



All about

Bariatric Surgery



Changi
General Hospital
SingHealth

What is bariatric surgery

- ➔ Bariatric surgery produces significant and sustainable weight loss result for improving one's health.
- ➔ It is not a cosmetic surgery.
- ➔ This booklet will provide information on the health issues related to obesity, surgical options for weight loss and the multidisciplinary care involved in the peri-operative period.

Introduction

- ➔ Obesity has become a global epidemic, and is on the rise in Singapore.
- ➔ This is contributed by an increasingly sedentary lifestyle and easy access to calorie-dense processed foods.
- ➔ The World Health Organization (WHO) estimates that globally, half a billion people are obese and at least 2.8 million deaths per year are attributable to obesity and consequent health issues.
- ➔ Obesity is a condition where a person has accumulated so much body fat that it has a negative impact on their health.
- ➔ This is associated with many major chronic diseases including cardiovascular disease, Type 2 diabetes and cancer.
- ➔ Body Mass Index (BMI) is a calculation used to determine a person's weight in relation to their height.

$$\text{BMI} = \frac{\text{Weight (kg)}}{\text{Height (m}^2\text{)}}$$

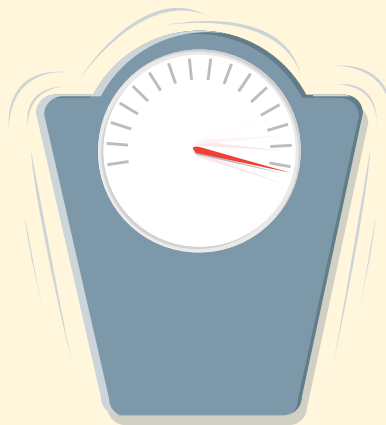
Definitions

WHO Classification	BMI (kg/m ²)
Normal	18.5 – 24.9
Overweight	25.0 – 29.9
Obese	≥ 30.0

Health Risk (for Asians)*	BMI (kg/m ²)
Average	18.5 – 22.9
Moderate	23.0 – 27.4
High	≥ 27.5

* The WHO has revised the BMI risk categories for cardiovascular disease and diabetes in the Asian population in 2004 due to a higher body fat composition for a given BMI.

BMI of 23 kg/m² and 27.5 kg/m², respectively, have been recommended as the cut-off points for public health action in Asians.



Health problems related to obesity

1 Neurological

- Headache
- Stroke
- Dementia, including Alzheimer's
- Vision loss from diabetes complications
- Raised intracranial pressure
- Diabetic neuropathy

2 Psychological

- Depression
- Anxiety
- Eating disorders

3 Respiratory

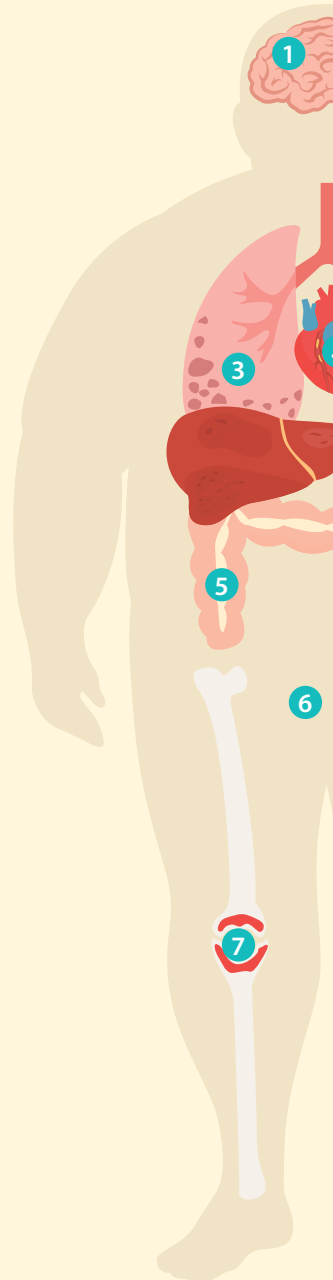
- Asthma
- Sleep apnea
- Pulmonary embolism
- Pulmonary hypertension

