Conversion of sleeve gastrectomy to R-Y gastric bypass:- Different strategies for obese and non-obese patients

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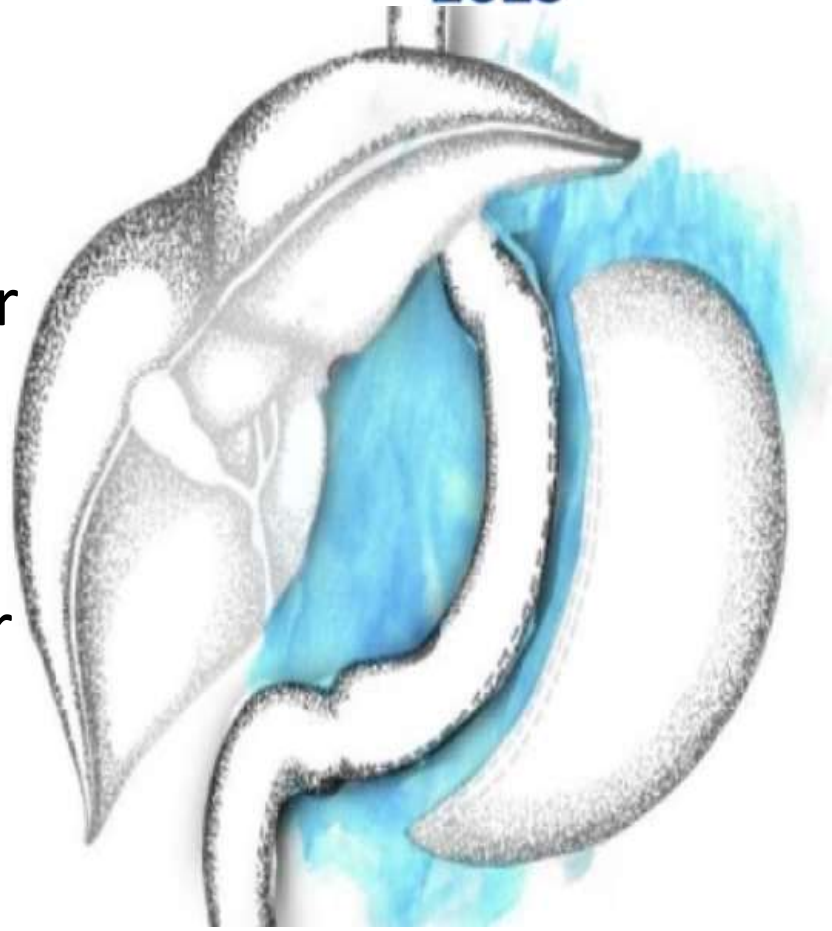
Introduction

- LSG is currently the most popular bariatric procedure.
- **GERD** and **weight regain** becomes the main drawback.
- The incidence of revision surgery for SG at 5-10 yr is 11 to 50%.*

* Genco A, Soricelli E, Casella G, et al. Gastroesophageal reflux disease and Barrett's esophagus after laparoscopic sleeve gastrectomy: a possible, underestimated longterm complication. Surg Obes Relat Dis. 2017;13(4).

- our own experience with revision surgery at 10 yr after LSG was 21%.**

** Chang DM, Lee WJ, Chen JC, et al. Thirteen-year experience of laparoscopic sleeve gastrectomy: surgical risk, weight loss and revision procedures. Obes Surg. 2018;28.



Conversion to RYGB is recommended

Effective for GERD but not for further weight loss.

Revision to OAGB or DS were recommended for weight loss.

The best revision procedure for patients with concurrent GERD and weight loss failure remained unclear.

Whether extension of the bypass limb, especially BP limb, may increase the weight loss after revision of SG to RYGB is an interesting question.

Aim

Analyze the outcomes of our patients who underwent **revisional** RYGB after SG for intractable GERD with concurrent obesity or without.

This retrospective review of a prospectively maintained database.

Intractable GERD endoscopic diagnosis of GERD with Gr C and PPI dependent.

