

Long-term Outcomes of Sleeve Gastrectomy for Severe Obesity in Korea

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The epidemic of obesity is growing and severe problem worldwide

More than 30 BMI patients in South Korea is gradually increasing and the incidence is 5.2% in 2016

In 2030, incidence of severe obesity ($>30\text{kg}/\text{m}^2$) will be 10% in South Korea

Sleeve gastrectomy was firstly performed by Dr. WW Kim in 2003

However, the numbers of metabolic and bariatric surgery have not been increased during past 10 years

In 2019, metabolic and bariatric surgery was covered by Korean National Health Insurance Service.

Until now, 2500 cases of metabolic and bariatric surgery are annually performed in South Korea

Sleeve gastrectomy is the most performing procedures worldwide as well in South Korea

Most surgeons choose sleeve gastrectomy (> 80%) as primary procedures in South Korea

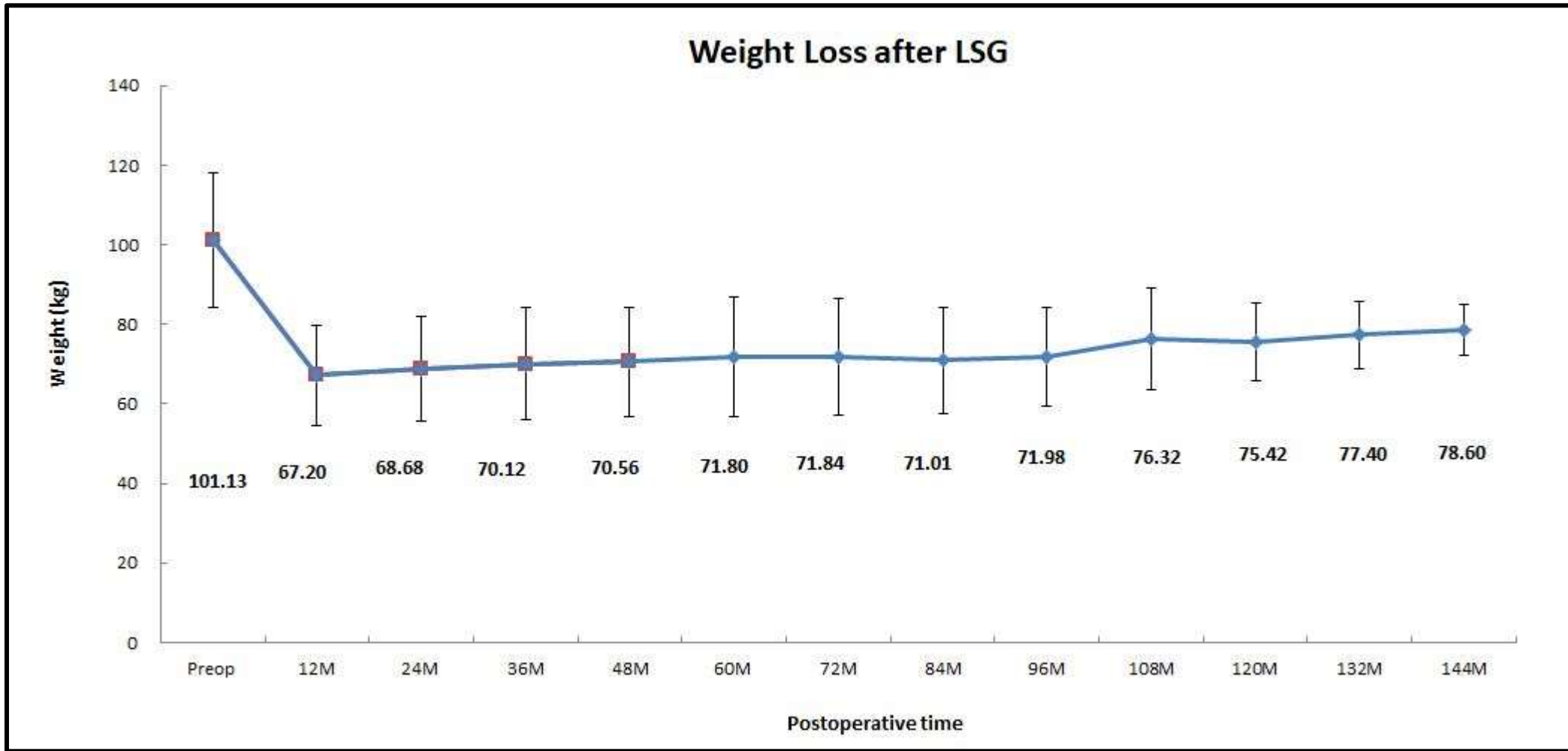
However, more than 10 years long-term outcomes of sleeve gastrectomy is few. Especially, these results were not introduced in South Korea