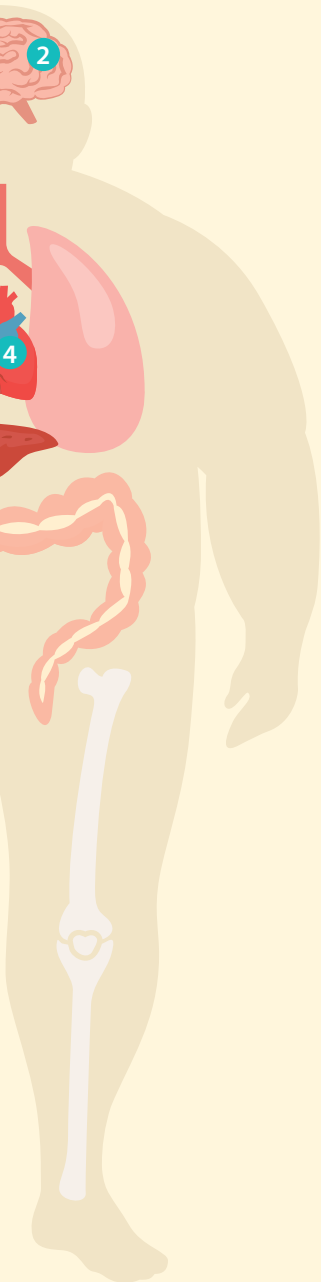
4 Circulatory

- High blood pressure
- High cholesterol
- Atherosclerosis
- Irregular heartbeat
- Heart attack
- Heart failure
- Poor circulation
- Leg and ankle swelling
- Blood clots
- Peripheral artery disease
- Lymphoma (lymph node cancer)

5 Gastrointestinal

- Reflux disease
- Esophageal cancer
- Colon polyps
- Colon cancer
- Fatty liver disease
- Liver cirrhosis
- Liver cancer
- Gallstones
- Gallbladder cancer





6 Reproductive

Women

- Irregular menses
- Infertility
- Polycystic ovarian syndrome
- Ovarian cancer
- Endometrial cancer
- Cervical cancer
- Breast cancer

Men

- Prostate cancer
- Infertility
- Erectile dysfunction

7 Musculoskeletal

- Arthritis (hips, knees and ankles)
- Lower back pain
- Vertebral disc disease

Nutritional

- Vitamin D and calcium deficiency
- Other vitamin and mineral deficiencies

Urological

- Diabetic kidney failure
- Kidney cancer

Pancreas

- Diabetes mellitus
- Pancreatitis
- Pancreatic cancer

Non-medical problems

- Limited social activities and public access
- Limited clothing choices
- Limitations in sexual activity
- Limited employment opportunities
- Increased costs of daily living
- Increased costs of medical treatment
- Lack of insurance coverage or increased in premiums

