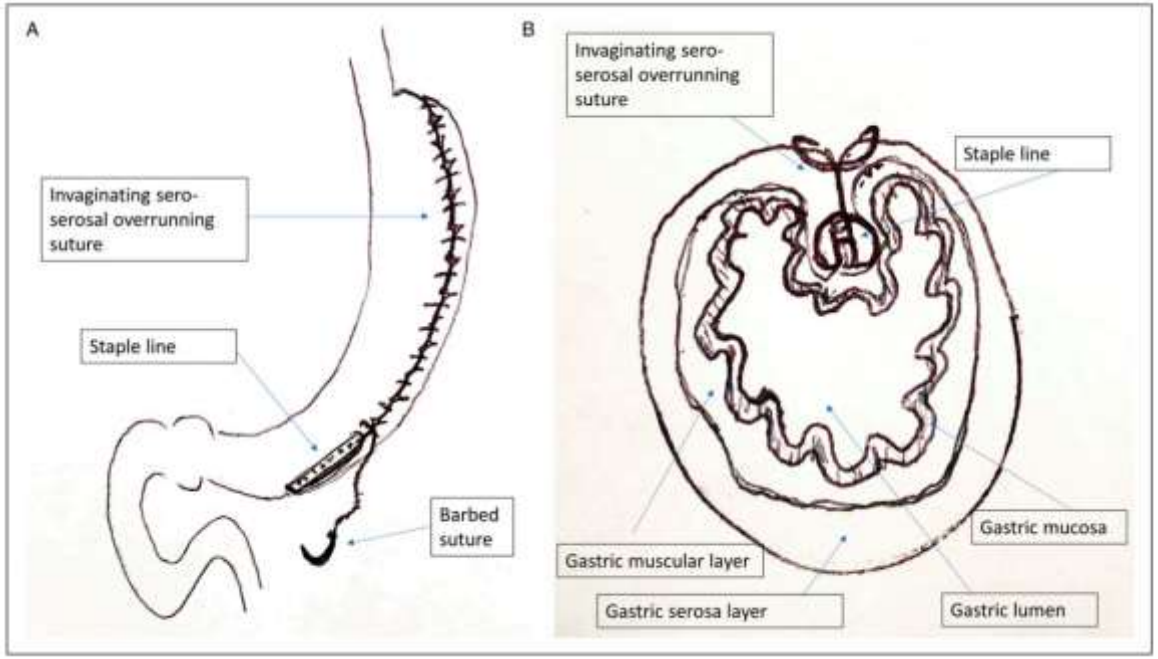
Table 3

Bleed rate by reinforcement type (sleeve and gastric bypass)

Buttress material	Number of study arms	Event rate (high to low)	Number of patients
None	83	3.45 %	17,808
Oversuture	58	2.69 %	14,368
Glycolide copolymer	44	2.48 %	2929
Bovine pericardium	30	1.23 %	6759

Bleed rate by reinforcement type for gastric bypass

Buttress material	Number of study arms	Event rate (high to low)	Number of patients
None	58	3.13 %	14,943
Oversuture	25	3.10 %	9686
Glycolide copolymer	16	3.02 %	932
Bovine pericardium	16	1.28 %	5127



Serosal suture is effective in reducing the risk of bleeding in metabolic surgery.