In our center, patients with previous SG and weight regain were advised converting to OAGB or DS if no concurrent GERD.

RYGB was recommended to those with intractable GERD after SG, with or without weight regain.

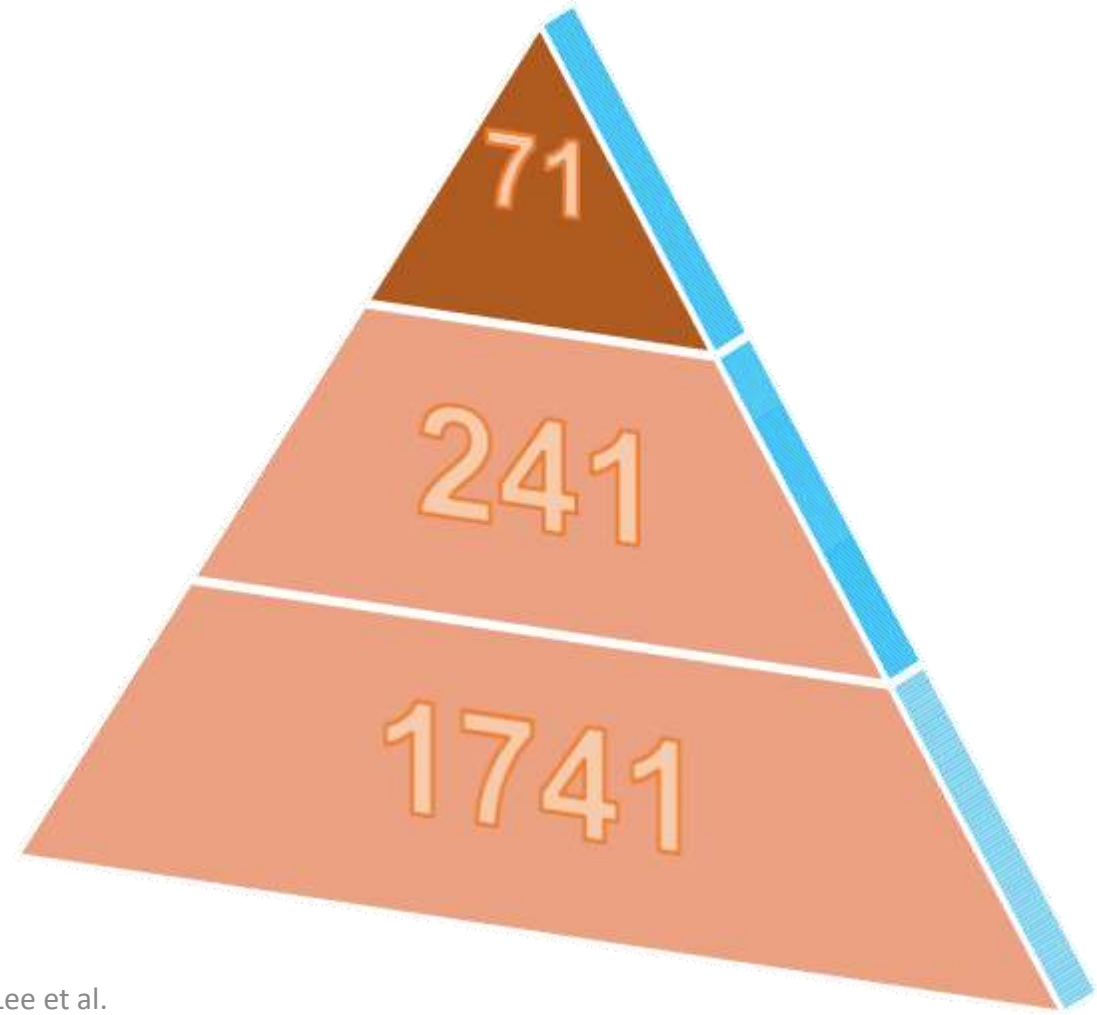
A thorough assessment was performed before surgery (barium,EGD)