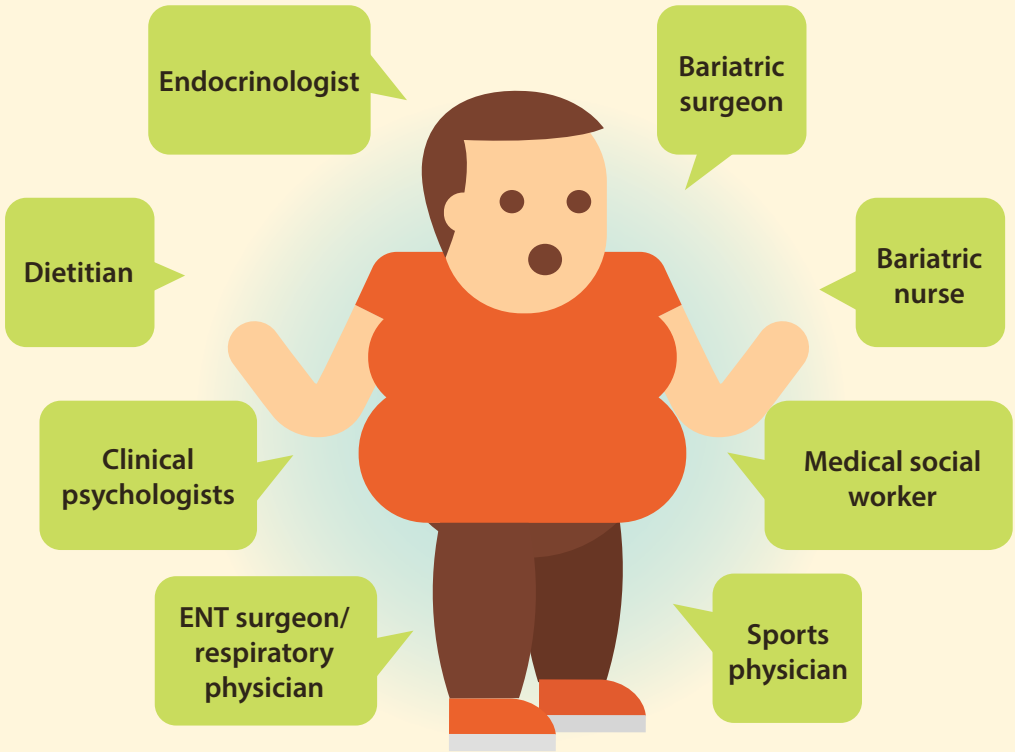
Managing obesity

- ➔ Obesity management is tailored to the BMI of the patient. Non-surgical measures can be effective for those with a lower BMI, and lower accompanying health risks.
- ➔ Non-surgical means of weight loss include:
 - Behaviour modification
 - Diet modification
 - Exercise therapy
 - Medications
- ➔ However, for the morbidly obese, surgery has been shown to be the most reliable, effective and durable way for patients to lose enough weight to treat their medical problems.
- ➔ Dietary compliance, regular exercise and behavioural modifications are still essential peri-operative strategies to maintaining healthy weight loss following surgery.



Multi-disciplinary approach

At Changi General Hospital (CGH), our multidisciplinary care team will work with you to achieve healthy weight loss and better health.



After bariatric surgery, regular exercise and a balanced diet are still the key fundamentals of ensuring sustainable weight loss.

Indication for bariatric surgery

- ➔ According to Ministry of Health's Clinical Practice Guidelines, bariatric surgery is recommended for the following patients:
- morbidly obese patients with *BMI > 37.5 kg/m²
 - obese patients with *BMI > 32.5 kg/m² with medical conditions** or complications as a result of obesity
 - failure of significant lifestyle and medical therapy attempts at weight loss



* As Asians have a higher body fat composition, the BMI action point is 2.5kg/m² less than Caucasians.

**Medical conditions include type 2 diabetes, high blood pressure, high cholesterol, obstructive sleep apnea, musculoskeletal problems etc.

Benefits of bariatric surgery

Durable weight reduction

- ➔ Studies have found that bariatric surgery consistently results in greater and longer lasting weight loss compared to exercising, dieting and taking medications only. These results are more pronounced in obese patients with higher BMI.
- ➔ Most studies demonstrate that more than 90% of severely obese patients are successful in maintaining 30% of total weight loss following bariatric surgery.



Reduction in mortality (death) due to obesity related medical conditions

- ➔ Several large population studies have found that severely obese individuals who have had bariatric surgery are at 30% lower risk of death by obesity related conditions, than those who did not undergo the surgery.

