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Laparoscopic adjustable gastric banding for the treatment of morbidly obese patients: early outcome in a Chinese cohort

以腹腔鏡可調節胃箍治療病態肥胖症：對華籍病者進行定群研究的早期成果

Objective. To evaluate the efficacy of laparoscopic adjustable gastric banding in the management of morbid obesity in a cohort of Chinese patients.

Design. Cohort study.

Setting. University teaching hospital, Hong Kong.

Patients. From August 2002 to September 2003, 10 patients (6 male, 4 female) with a median age of 34 years (range, 23-48 years) underwent laparoscopic adjustable gastric banding to treat morbid obesity. Considerable co-existing diseases were present in 90% of the cases. We instituted a team approach that allowed every patient to see our dietitian, physician, psychiatrist (if necessary), and surgeon prior to deciding on the procedure to be used.

Main outcome measures. Excessive body weight loss, quality-of-life score (SF36), and co-morbidities improvement.

Results. The 10 patients had a median weight of 127 kg (range, 115-196 kg) and median body mass index of 47 kg/m^2 (range, 38-67 kg/m^2). The operation was successful in all patients with a median operating time of 110 minutes (range, 75-240 minutes). The median hospital stay was 3 days (range, 3-4 days) and three of the patients required overnight observation in the intensive care unit because of severe sleep apnoea and asthma. The median follow-up period was 12 months (range, 1-18 months). The mean weight loss at 6, 12, and 18 months was 19.3, 22.4, and 25.9 kg, respectively. Mean percentage of excessive weight loss at 6, 12, and 18 months was 34.9%, 36.5%, and 40.5%, respectively. Unsatisfactory weight loss (<20 kg) occurred in three patients because of poor dietary compliance and non–follow-up. Surgery also considerably improved the patients' co-morbidities (hypertension, diabetes, and obstructive sleep apnoea) and the quality of life.

Conclusion. In the short term, laparoscopic adjustable gastric banding is certainly an effective procedure for morbid obesity, which results in a substantial weight loss and improvement of co-existing morbidities. Longer follow-up will show whether this weight loss is maintainable.

目的：以一個華裔群組為對象，評估以腹腔鏡可調節胃箍治療病態肥胖症的果效。

設計：定群研究。

安排：大學教學醫院，香港。

Key words:
Laparoscopy;
Morbid obesity;
Quality of life

關鍵詞：
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病者：2002 年 8 月至 2003 年 9 月期間， 10 位病人（6 男 4 女）利用腹腔鏡可調節胃箍治療病態肥胖症，年齡中位數為 34 歲（值域， 23-48 歲），九成病者均出現合併症。我們採用團隊治療方式，讓每位病人在決定治療前，面見營養師、內科醫生、精神科醫生（如有需要），以及外科醫生。

主要結果測量：減重超標的情況、生活質素指數（SF36），以及合併症病情的改善情況。

結果：10 位病人體重的中位數為 127 公斤（值域， 115-196 公斤），而體重指數的中位數則為 47 公斤／平方米（值域， 38-67 公斤／平方米）。手術全部成功，所需時間的中位數為 110 分鐘（值域， 75-240 分鐘），留院日數的中位數為 3 天（值域， 3-4 天）。三位病人因出現嚴重睡眠窒息症和哮喘，須在深切治療部過夜接受觀察。隨訪期中位數為 12 個月（值域， 1-18 個月）。在術後 6 個月、 12 個月，以及 18 個月的平均減重依次為 19.3 公斤、 22.4 公斤，以及 25.9 公斤，減重超標的平均比率依次為 34.9% 、 36.5% 和 40.5% 。當中，三位病人由於飲食沒有依足指示調節，亦沒有隨訪，減重情況並不理想（即少於 20 公斤）。手術亦顯著改善了病人其他合併症的病情，包括高血壓、糖尿病，以及阻塞性睡眠窒息症，並提高他們的生活質素。

結論：短期而言，腹腔鏡可調節胃箍療法能有效醫治病態肥胖症，達到大幅減重並改善合併症病情的效果。長時間隨訪亦有助了解病人維持減重的情況。

Introduction

Obesity is one of the most prevalent chronic illnesses in the western world with an incidence of between 10% and 15%. Obesity causes or exacerbates many diseases and is associated with major physical and psychosocial disabilities.[1] The health risks of obesity include coronary artery disease, hypertension, diabetes, gallstones, cancer, orthopaedic problems, sleep apnoea, and general debility. According to the World Health Organization, 'overweight' is defined as a body mass index (BMI), ie weight (kg)/[height (m)]^2, of greater than 25 kg/m^2, whereas 'obese' is defined as a BMI of greater than 30 kg/m^2. Data from the US national population survey have shown that the prevalence of overweight and obese people was 55% and 20%, respectively,[2] whereas data from Hong Kong have shown a lower prevalence of those overweight (29%) or obese (3.8%).[3] However, problems of obesity in Hong Kong should not be underestimated, especially because the prevalence of obesity in children and adolescents is increasing.[4] Moreover, ethnic background can also be a risk factor for BMI-related disease, for example, South-East Asian populations have a higher risk of developing diabetes and cardiovascular disease than Caucasians for a given BMI.[5]