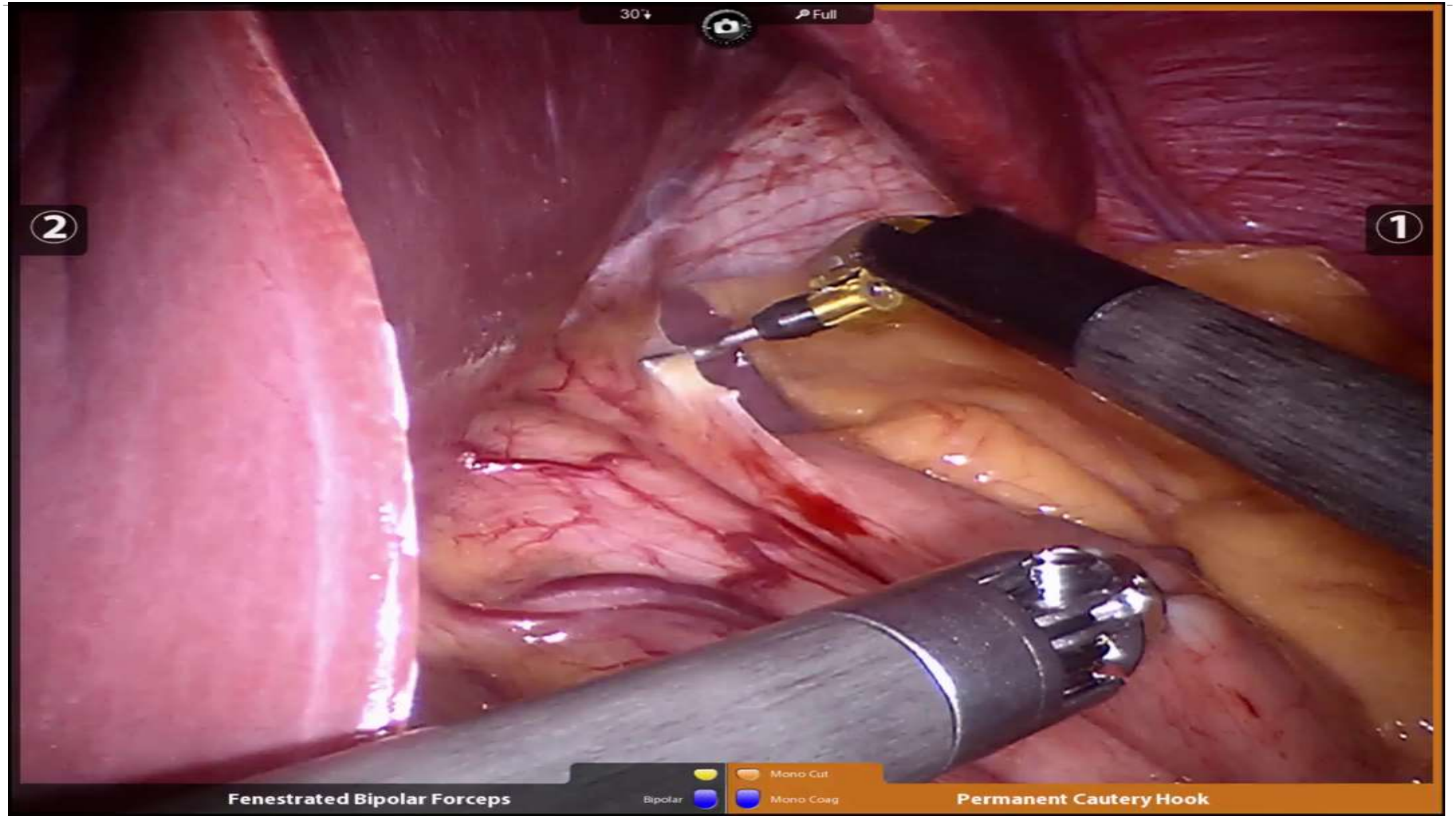
Shikora SA, et al. Obes Surg. 2015 Jul;25(7):1133-41.
Tolone S, et al. Surgical Innovation. 2021;28(1):18-23