Improvement and cure of obesity related medical conditions

- ➔ Weight loss and hormonal changes can result in improvement or even remission of type 2 diabetes, high blood pressure, obstructive sleep apnea (OSA), high cholesterol, musculoskeletal problems and more.
- ➔ Based on recent studies, bariatric surgery is recommended as the treatment of choice for patients suffering from severe obesity and poorly controlled type 2 diabetes.

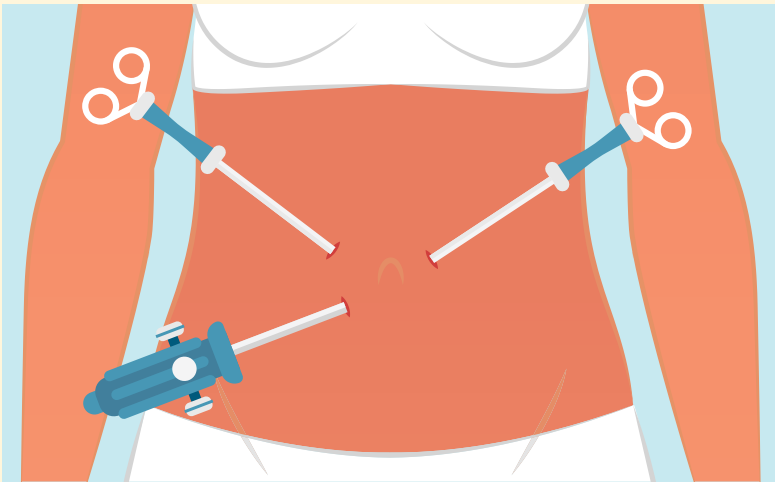
Improvement in quality of life

- ➔ The weight loss and improvement in medical conditions brought about by bariatric surgery can enhance quality of life and psychological well-being, by increased mobility, self-esteem, ability to work, and social interactions.



Types of surgery

- ➔ Surgery will be tailored to the needs, expectations and medical conditions of every individual patient.
- ➔ These procedures are performed via laparoscopy (“key-hole”) under general anaesthesia.
- ➔ This offers smaller scars, faster recovery, less pain and better cosmetic outcome compared to conventional surgery methods.
- ➔ The two common procedures performed in CGH are the ‘sleeve gastrectomy’ and the ‘gastric bypass’.



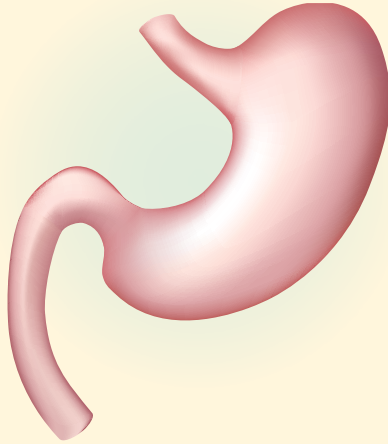
	Sleeve Gastrectomy	Gastric Bypass
Surgical approach	Laparoscopic ("key-hole")	Laparoscopic ("key-hole")
Operation duration	2 - 3 hours	3 - 4 hours
Hospital stay	3 - 4 days	3 - 4 days
Estimated total weight loss	25 - 30%*	30 - 35%*
Resolution of diabetes	40 - 50%*	60 - 70% *
Significant complications	Heartburn/reflux Sleeve stricture Staple line leak Bleeding Nutritional/vitamin deficiencies	Anastomotic stricture Anastomotic leak Intestinal obstruction Bleeding Nutritional/vitamin deficiencies
Re-operation rates	0.4 - 0.6%	2 - 2.5%
Post-surgery 30 days mortality (death) rate	2 in 1000 patients	5 in 1000 patients

*Weight loss and resolution of diabetes outcomes are obtained from the data of international studies and guidelines. Results may vary between patients. Extent of weight loss and diabetes resolution is also closely linked to compliance with post-surgery dietary, lifestyle modifications and exercise.