Morbid obesity, defined as a BMI of greater than 35 kg/m^2, occurs in 2% to 5% of the population of Europe, Australia, and the US, and it is becoming increasingly common.[6,7] However, the exact prevalence in Hong Kong is unknown. Overall, the health risk associated with morbid obesity is substantially higher than normal obesity. Non-surgical intervention, such as dieting, exercise, and pharmacological therapy may be effective in moderately overweight patients, but it has been shown to be of little long-term benefit in patients with morbid obesity.[8] In contrast, surgical treatments including bariatric surgery can lead to long-term weight loss with an amelioration of the attendant medical problems in approximately two thirds of patients.[9-11]

The two types of weight reduction surgery available are gastric restrictive procedures (eg stapled gastroplasty, Roux-en-Y gastric bypass, and adjustable gastric banding) and malabsorptive procedures (eg biliopancreatic bypass and jejuno-ileal bypass). However, there is still no consensus on the procedure of choice in morbidly obese patients. Some of these procedures have already been discontinued either because of ineffective weight loss as in horizontal gastroplasty, or because of complications as in jejuno-ileal bypass. Other techniques, such as gastric bypass and laparoscopic adjustable gastric banding (LAGB) have been widely adopted as the procedure of choice in weight reduction.

Although the incidence of perioperative morbidity for open surgery has steadily diminished in recent years, cardiopulmonary and wound complications remain a major problem in morbidly obese patients. Obese patients can benefit greatly from minimally invasive techniques that may help to reduce the incidence of these complications. Laparoscopic adjustable gastric banding, which was introduced in early 1990s, offers the advantages of minimally invasive surgery, adjustability, and reversibility. This purely gastric restrictive procedure involves the use of an adjustable silicone band placed around the gastric cardia, which creates a small gastric pouch (15 mL) with a narrow outlet (Fig 1), similar in concept to that of the vertical banded gastroplasty (VBG). The two most common commercially available products are the LapBand (Bioenterics, Carpinteria [CA], US) and the Swedish Band (OBECH, Zug, Switzerland). These bands can

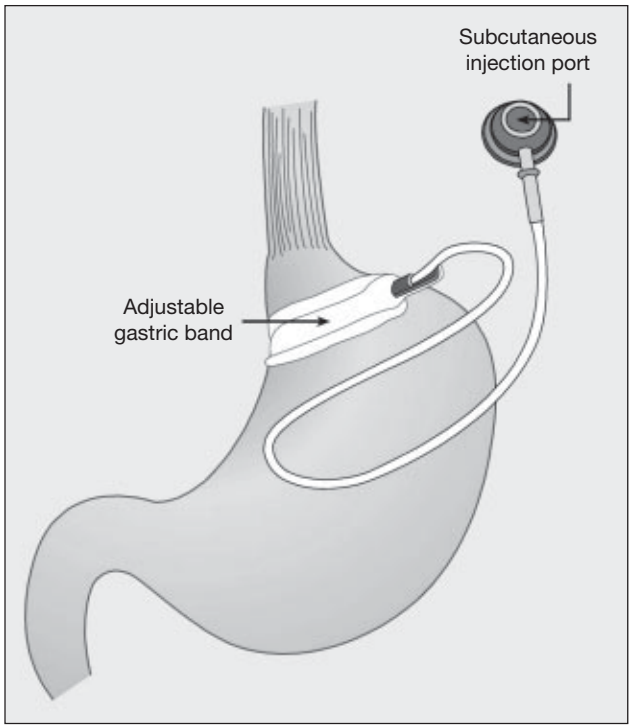


Fig 1. Adjustable gastric banding

be adjusted postoperatively by inflating a reservoir, which is accessed percutaneously by a subcutaneous port placed deep in the abdominal wall. Injection or withdrawal of saline from the port allows adjustment of the band luminal diameter. In our locality, where the prevalence of morbid obesity is low, we would like to adopt this gastric restrictive procedure as the primary operative treatment because it is the least invasive of the available techniques and it is completely reversible. Malabsorptive procedures should only be used as the secondary option when the restrictive approach fails. In the current study, we evaluated the LAGB procedure using the Swedish adjustable gastric band (SAGB).

Patients and methods

Patients were considered as candidates for LAGB procedure if the following conditions were met: aged between 18 and 55 years, BMI of greater than 40 kg/m^2 or greater than 35 kg/m^2 with serious comorbidities, no excessive intake of sweets or alcohol, and no concurrent psychiatric illness (Box). All the patients had tried and failed to control their weight problem by conservative methods. To encourage these patients to view their obesity as a disease process rather than just a problem of overeating, we emphasised the need for long-term maintenance and follow-up.