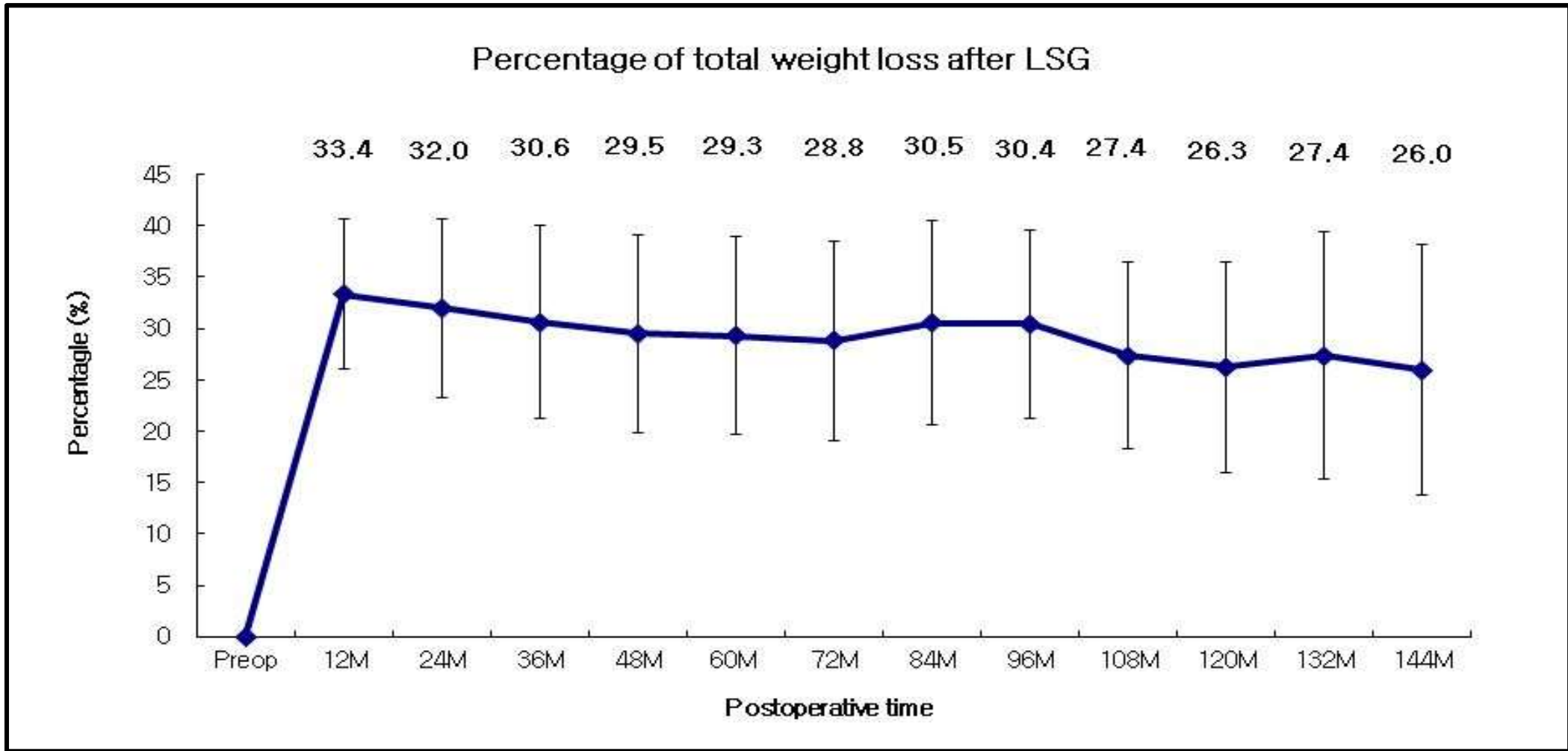
We retrospectively analyze the prospectively collected data of sleeve gastrectomy by performed single surgeon from January 2007 to December 2021.