Low-BMI RYGB

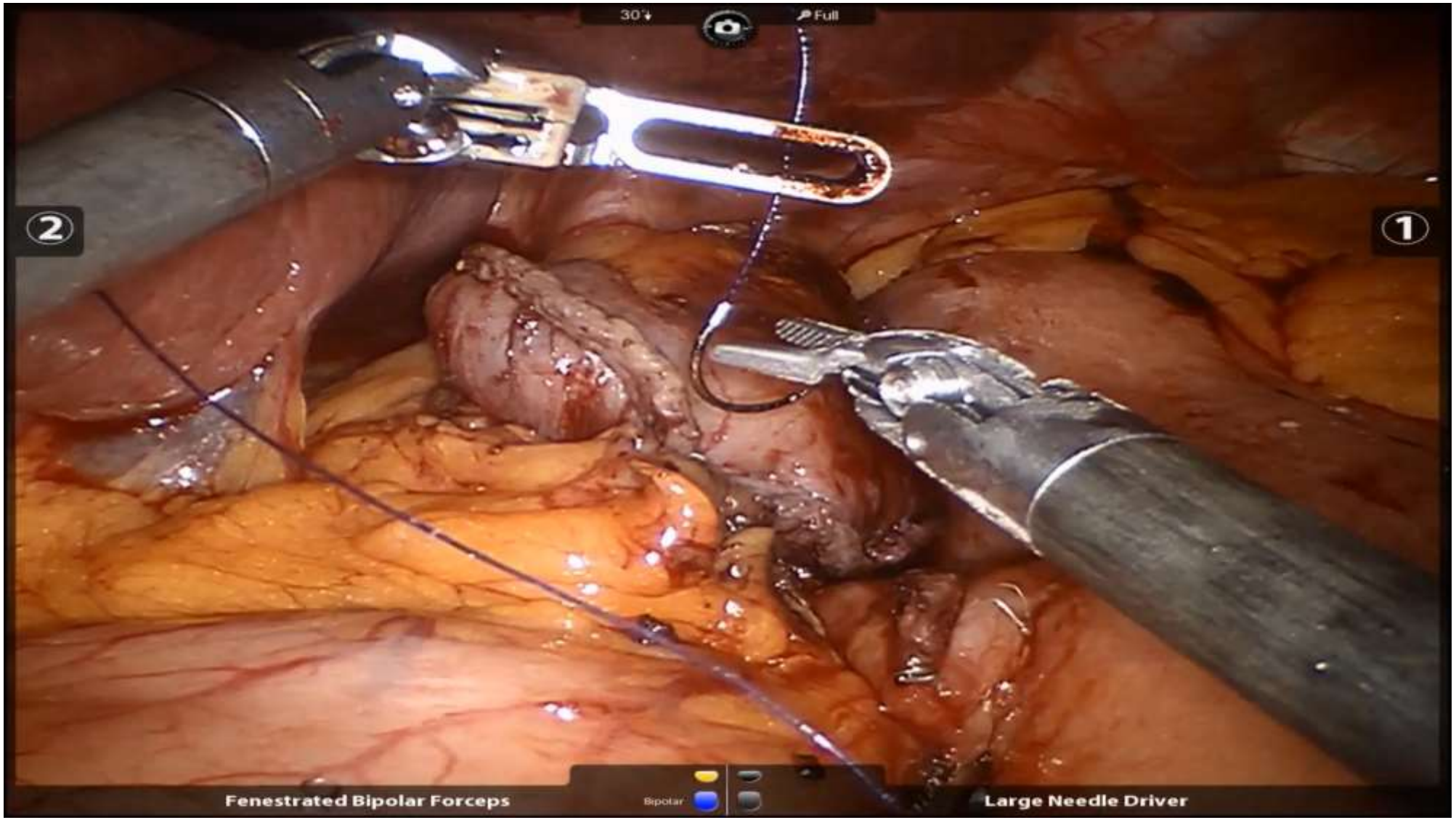
General Information

- Male, 57 y;
- Polyphagia, polydipsia, and polyuria for 18 years with body weight loss for 5 years;
- BMI 27.5 kg/m^2, WC 87 cm;