Preoperative evaluation

A team approach was set up to allow every patient to be seen by our dietitian, physician, psychiatrist (if necessary), and surgeon prior to making the decision of which procedure to be used. All the patients were screened for major endocrine disorders including hypothyroidism, diabetes, and Cushing's syndrome. The patient would undergo upper endoscopy to exclude the presence of a hiatus hernia or other upper gastrointestinal pathology preoperatively. Oesophageal contrast or function study, cardiac evaluation, sleep study, and pulmonary function testing were also performed if clinically indicated. Following careful clinical assessment, the physicians and bariatric surgeon would jointly see every patient at our obesity clinic to answer all the queries about the weight reduction surgery. The LAGB procedure was explained in detail with emphasis on the likely success of the operation, principal risks, common adverse effects, and the importance of close out-patient supervision. All patients were repeatedly instructed on the importance of adapting their diet and disciplining their eating habits. More specifically, patients were advised to take frequent but small meals and to avoid calorie-containing drinks, sweets, congee, and bread.

Operative procedure

Informed consent was obtained from all participants. A high-dose low-molecular-weight heparin was given in the morning of operation, and an antibiotic prophylaxis (cefuroxime, 1.5 g intravenous) was given during induction. The operation was performed under general anaesthesia. The patient was in the reverse Trendelenburg position with the legs extended in stirrup, and the operating surgeon was standing between the patient's legs. A sequential compression device was applied to both legs as a prophylaxis for deep vein thrombosis.

Initial access to the peritoneum was gained with a Visiport optical trocar (Autosuture, Norwalk, US) placed laterally below the left costal margin using a zero-degree scope. This procedure allowed easy

Indications for weight reduction surgery
1. Body mass index (BMI) >40 kg/m^2, or BMI >35 kg/m^2 with severe obesity-related disease;
2. Over 5 years of obesity and failure in previous weight reduction therapy;
3. No alcohol or drug abuse problems, no excessive intake of sweets;
4. No major psychiatric disease; and
5. Age of 18 to 55 years with no endocrine-related obesity.

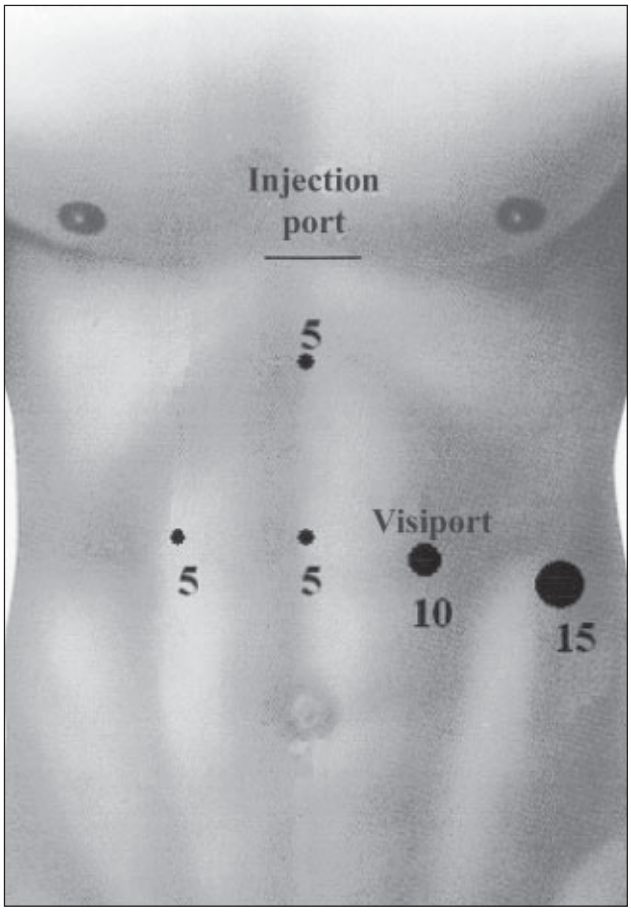


Fig 2. Post-site position for laparoscopic gastric banding surgery

access to the peritoneal cavity in very obese patients. A five-trocar technique was used with a 15-mm port to allow insertion of the gastric band into the peritoneal cavity (Fig 2).

After the liver was retracted with laparoscopic retractor, the pars flaccida technique[12] was performed. The dissection began at the base of the left crus well above the first short gastric artery to free the angle of the His of the stomach. Following the opening of the left phrenoesophageal ligament, the gastro-hepatic ligament (pars flaccida) was divided, and blunt dissection was performed to create a passage between the diaphragmatic pillars and the posterior aspect of the gastro-oesophageal junction (Fig 3). This retrogastric dissection should remain at the retroperitoneal plane by going behind the oesophagogastric angle towards the oesophagus rather than posterior to the gastric side. The empty band was then inserted through the 15-mm trocar and pulled through the retrogastric tunnel with the help of the Goldfinger dissector. Once the band was locked in place, the device was anchored anteriorly by three gastrogastric stitches with non-absorbable sutures. The fundus of the stomach below the band was stitched to the gastro-oesophageal junction completely covering the anterior aspect of the band to prevent herniation of the fundus. After the band was secured, a separate incision was made just above the xiphoid, and the port was connected and sutured subcutaneously to the presternal fascia (Fig 2).