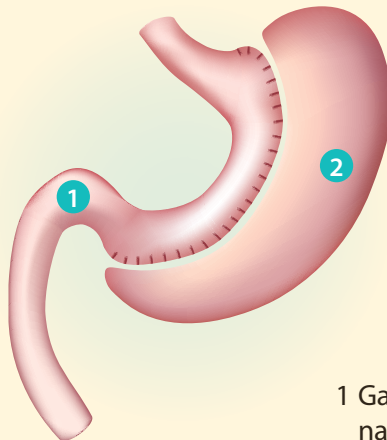
Laparoscopic sleeve gastrectomy

- ➔ The stomach is stapled and excised along its outer edge, leaving a narrow tube-like (“sleeve”) remnant. This reduces the size of the stomach and controls the amount of food the patient can consume.
- ➔ The reduction in food (as well as calorie) intake results in weight loss.
- ➔ This surgery involves removing part of the stomach (the fundus) that produces an appetite-stimulating hormone, ghrelin. In addition to the restriction of the narrow sleeve, this helps patients to reduce their calorie intake.
- ➔ Sleeve gastrectomy also results in more rapid emptying of food from the stomach. This leads to changes in intestinal hormones, resulting in weight loss and improved diabetes control.

Before surgery



After surgery



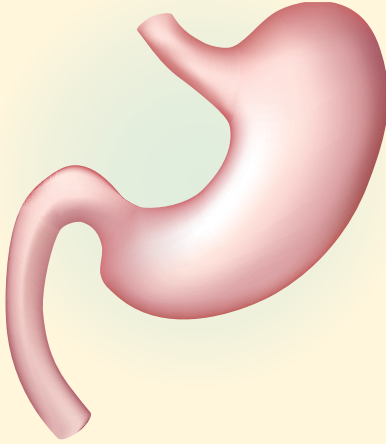
1 Gastric sleeve (new narrow stomach)

2 Portion of stomach removed

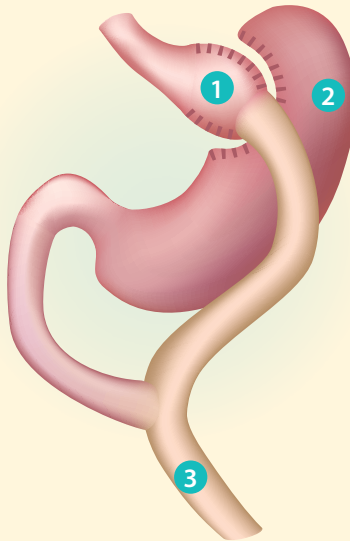
Laparoscopic gastric bypass

- ➔ In this procedure, the size of the stomach is reduced by trimming it into a small pouch. This reduces the size of the functional stomach and restricts the amount of food patients can consume. The small bowel will also be “rewired” and connected to the stomach pouch.
- ➔ This procedure may result in greater long-term weight loss compared to the laparoscopic sleeve gastrectomy. Due to the changes in intestinal hormones from rewiring of the small bowel to the stomach pouch, there is better blood sugar control and decreased reliance on diabetic medications. This operation is also suitable for patients with gastric reflux disease.
- ➔ As this is a more complicated procedure, risks are slightly higher than that of laparoscopic sleeve gastrectomy.

Before surgery



After surgery



- 1 Gastric pouch
- 2 Portion of stomach and duodenum bypassed
- 3 Small bowel joined to allow mixing of food and digestive juice

Peri-operative care

A general timeline of the surgical journey is shown below. You are expected to be placed under observation for 3 to 4 days after surgery.