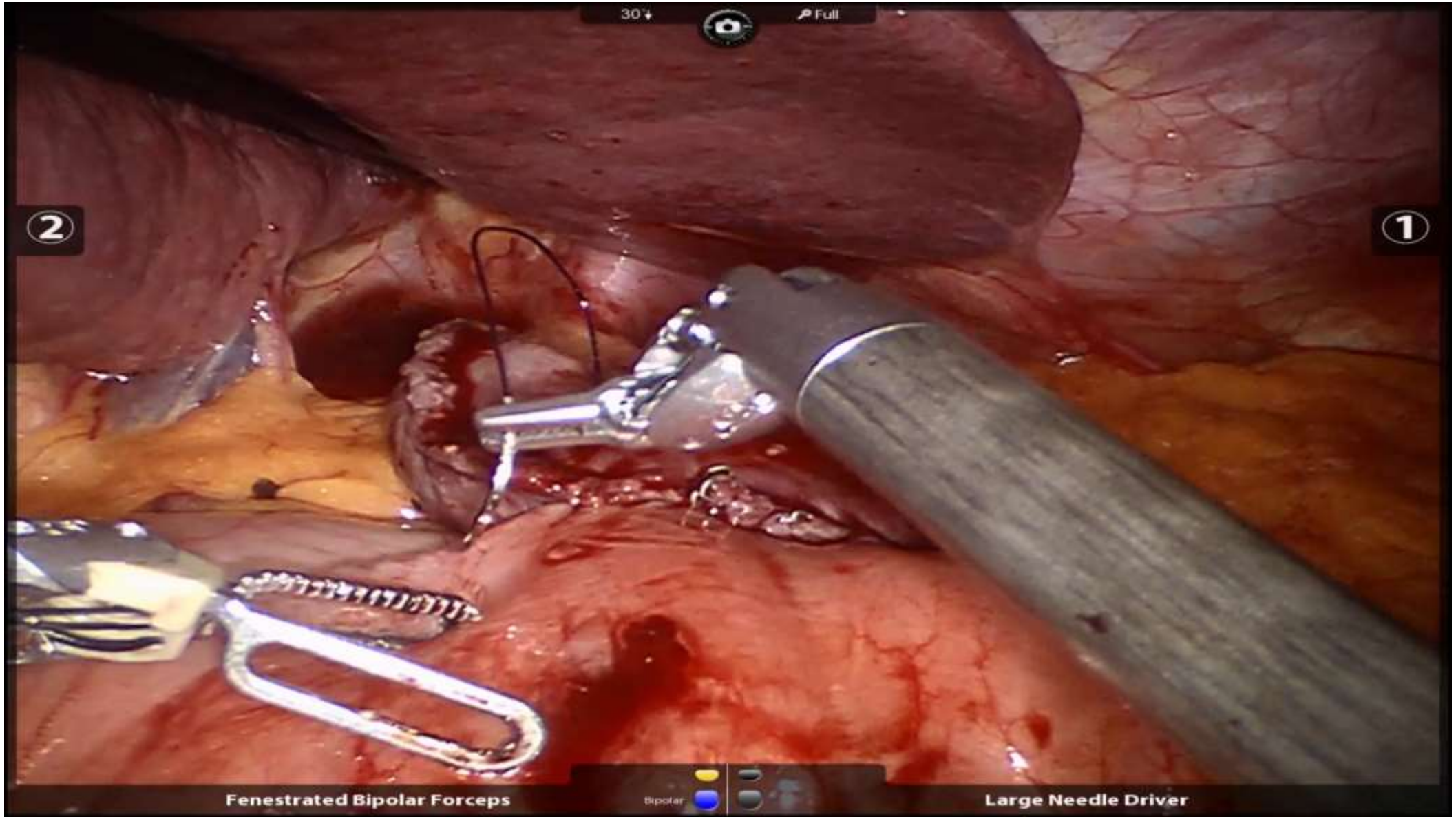
With Careful Dissection and Creating A Small Gastric Pouch