The patients were allowed clear fluids on the first postoperative day. The next morning, a contrast swallowing examination was performed to confirm the satisfactory positioning of the band and the size of the pouch. Patients were discharged the next day and with the help of a dietitian, were placed on a nutritious fluid diet for 4 weeks, then on a purée diet for a further 2 weeks, and finally on a normal diet of solid foods.

Follow-up protocol

In the initial phase, the band size was not adjusted and most of the patients started to lose weight because of the induced satiation. The patients were reviewed monthly for the first 6 months, and the band was tightened if they were not satiated and stopped losing weight. The SAGB manufacturer's recommendations were followed and the band adjustments were done under fluoroscopy. The silicon diaphragm of the injection port was punctured by a non-traumatic Huber needle, and an isotonic contrast iopamidol solution was injected under X-ray guidance. The SAGB, connection tubing, and the band were radiolucent and would not be visible with X-rays unless a contrast medium was used. Normal saline solution was not recommended because it would diffuse through the SAGB. Subsequent adjustment could be performed by a similar method or if the surgeon was experienced in locating and injecting the port. The procedure could be done in the clinic. Correct puncturing was ascertained by the aspiration of the previous contrast solution; further contrast solution could then be added or removed. The initial adjustment was made by adding 2 mL of the contrast solution, proceeded by increments of 1 mL up to a total of 8 mL, but most patients needed only 4 to 5 mL. Follow-up visits were planned every 3 months thereafter. The body weight, blood pressure, and waist circumference were measured during each visit, and the glucose and lipid profile was checked at 6-monthly intervals postoperatively.

The quality of life (QOL) was assessed using a Chinese (Hong Kong) modified version of the Medical Outcome Study, in which a 36-item short-form health survey (SF36) was completed preoperatively and 6 months postoperatively.[13,14] The SF36 measured the