Patients

- From January 2006 to December 2019,
- 1741 patients underwent LSG, 1500 as primary bariatric procedure and 241 as revision procedure.
- We identified 71 patients with previous SG.
- 55 (follow-up rate 77.5%) of them with one year follow-up data available were recruited in this study.
- Patients were classified into two groups, those with body mass index

  BMI 25 kg/m2

  BMI < 25 kg/m2



Surgical technique

- Laparoscopically.
- Adhesionlysis
- Preserve the vagus nerve .
- Hiatal hernia repair.
- RYGB was then performed
- The policy for bypass limb was different for those obese and non-obese patients

M.-H. Lee, O.M. Almalki, W.-J. Lee et al.

non-obese patients

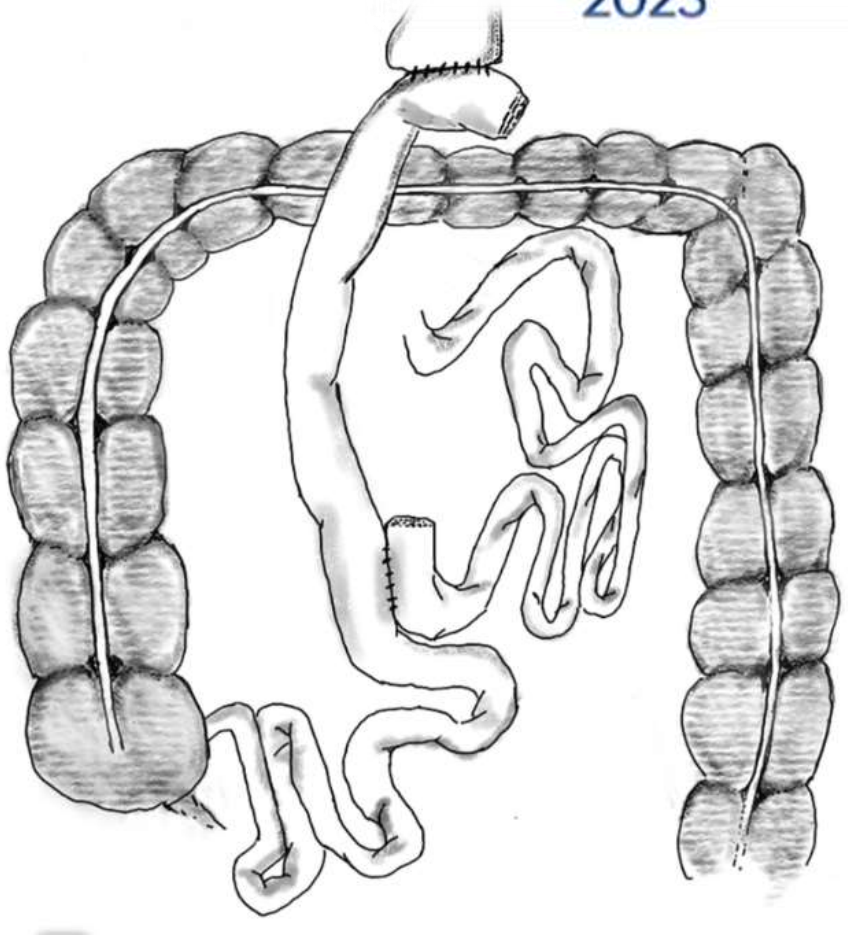
a standard RYGB technique was performed.

100-cm BP limb and a 100 cm alimentary limb.

obese patients

a modified RYGB technique was adopted.

BP limb was extended to 200 cm or 30% of the whole small bowel length.



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- Our policy is to make sure the **common channel** was longer than **400 cm** or 70% of the whole small bowel length, to avoid protein malnutrition after surgery.