We compared long-term outcomes between primary and secondary (from gastric band) sleeve gastrectomy

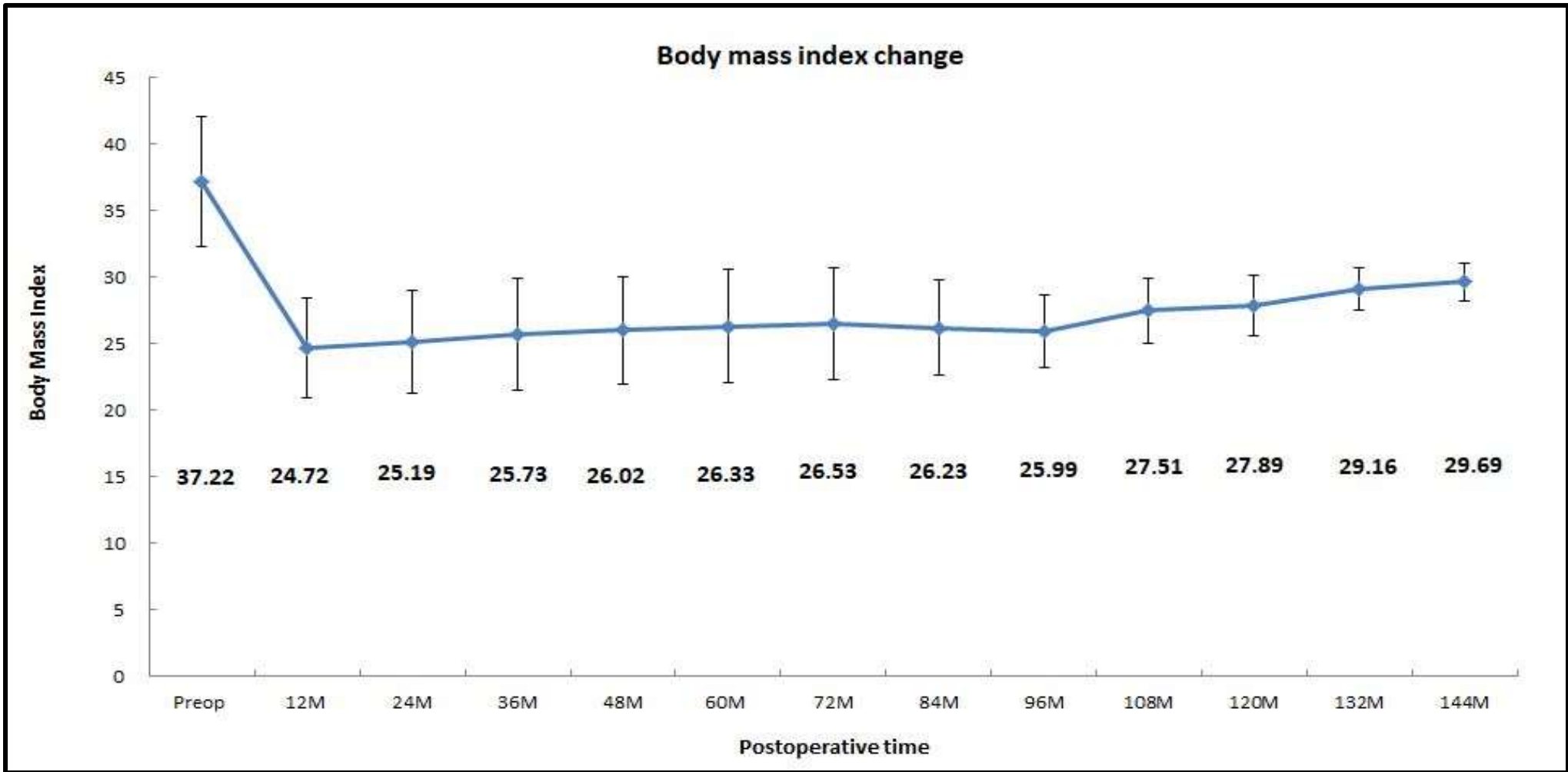
Indications for surgery: >35 BMI or >30 + obesity related conditions