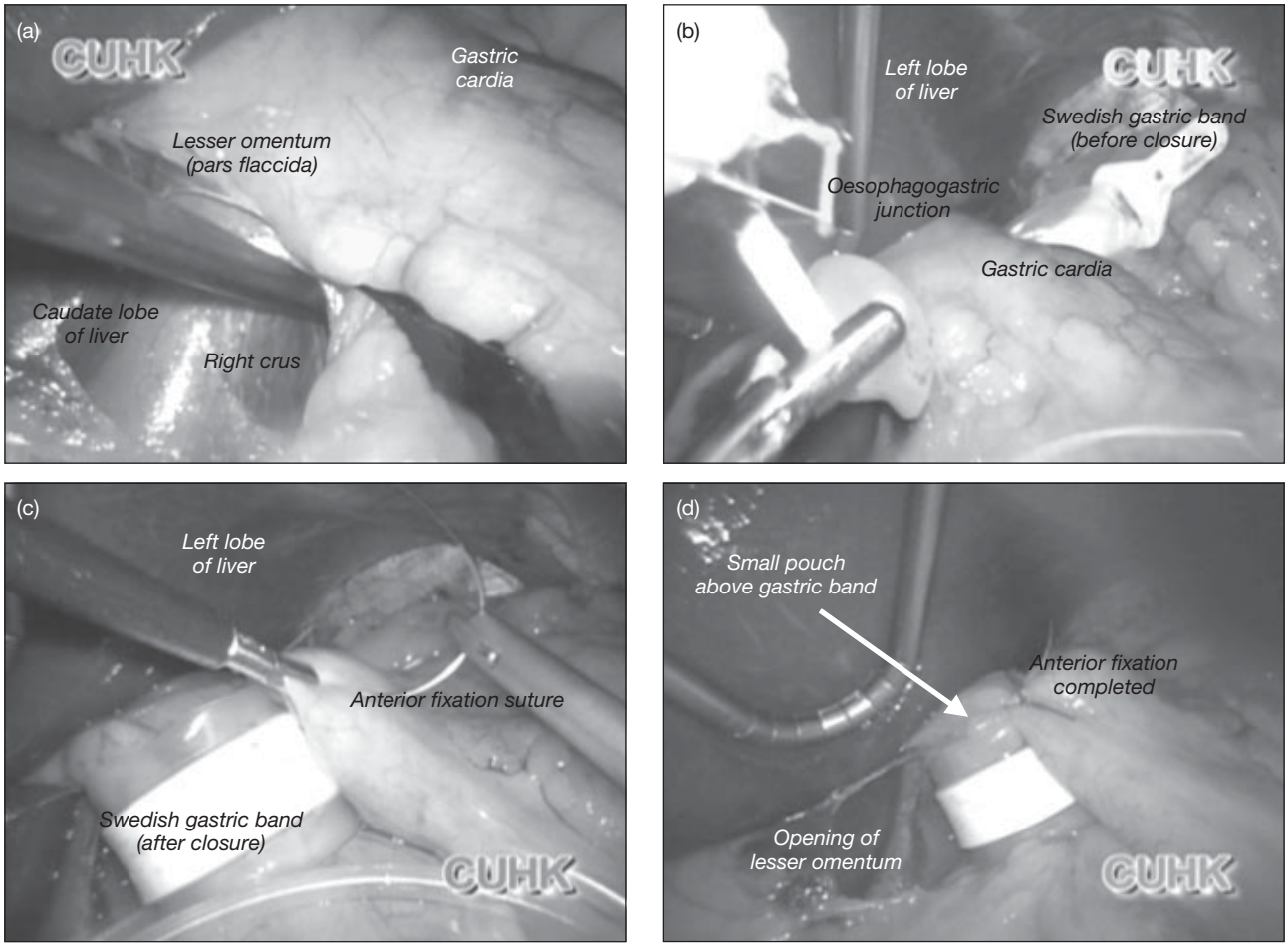


Fig 3. Operative procedure (pars flaccida technique)
(a) Retrogastric tunnel created behind cardia by pars flaccida technique; (b) Swedish adjustable gastric band placed around proximal stomach; (c) anterior fixation of band after closure; and (d) Swedish adjustable gastric band in place postoperatively

following eight domains of QOL: (1) physical functioning; (2) role limitations caused by physical problems; (3) bodily pain; (4) social functioning; (5) general mental health; (6) role limitations caused by emotional problems; (7) role limitations caused by loss of vitality; and (8) general health perceptions. This assessment provided a score that represented both the physical and emotional well-being after LAGB surgery.

Statistical method

The median and range were calculated from the demographic data (age, body weight, and BMI) and the outcomes of the operation (operating time, hospital stay, and follow-up period). Wilcoxon signed rank test was used to compare the changes in body arthopometric parameters (body weight, waist circumference, BMI, and percentage of weight loss), blood pressure (systolic and diastolic pressures), and QOL scores (SF36) preoperatively and postoperatively. Numerical values were expressed as the mean and standard deviation (SD), and statistical significance was set at a P value of less than 0.05.

Results

From August 2002 to September 2003, 10 patients (6 male, 4 female) with a median age of 34 years (range, 23-48 years) underwent LAGB. They had a median BMI of 47 kg/m^2 (range, 38-67 kg/m^2) and a median weight of 127 kg (range, 115-196 kg). Obesity-related morbidities were present in a large proportion of these patients. Eight of the patients had obstructive sleep apnoea syndrome (OSAS), and five of them required a continuous positive airway pressure machine during sleep. Three of the patients had diabetes mellitus, two had hypertension, two had amenorrhoea, and two had degenerative joint problems with knee pain.

Operative outcome

The median operating time was 110 minutes (range, 75-240 minutes) and all cases were successfully performed without open conversion. The median hospital stay was 3 days (range, 3-4 days), and three patients required overnight observation in the intensive care unit because of severe sleep apnoea and asthma. There

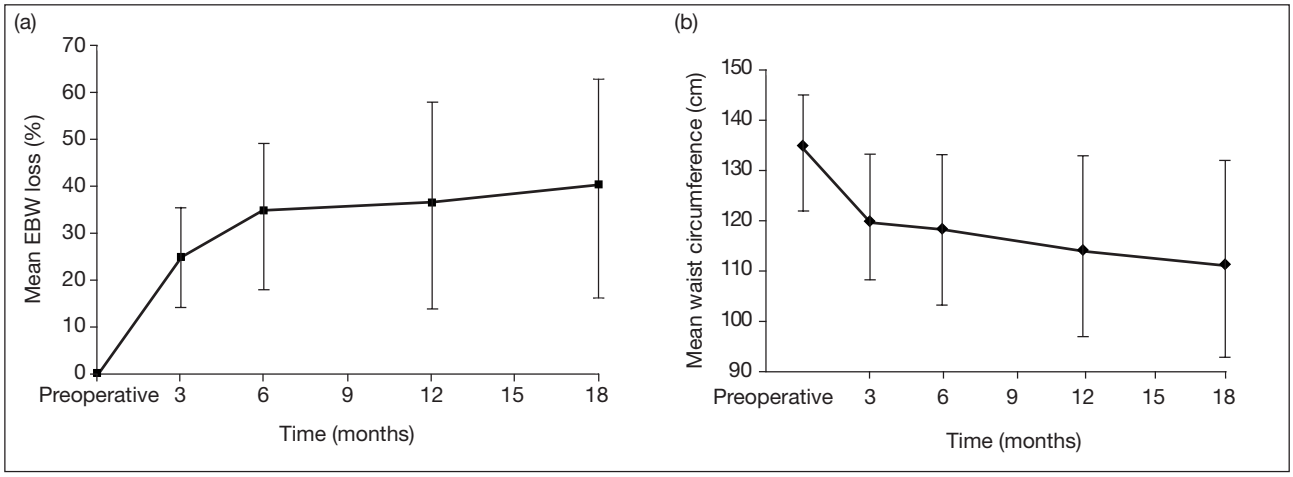


Fig 4. (a) Postoperative mean percentage of excessive body weight (EBW) loss. (b) Postoperative change in mean waist circumference

were no operative mortalities and all patients were discharged without early complications. Late complications only occurred in two of the patients. In the first patient, the connection tube became kinked at the subcutaneous injection port, which was subsequently readjusted in a minor operation under local anaesthesia 6 months after the initial operation. The second patient developed oesophageal and gastric pouch dilatation 10 months postoperatively and he presented with symptoms of postprandial food regurgitation. The balloon was temporarily deflated and his symptoms and oesophageal dilatation were resolved 2 months later.