- The gastroenterostomy size was controlled within 2 cm.
- The dilated gastric pouch was sometimes trimmed or plicated to a smaller size

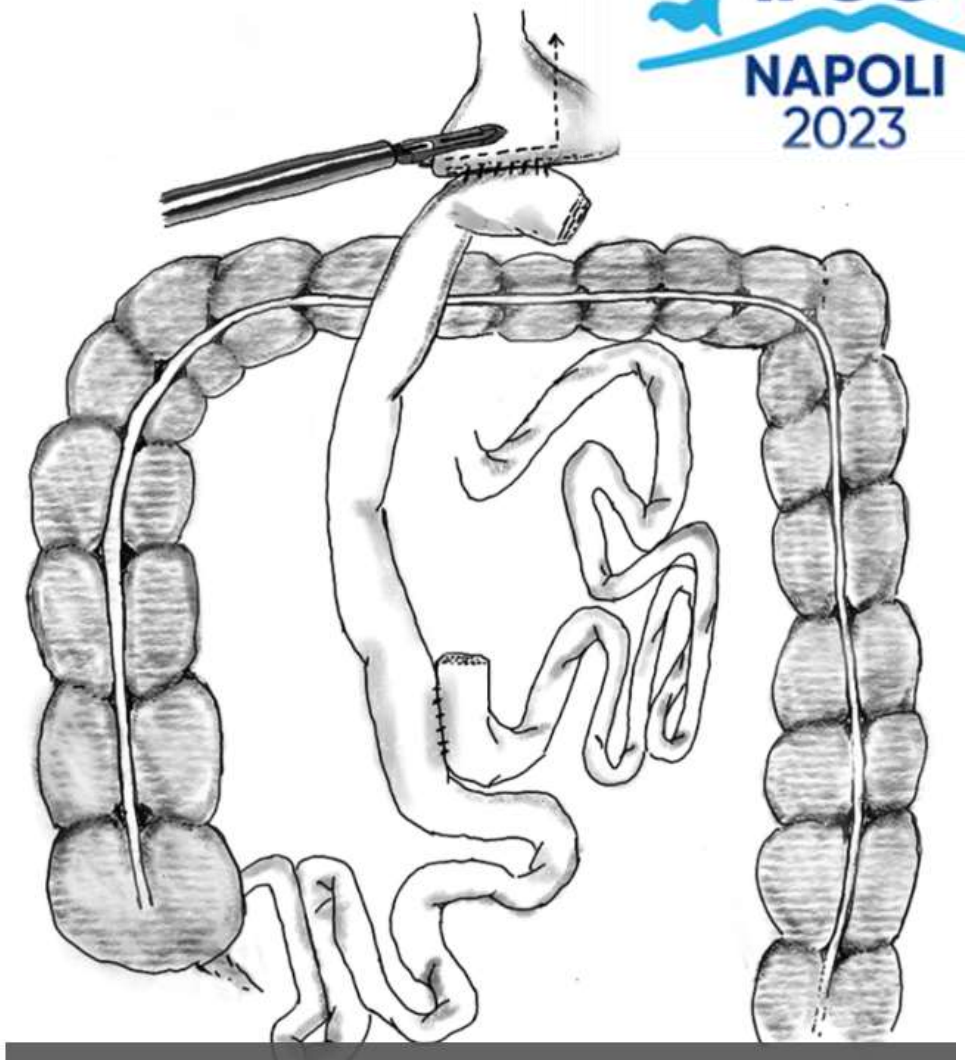

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Table 1

Clinical characteristics of Asian patients with BMI < 25 kg/m^2 and those with (BMI≥25 kg/m^2) underwent revision from SG to RYGB.