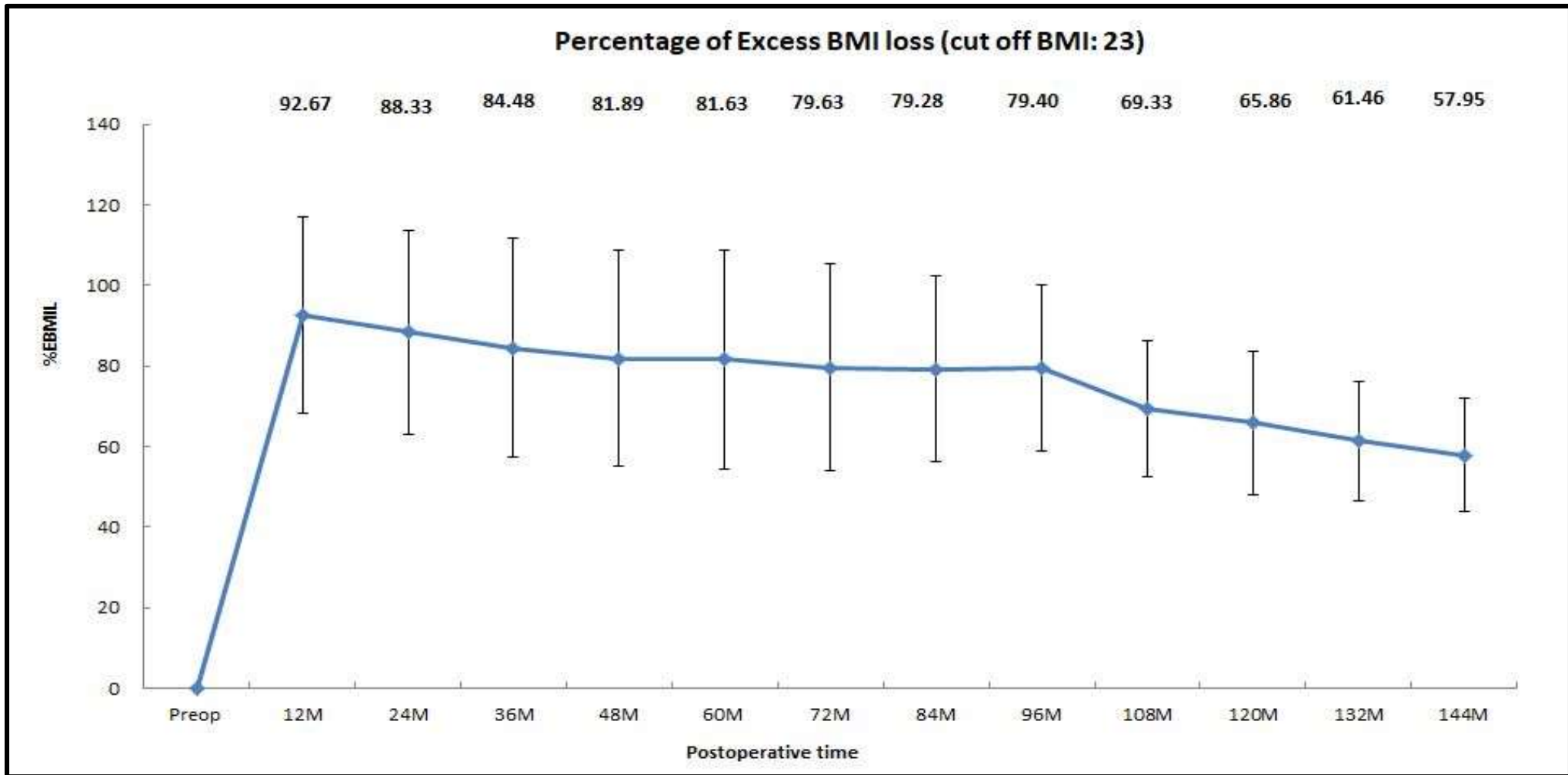
- **January 2007 - December 2021, Single surgeon**
- **826 patients; female: 710 (86%), male: 116 (14%)**
- **Primary SG: 760, Secondary SG: 66**
- **34.7 ± 4.1 years**
- **Weight: 101.1 ± 17.0 kg**
- **BMI: 37.2 ± 4.9 (30-60.2) kg/m²**
- **4cm from pylorus, 36Fr bougie, reinforcement**
- **Fixed follow-up: 1,3,6,12 months and annually**





Results (BMI change)





Results (primary and secondary)

| Variables | Primary (n=760) | Secondary (n=66) |
|--------------------------------------|-----------------|------------------|
| Age (years) | 34.6 ± 8.35 | 37.1 ± 12.7 |
| Sex | | |
| Female | 646 (85%) | 64 (97%) |
| Male | 114 (15%) | 2 (3%) |
| Weight (kg) | 101.7 ± 16.9 | 95.12 ± 16.7 |
| Height (cm) | 164.5 ± 7.6 | 1.635 ± 5.8 |
| Body mass index (kg/m ²) | 37.4 ± 4.84 | 35.4 ± 4.7 |
| Comorbidities | | |
| Fatty liver | 509 (66.97%) | 31 (46.97%) |
| Dyslipidemia | 461 (60.66%) | 23 (34.85%) |
| Hypertension | 316 (41.58%) | 14 (21.21%) |
| Type II diabetes | 191 (25.13%) | 9 (13.64%) |
| Sleep apnea | 326 (42.89%) | 10 (15.15%) |