Weight loss, co-morbidities, and quality of life

Complete follow-up data were available from only nine patients, because one patient defaulted follow-up 3 months postoperatively. The median follow-up period was 12 months (range, 1-18 months). All patients required band adjustment of between 2 and 5 mL over the course of their follow-up. The mean weight loss at 6, 12, and 18 months was 19.3, 22.4, and 25.9 kg, respectively. The postoperative mean drop in BMI was 6.9, 8.7, and 10.1 kg/m^2 after 6, 12, and 18 months, respectively. The mean percentage of excessive body weight (EBW) loss [% EBW loss=weight loss/(initial body weight–ideal body weight at BMI 25) x 100%] at 6, 12, and 18 months was 34.9%, 36.5%, and 40.5%, respectively (Fig 4a). The mean waist circumference also reduced significantly from 134.9 (SD, 11.1) to 111.4 (SD, 19.5) cm at 18 months postoperatively (P=0.032) [Fig 4b]. However, the weight reduction was unsatisfactory in three of the patients who lost less than 20 kg in 1 year. The first case, as already mentioned, was not followed up, and the other two patients had poor dietary compliance. One of these two patients had suffered preoperatively from depression and had a binge-eating problem, which was confirmed to have been under control by the psychiatrist. However, she developed recurrent depression postoperatively and had episodes of binge eating of ice-cream and yogurt. The other patient failed to control his diet and developed an oesophageal and gastric pouch dilatation 1 year postoperatively.

The surgery significantly improved the control of blood pressure with reduction of mean systolic blood pressure from 124 (SD, 8) to 108 (SD, 8.4) mm Hg (P=0.020) and pulse pressure from 60 (SD, 17.6) to 31 (SD, 7.8) mm Hg (P=0.024). All of the patients who had hypertension preoperatively successfully reduced the antihypertensive drug dosage postoperatively. Also, the knee pain problems in those patients with osteoarthritis were resolved. Those patients who had diabetes preoperatively had improved glucose control postoperatively—the hypoglycaemic agent was actually stopped in one patient and the dosage was reduced in the other two. The sleep apnoea was also considerably improved postoperatively, and the two patients with mild OSAS no longer required the use of continuous positive airway pressure, which was lowered for the other two patients. Eight patients completed the SF36 QOL assessment preoperatively and 6 months postoperatively, and all the scores were generally lower compared with the norm values from the Hong Kong population-based data.[14] Of the eight domains within the SF36 health survey, all parameters showed significant improvement except 'Mental health' domain (Fig 5).

Discussion

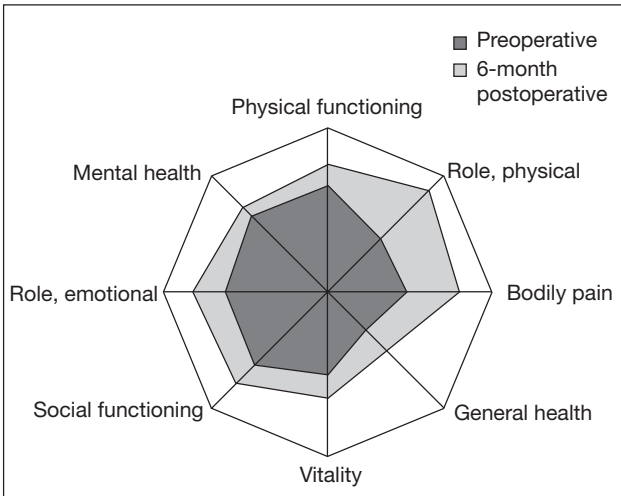
The extent and development of obesity surgery in Hong

Kong is far behind that of Caucasian countries because the prevalence of severe obesity in Hong Kong is much lower. The traditional Chinese population and most of the physicians still believe that obesity is simply a behavioural problem and is not considered a disease. Obesity is usually viewed as being voluntary and associated with some degree of moral deficiency, from lack of self-control to unrestrained gluttony. Those who are obese seldom seek medical advice. All these factors have also contributed to the underdevelopment of obesity surgery in Hong Kong.

Surgical treatment has had an established role in the management of morbid obesity in Caucasian countries for about half a century. The criteria for selecting patients for bariatric procedures in these countries are based mainly on the BMI definition of obesity as recommended by the World Health Organization. We followed the international criteria for choosing the candidates because bariatric surgery is still considered a new procedure in Hong Kong. However, lowering the BMI criteria for bariatric surgery (eg BMI >35 kg/m^2 or BMI >30 kg/m^2 plus co-morbidities) in the Hong Kong Chinese population is still open for discussion. The recommendations for lowering the cut-off point for defining those overweight or obese[15] are given in the Table. Local studies comparing the best medical treatments and bariatric surgery among patients with a lower BMI (eg BMI of between 30 and 35) may be useful in answering this question.