	with BMI<25 kg/m^2 (n = 19)	with BMI ≥ 25 kg/m^2 (n = 36)	P value
Age (years)	40.8(10.9)	42.9(9.2)	0.455
Female (%)	89.50%	75%	0.202
Period from SG to RYGB (month)	41.8(26.6)	55.3(39.6)	0.186
BMI at revision (Kg/m^2)	22.2(1.72)	30.0(4.2)	<0.001*
BMI at origin (Kg/m^2)	33.1(6.9)	35.3(5.8)	0.196
SBP (mmHg)	119.9(17.9)	129.7(14.2)	0.032*
DBP (mmHg)	73.4(9.3)	79.2(9.6)	0.037*
Fasting Glucose (mg/dL)	88.7(7.9)	99.2(29.7)	0.159
HbA1c %	5.6(0.9)	5.9(1.2)	0.360
Total Cholesterol (mg/dL)	190.4(35.6)	194.4(35.9)	0.712
Triglycerides (mg/dL)	78.9(32.7)	113.1(76.6)	0.030*
LDL (mg/dL)	111.6(30.5)	120.5(23.9)	0.274
GPT (IU)	12.6(4.3)	25.6(40.5)	0.210
Albumin (gm/dL)	4.1(0.3)	4.3(0.4)	0.165
Hb (gm/dL)	12.3(1.4)	12.8(2.1)	0.370
MCV (fl)	82.4(7.3)	81.6(8.2)	0.721
WBC (1000)	6.3(2.7)	6.8(2.3)	0.440
Hs-CRP (mg/dL)	0.625(2.1)	0.289(0.3)	0.520
Ca (mg/dL)	9.1(0.4)	9.4(0.5)	0.059
PTHi (pg/mL)	69.4(44.8)	67.2(26.8)	0.833

Table 2

A comparison of peri-operative clinical data between Asian patients with BMI < 25 kg/m^2 and those with BMI≥25 kg/m^2 underwent revision from SG to RYGB.

	with BMI<25 kg/m^2 (n = 19)	with BMI ≥ 25 kg/m^2 (n = 36)	P value
Mean operative time(min)	175.5(49.9)	198.8(62.9)	0.170
Intra-operative blood loss (ml)	33.2 (9.5)	49.7(44.0)	0.115
Postoperative hospital stay (day)	4.5(3.1)	3.7(1.6)	0.179
Early postoperative complication	3 (15.8%)	4 (11.1%)	0.615
Minor (Clavien Dindo Grade1 or 2)	1	2	
Major (Clavien Dindo Grade ≥3)	2	2	
Bleeding	0	1	
Gastric stenosis	1	0	
Ileus	1	1	
BP limb length(cm)	87.6(16)	192.4(77.1)	<0.001*
Alimentary limb length (cm)	116.1(34.8)	114.7(32.9)	0.887
Total small bowel length (cm)	753(150.1)	788.9(92.8)	0.545
Common channel length (cm)	475(124.4)	490(79.4)	0.768

Table 3

Comparison of clinical data between Asian patients with BMI < 25 kg/m^2 and those with BMI≥25 kg/m^2 underwent revision from SG to RYGB at 1 year after surgery.

	with BMI<25 kg/m^2 (n = 19)	With BMI ≥ 25 kg/m^2 (n = 36)	P value
BMI (Kg/m^2)	23.0(4.2)	27.2(2.8)#	0.004*
%TWL	−3.1(1.4)	9.1(8.4)	0.005*
Complete waive of PPI	**10(52.6%)**	**23(63.9%)**	0.418
SBP (mmHg)	128.5(6.4)	129.1(11.9)	0.946
DBP (mmHg)	85(14.1)	77.6(11.8)	0.464
Fasting Glucose (mg/dL)	91.7(11.5)	93.5(23.6)	0.903
HbA1c %	5.9(1.1)	5.6(0.9)#	0.359
Total Cholesterol (mg/dL)	154.7(23.8)	166.6(32.2)	0.449
Triglycerides (mg/dl)	71.7(12.5)	91.4(41.9)	0.884
LDL (mg/dL)	81.0(13.5)	104.6(29.5)	0.223
GPT (IU)	27.7(7.9)	23.5(11.5)	0.629
Albumin (gm/dL)	4.2(0.5)	4.3(0.3)	0.728
Hb (gm/dL)	11.3(2.3)	12.8(2.5)	0.359
MCV (fl)	86.4(7.8)	82.2(9.3)	0.498
WBC (1000)	4.8(0.3)	5.8(1.1)	0.167
Hs-CRP (mg/dL)	0.069(0.08)	0.247(0.308)#	0.448
Ca (mg/dL)	8.9(0.5)	9.2(0.4)	0.300
PTHi (pg/mL)	72.2(49.7)	74.8(35.1)	0.919

Discussions

- This study, to the best of our knowledge is the largest series of Asian patients received conversion of SG to RYGB.