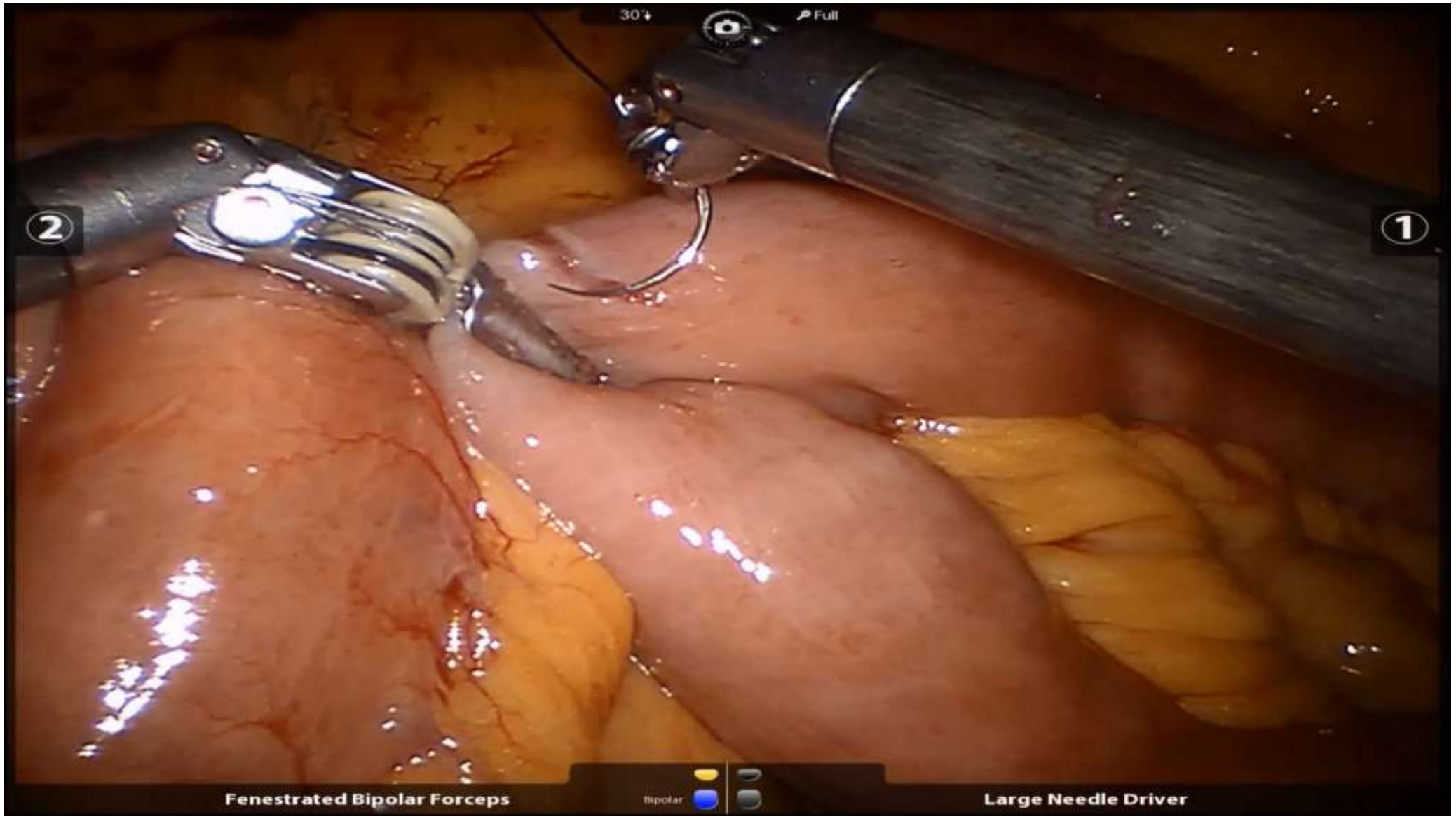
Serosal Suture for Cut Edge



Serosal Suture for Gastrojejunal Anastomosis



Serosal Suture for Jejuno-jejunal Anastomosis



Domestic MicroHand SII Surgical System

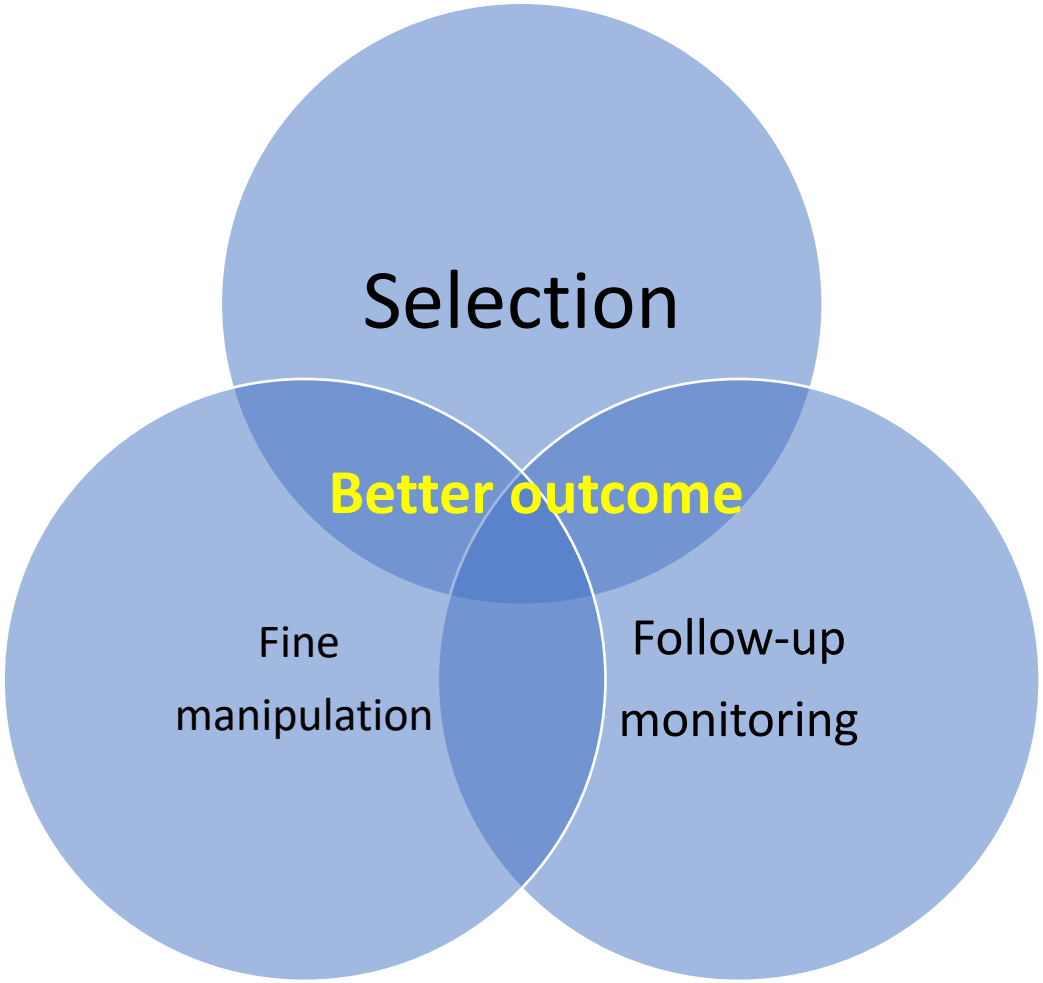
Rectal cancer
Common bile duct exploration

Gastric cancer
Resection of choledochal cysts

Right half colon cancer
Liver resection left lateral lobe

Left half colon cancer
Resection of pancreatic body and tail

Should low-BMI with comorbidities patients have MBS?



Thanks!

Shaihong Zhu

The Third Xiangya Hospital of Central South University