Since the first jejuno-ileal bypass performed by Kremer and Linner in 1960s, various approaches and procedures have been developed in an attempt to tackle the problem of obesity. Malabsorptive procedures, such as jejuno-ileal, biliopancreatic, or gastric bypass allow the patient to 'lose weight while eating'. Although considerable weight loss can be achieved by the bypass operation, the cost of the fragile anastomosis and the potentially serious nutritional deficiencies can sometimes outweigh its advantages. Moreover, the jejuno-ileal bypass procedures have now been discontinued because of the high mortality and morbidity rate.[16] Nowadays in the US, the Roux-en-Y gastric bypass is considered the gold standard operation. This procedure has recently been adapted for use with laparoscopy, achieving an acceptably low rate of complications (3.3% major and 27% minor) and an excellent weight loss of at least 60% EBW.[17] However, this procedure is both difficult and lengthy (2 to 3 times longer than our procedure), and complications, such as anastomotic failure and intestinal obstruction, are potentially lethal.

In contrast, restrictive procedures, which induce slow gastric emptying via a small pouch, create early satiation allowing a 40% to 50% reduction in the excess weight in 1 to 2 years.[18] Vertical-banded gastroplasty, which was introduced by Manson[19] in 1980, is one of the most favourable restrictive procedures because it is associated with extremely low (<1%) mortality and avoids the life-long risks of malnutrition and gastro-intestinal tract exclusion.



Quality-of-life domain	Hong Kong norm* Mean (SD†)	Preoperative score Mean (SD)	6-month score Mean (SD)	P value‡
Physical functioning	0.91 (0.13)	0.65 (0.25)	0.79 (0.13)	0.019
Role, physical	0.82 (0.31)	0.46 (0.36)	0.88 (0.19)	0.014
Bodily pain	0.84 (0.22)	0.49 (0.30)	0.81 (0.23)	0.013
General health	0.56 (0.20)	0.34 (0.19)	0.51 (0.18)	0.006
Vitality	0.60 (0.19)	0.51 (0.17)	0.65 (0.17)	0.015
Social functioning	0.91 (0.16)	0.64 (0.28)	0.80 (0.22)	0.049
Role, emotional	0.72 (0.28)	0.63 (0.38)	0.83 (0.25)	0.049
Mental health	0.73 (0.17)	0.66 (0.21)	0.74 (0.19)	0.104

* Population-based norm values of the SF36 Chinese (Hong Kong) version
† SD standard deviation
‡ Wilcoxon signed rank test

Fig 5. Preoperative and 6-month postoperative SF36 quality-of-life health survey scores

Table. World Health Organization criteria for defining obesity in the European and Asian populations[15]

	European		Asian		
	Body mass index (kg/m²)	Risk of co-morbidities	Body mass index (kg/m²)	Risk of co-morbidities Waist circumference (cm)	
				<90 (male), <80 (female)	≥90 (male), ≥80 (female)
Normal weight	18.5-24.9	Average	18.5-22.9	Average	Increased
Overweight					
At risk	25-29.9	Increased	23-24.9	Increased	Moderate
Obese I	30-34.9	Moderate	25-29.9	Moderate	Severe
Obese II	35-39.9	Severe	≥30	Severe	Very severe
Obese III	≥40	Very severe	-	-	-

However, problems of the fixed band outlet size, subsequent pouch dilatation, and staple failure can lead to a high incidence of uncontrolled gastro-oesophageal reflux and inadequate weight reduction. An adjustable gastric banding (AGB) device introduced by Kuzmak[20] has been adopted and is widely used in Europe, Australia, and the US. The proposed advantages of AGB include its simplicity, reversibility, the adjustability of the band's stoma size, and results comparable to VBG. A small randomised control trial comparing open VBG and open AGB demonstrated similar amounts of weight loss, but a higher re-operation rate in VBG group because of stomal stenosis and staple line disruption.[21] The advantage of using the laparoscopy with AGB was further demonstrated in a retrospective comparison of open VBG and LAGB in Switzerland.[22] Despite 15-year experience of VBG compared with only 3 years in LAGB, both procedures showed similar weight losses after 2 years, but LAGB had the advantages of much lower postoperative morbidities (8.0% vs 23.8%) and shorter hospital stay. Laparoscopic bariatric surgery can considerably reduce the incidence of incisional hernia in open surgery, and the design of the band avoids the risk of staple line leakage. The stomal outlet size can also be adjusted; hence, re-operation for stomal problems can be minimised.