- It provided some interesting data that a modified RYGB technique might be consider for those with inadequate weight loss or weight regain issues after SG.

- Previous several randomized controlled trials have demonstrated that there was no difference in weight loss after SG versus RYGB for obesity treatment.

* Ignet M, Vix M, Imad I. Randomized trial of Roux-en-Y gastric bypass versus sleeve gastrectomy in achieving excess weight loss. Br J Surg. 2017;104(3).

**Salminen P, Helmio M, Ovaslta J, et al. Effect of laparoscopic sleeve gastrectomy vs laparoscopic Roux-en-Y gastric bypass on weight loss at 5 years among patients with morbid obesity. The SLEEVEPASS randomized clinical trial. JAMA. 2018;318(3).

***Petarli R, Wolnerhanssen BK, Peters T, et al. Effect of laparoscopic sleeve gastrectomy vs laparoscopic Roux-en-Y gastric bypass on weight loss in patients with morbid obesity: the SM-BOSS randomized clinical trial. JAMA. 2018;319

- Therefore, it is not surprising that conversion SG to RYGB might be effective for GERD but did not result in further weight loss.

- In this study, non-obese patients with SG did not have any further weight loss after converting to standard RYGB corroborating with the previous reports.

- However, converting to a modified RYGB **with long BP limb** RYGB can result approximate **10% further TWL** in obese patients with previous SG in this study

a longer BP limb

1) A better weight loss and glycemic control was demonstrated in a randomized trial comparing a 50 cm BP limb to 150 cm. *

2) Another matched comparison study also dem
weight loss in 150 cm BP limb than 75 c

3) For revisi
is imp

increase of circulating bile acid level or deactivation of digestive enzymes

* Venciaus
treatment
short vs. long biliopancreatic limb gastric bypass for
controlled study. Obes Surg. 2014;24:1149e1150

**Smelt HJM
Sv, Panwels S, Aarts MPW, Smulders JF. The influence of different alimentary and biliopancreatic limb length in gastric bypass patients. Obes Surg. 2021;31(3):481e489.

***Caruana TA, Monte SV, Jacobs DM, et al. Distal small bowel bypass for weight regain after gastric bypass: safety and efficacy threshold occurs at < 70%

bypass. Surg Obes Relat Dis. 2015;11:1248e1256

De novo GERD

- main long-term drawback of SG
- up to half of the SG patients.

*Felsenreich DM, Kefurt R, Schermann M, et al. Reflux, sleeve dilatation, and Barrett's esophagus after laparoscopic sleeve gastrectomy: long-term followup. Obes Surg. 2017;27

**Genco A, Soricelli E, Casella G, et al. Gastroesophageal reflux disease and Barrett's esophagus after laparoscopic sleeve gastrectomy: a possible, underestimated long-term complication. Surg Obes Relat Dis. 2017;13

complete resolution in 60% after conversion SG to RYGB.