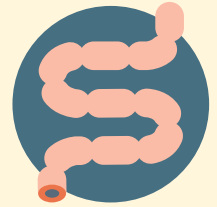
▶ 1 First clinic visit

- Counselling and assessment

▶ 2 Day of surgery

▶ 3 4 to 6 weeks before surgery

- Anaesthetist assessment (PAAC)
- Bariatric nurse
- Dietitian
- Otolaryngologist (ENT- ear, nose and throat)
- Endoscopic evaluation (OGD)
- Endocrinologist (if required)
- Psychologist (if required)
- Social worker (if required)



▶ 4 1 to 2 weeks before surgery

- Start continuous positive airway pressure (CPAP)
- Start very low calorie diet (VLCD) meal replacement

▶ 5 Day of surgery

- Admission and surgery
- Have sips of water
- Sit out of bed

▶ 6 Day 1 post-surgery

- 500mL of clear liquids
- Walking physiotherapy

▶ 7 Day 2 post-surgery

- Liquids as tolerated
- Continue walking physiotherapy





▶ **8 Day 3 - 4 post-surgery**

- Liquids as tolerated
- Discharge when able to tolerate > 1.5L a day

▶ **9 Discharge from hospital**

▶ **10 2 weeks post-surgery**

- Clinic review
- Dietitian review for diet progression (blended diet)
- Resume normal daily living activities/work
- Bariatric lesson

▶ **11 4 weeks post-surgery**

- Clinic review
- Dietitian review for diet progression (soft diet)
- Start simple exercises e.g. brisk walking
- Endocrine review (if needed)

▶ **12 6 weeks post-surgery**

- Dietitian review for diet progression (normal diet)
- Engage in moderate intensity exercises
- Endocrine review (if needed)

▶ **13 3 months post-surgery**

- Clinic review with blood tests
- Engage in moderate to high intensity exercises
- Endocrine review (if needed)

▶ **14 6 and 12 months post-surgery**

- Clinic review with blood tests
- Engage in moderate to high intensity exercises
- Endocrine review (if needed)



Post-operative care

After bariatric surgery, you will need to make some changes to your lifestyle:

- ➔ Take only ½ to 1 cup of food per meal.
- ➔ Take nutritious food as advised by dietitians.
- ➔ Chew every mouthful of food slowly and carefully.
- ➔ Strongly encourage you not to take any water while eating.
- ➔ Drink water about 30 minutes before or 45 minutes after meals.
- ➔ Take small sips of water regularly throughout the day to reach 1 - 1.5L of fluid per day.
- ➔ Take lifelong multivitamins and supplements.
- ➔ Exercise regularly for 3 times per week for 30 minutes each time, to facilitate and maintain weight loss while maintaining muscle mass.
- ➔ Go for follow-up clinic reviews with blood tests.



These changes will prevent weight regain and avoid nutritional complications after bariatric surgery.

Summary

- ➔ Obesity is a serious medical condition with increasing rates, on a global scale.
- ➔ Many medical and psychosocial problems resulting from obesity cause higher mortality and poorer quality of life for patients.
- ➔ Bariatric surgery, together with healthy eating and increased physical activity, is the most effective treatment for severe obesity.
- ➔ A multidisciplinary team approach helps to tailor the pre and postoperative care for patients undergoing bariatric surgery.
- ➔ Changes in dietary habits, physical activity levels and lifestyle helps to prevents weight regain after bariatric surgery.

For enquires

- ➔ Email cghbmi@cgh.com.sg
- ➔ Online resources
 - American Society for Metabolic and Bariatric Surgery
<https://asmbs.org/patients>
 - <http://www.obesitycoverage.com>
 - Health Promotion Board website page on weight management
<http://www.hpb.gov.sg/HOPPortal/healthtopic/Weight%20Management>

For consultation appointment

- ➔ Obtain referral from outpatient services e.g. government polyclinics (for subsidised patient)
- ➔ Please call CGH appointment centre hotline at 6850 3333 to make an appointment under obesity surgery (for private patients)





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Operating hours:

8.30 am to 8.00 pm (Monday to Friday)
8.30 am to 12.30 pm (Saturday & Sunday)
Closed on Public Holidays

For more information, please visit www.cgh.com.sg