In the past decade, the LAGB technique has improved with an estimated 100 000 patients having had this procedure.[23] Operative morbidities including bleeding and gastric perforation occurred in 0% to 1% of patients, and early complications, such as food intolerance, wound infection, deep vein thrombosis, and chest infection occurred in less than 10% of cases. Most of the early series in LAGB reported a high incidence of band slippage (8%-20%) usually caused by inadequate posterior fixation of the band using the 'perigastric approach'. With the introduction of the pars flaccida technique, the band is not inserted through the lesser sac, and the posterior gastric wall remains fixed by the retroperitoneal attachment; hence, posterior band migration is avoided. The LAGB procedure coupled with the increased experience of the surgeon seems to minimise the chances of complication due to band migration.[12] In our series, all patients were fully ambulated on the first day postoperatively and were able to return home within 72 hours. The mortality rate for LAGB was consistently low (0%-0.5%) in all series and this indicates that it is definitely a safe procedure to reduce weight.[23]

Numerous comparative studies for the treatment of morbid obesity have been done, but the bariatric procedure of choice is still under debate. The quick postoperative recovery from the LAGB is largely related to the minimally invasive approach and early mobilisation, whereas the long-term outcome depends on the actual procedure and its related complications. Moreover, when interpreting the favourable outcomes of a particular study, the applicability of such results to our own locality must be carefully considered. In a recent study by Morino et al,[24] 100 patients with a BMI of between 40 and 50 kg/m² were randomly assigned to either LAGB or laparoscopic VBG groups. Although LAGB resulted in shorter operating time and hospital stay, the authors favoured laparoscopic VBG because of the better long-term outcomes of more weight loss, fewer complications, and less re-operations. However, it is worth noting that the authors had vast experience in the laparoscopic bariatric methods (>300 operations) and had been performing VBG for more than 10 years, but had only performed 40 LAGB procedures. The poor LAGB results were mainly related to the band slippage (18%), which directly led to unsatisfactory weight loss and subsequent re-operation; such a high incidence of slippage is uncommon in an experienced centre.[12] Moreover, the good laparoscopic VBG results were likely related to the experience of the surgical team; whether such results could be replicated in other less experienced centres are doubtful.

Another advantage of LAGB is the adjustable stoma size by inflating or deflating the inner balloon of the gastric band, which allows control of the weight reduction rate. Furthermore, obstructive complication from stomal stenosis can be avoided and reversed. Band adjustment procedures vary among different brands of gastric band (eg LapBand and SAGB) and among different centres. For band adjustment, we followed the SAGB manufacturer's instructions and used a contrast solution under fluoroscopic guidance. In contrast, the manufacturer of LapBand recommends the use of normal saline solution, and the adjustment can be performed in the clinic unless the injection port cannot be palpated and punctured. We suggest that new surgeons, who are not familiar with the palpation and puncturing of the injection port, use fluoroscopic guidance during the band adjustment in extremely obese patients.

Our study of the laparoscopic gastric banding for the treatment of morbid obesity is the first in Hong Kong. Our low operative mortality (0%) and early morbidity (10%) rates are comparable to those in a recent article by O'Brien and Dixon,[25] who analysed LAGB data from more than 1000 patients for more than 6 years. Late complications, such as band migration and erosion, usually developed at about 18 months postoperatively[25]; hence, it is still too early to comment on these complications in our series. In our series, we achieved a mean excessive weight loss of 40% in the 18-month period (range, 14%-62%). O'Brien and Dixon[25] have shown a gradual weight loss over 18- to 24-month period followed by a stable, approximately 50% loss of EBW at up to 6 years as monitored during the follow-up. To determine the true efficacy of LAGB in Chinese in weight control, a longer follow-up period is necessary, but we hope to have achieved similar results when the long-term data are available. Although the magnitude of weight loss is lower than bypass procedures, our LAGB patients gained considerable improvements in both their medical conditions and QOL within the first 6 months. Furthermore, the patients showed a distinct regression of the obesity-related co-morbidities, such as hypertension, diabetes, painful degenerative joint disease, and OSAS, which played an important part in this improvement.

We have no experience on the efficacy of LAGB with regard to the loss of weight in patients on a traditional Chinese diet. Experiences in Taiwan showed that VBG had extremely low morbidity and acceptable success rates among Chinese people.[26] Restrictive procedures, for example, LAGB, can only restrict solid food and are less effective if the patient consumes liquids or semi-solids, eg chocolates or ice-cream, which have a high sugar content. Although the major source of food for the Asian population is rice, we found that apart from liquid calorie diet, semi-solid foods including congee, noodle soup, and bean curd could also easily pass through the band. Failure of adequate weight loss still occurred in about 9% to 20% of patients in some large LAGB series.[12,27] This failure could be attributed to complications of the surgery or non-compliance of the restricted diet. Three patients in our series had unsatisfactory weight loss due to non-compliance to the dietary advice and non–follow-up. Although no foolproof method exists to detect patients at risk of failure, preoperative psychological evaluation should be given together with detailed counselling on changing the lifestyle and dietary habits—a strict diet is essential.

Weight reduction surgery is the only proven method for long-term weight control in morbidly obese patients.[28] The long-term efficacy of LAGB surgery is still uncertain, but our early results from the gastric banding procedures are comparable to other series. The laparoscopic approach allows early mobilisation, short hospital stay, early return to work, and fewer wound complications. This reversible and adaptable procedure promises to be a good alternative to other bariatric surgeries, provided that the morbidity rate remains low. However, this procedure should not be recommended for aesthetic motivation, but only on medical grounds. Moreover, multidisciplinary care is essential in obese patients, because it is a complex pathology. The surgeons, physicians, nutritionists together with the psychologists must monitor the patient during the entire weight loss programme.

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