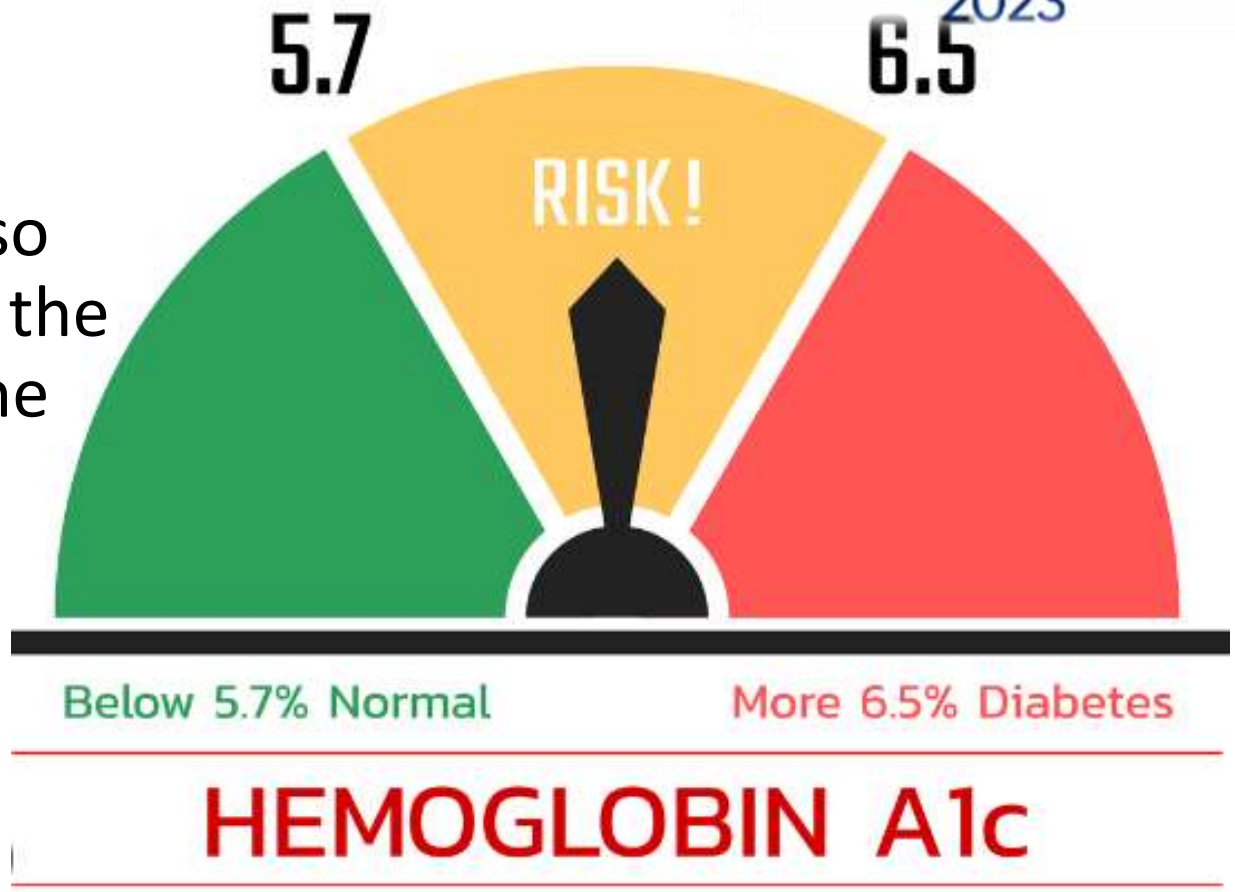
40% still

Why?

HbA1c

In this study,

a significant reduction of HbA1c was also observed in the obese group but not in the non-obese group, corroborating with the previous results



Longer BP limb may result in more diarrhea and nutritional deficiencies.

In our previous study*

- length of CC is very important for avoiding the accompanying the extension of BP limb length.
- incidence of protein-calories deficiency significantly after routinely measured the small bowel length and maintained at least **400 cm** common channel.

*Soong TC, Almalki OM, Lee WJ, et al. Measuring the small bowel length may decrease the incidence of malnutrition after laparoscopic one-anastomosis gastric bypass with tailored bypass limb. Surg Obes Relat Dis. 2019;15(10)

Limitations of this study

- Prospectively collected data
- Low case number
- lack of follow-up manometry or 24 PH studies.
- However, PPI usage is a very reliable and useful clinical indicator in management of patients with intractable GERD.
- The data of this study is compatible with previous studies and might be useful in our clinical practice

- Laparoscopic revision to RYGB is a safe and technically feasible procedure for patients with a failed SG.

  (some may still have residual symptoms even after revision)

- Using an modified RYGB with extended BP limb RYGB may help in weight reduction and glycemic control in patients had concurrent obesity or diabetic control.


QUESTIONS