Results (%TWL)

| Variables | Primary (n=760) | Secondary (n=66) |
|-----------------------|-----------------|------------------|
| Percentage of TWL (%) | | |
| 1 year | 33.76 ± 7.14 | 29.23 ± 7.69 |
| 2 year | 32.40 ± 8.62 | 28.54 ± 8.60 |
| 3 year | 30.91 ± 9.36 | 27.46 ± 9.51 |
| 4 year | 29.58 ± 9.73 | 27.44 ± 9.36 |
| 5 year | 29.60 ± 9.55 | 26.47 ± 9.76 |
| 6 year | 28.82 ± 9.63 | 27.84 ± 10.35 |
| 7 year | 30.49 ± 9.67 | 31.07 ± 15.6 |
| 8 year | 29.92 ± 8.88 | 46.67 |
| 9 year | 26.30 ± 8.04 | 46.67 |
| 10 year | 24.10 ± 7.95 | 46.67 |
| 11 year | 22.55 ± 7.94 | 46.67 |
| 12 year | 20.81 ± 7.31 | 46.67 |

| Variables | Primary (n=760) | Secondary (n=66) |
|------------------------|-----------------|------------------|
| Percentage of EBMI (%) | | |
| 1 year | 92.77 ± 23.93 | 89.57 ± 26.7 |
| 2 year | 88.26 ± 24.56 | 86.19 ± 27.92 |
| 3 year | 84.21 ± 26.47 | 83.02 ± 30.24 |
| 4 year | 80.95 ± 26.45 | 81.55 ± 31.32 |
| 5 year | 79.45 ± 26.71 | 81.61 ± 32.94 |
| 6 year | 78.26 ± 25.59 | 77.07 ± 24.99 |
| 7 year | 79.93 ± 23.25 | 67.24 ± 15.03 |
| 8 year | 79.31 ± 21.00 | 82.27 |
| 9 year | 68.57 ± 17.03 | 82.27 |
| 10 year | 63.98 ± 17.55 | 82.27 |
| 11 year | 56.25 ± 11.84 | 82.27 |
| 12 year | 51.87 ± 8.76 | 82.27 |

Results (early complications)

| Variables | Primary (n=760) | Secondary (n=66) |
|---|-----------------|------------------|
| Early complications (< 30days) | 12 (1.58%) | 3 (4.54%) |
| Leak (IIIb) | 1 (0.13%) | |
| Sub-phrenic abscess (IIIb) | 1 (0.13%) | |
| Bleeding (II) | 4 (0.53%) | |
| Pancreas tail injury (IIIb) | 1 (0.13%) | |
| Trocar hematoma (II) | 1 (0.13%) | |
| Wound infection (I) | 2 (0.26%) | |
| Pulmonary thromboembolism (II) | 1 (0.13%) | |
| SMV thrombosis (II) | 1 (0.13%) | |
| Stricture (II) | | 1 (1.52%) |
| Small bowel perforation d/t trocar (IIIb) | | 1 (1.52%) |
| Cystic duct injury (IIIb) | | 1 (1.52%) |

Results (late complications)

| Variables | Primary (n=760) | Secondary (n=66) |
|-------------------------------|-----------------|------------------|
| Late complications (> 30days) | | |
| GERD | 198 (26.05%) | 22 (33.33%) |
| Anemia | 74 (9.74%) | 10 (15.15%) |
| Gallbladder stone | 36 (4.74%) | 6 (9.09%) |
| Ureter stone | 18 (2.37%) | 1 (1.52%) |
| Dumping like syndrome | 88 (11.58%) | 4 (6.06%) |
| Herpes zoster | 2 (0.26%) | 1 (1.52%) |
| Trocar site hernia (IIIb) | 1 (0.13%) | |
| Pancreatic cancer | 1 (0.13%) | |
| Pancreatitis | 2 (0.26%) | |
| Nephritis | 1 (0.13%) | |
| Meniere's disease | 1 (0.13%) | |

- **Sleeve gastrectomy is sustainable long-term weight loss procedure and safe**
- **Micro-nutrients (iron, vitamin D, vitamin B12) surveillance and supplementation are necessary for the prevention of deficiency**
- **The long-term observational or prospective randomized study in T2DM patients is needed to fully assess the effects of RYGB with long BPDL**