Clinical Practice Guideline

Thai Society for Metabolic and Bariatric Surgery Consensus Guideline on Bariatric Surgery for the Treatment of Obese Patient in Thailand

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Background: The prevalence of obesity is increasing in Thailand. The Thai Society for Metabolic and Bariatric Surgery just developed the first Thailand guideline for Bariatric surgery as a gold standard treatment of morbid obesity.

Objective: To enhance the quality of care in obesity treatment through metabolic and bariatric surgery

Methods: The present study would provide suggestions for management that were derived from available knowledge, peer-reviewed of scientific literature, and expert opinion. The guideline was developed by performing a review of currently available literatures regarding obesity, obesity treatments, and metabolic surgery from all references published worldwide.

Results: The intent of issuing such a guideline is to provide definite criteria for surgery, pre-operative care, and post-operative care, including practical points in each step.

Conclusion: This is the first practice guideline on bariatric surgery for the treatment of obese patient in Thailand. The guideline would be revised in the future should additional evidence become available and future research is needed to gather more evidence and study clinical outcomes for the development of future practice guidelines.

Keywords: Bariatric surgery, Obesity, Metabolic surgery, Clinical practice guidelines, Best practice guidelines, Weight loss surgery

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Morbid obesity has emerged as a concern in Thailand with an increasing number of patients over the years. Recent data of Thailand, prevalence of class I obesity and class II obesity are increasing from 18.2% and 3.1% in 1991 to 26% and 9% in

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2009, respectively[1,2]. Patients with morbid obesity do not only have physical and psycho-social problems but also increase risk for developing many medical problems. Obesity requires significant resources in the health sector for treatment. About 0.13% of the Thai Gross Domestic Products (GDP) was estimated as a total cost of obesity related health expense in 2012[3,4].

Bariatric surgery is the most successful long-term weight loss therapy. In addition, it can improve many comorbid diseases[4,5]. The team approach for peri-operative and post-operative care is a key success factor, especially in aspect of nutritional and metabolic managements, which needs the expertise of care providers. While many clinical practice guidelines (CPG) have been reported, there are many variations[6-10]. To standardize bariatric surgery protocols in Thailand, an updated CPG aimed to provide new knowledge and maintain relevance at the point of care under the updated evidence based on literature along with the accompanying consensus and checklist, to assist physicians in the way to improve standard of care for bariatric surgery.

Methods

The Boards of Thai Society for Metabolic and Bariatric Surgery (TSMBS) have approved the establishment of the first TSMBS Guideline for Clinical Practice for the selection criteria, pre-operative, post-operative, and nutritional management of bariatric surgery patients.

The following clinical guideline was developed following a review of the evidence on the search for existing guidelines from guideline institutes, systematic reviews were searched in the Cochrane Library and scientific publications using electronic databases PubMed, EBSCO, and Embase (2007 to 2018). The literatures were selected by the committee members and their data were summarized in a conclusion, in which references to the key literatures were provided.

The present committee developed the practice guideline by dividing in three sections and assigned two members to create the primary draft of each section of the document. Each section was then reviewed and revised by the member of each group. All recommendations were reviewed by the full committee and finalized using a consensus process. In considering available treatment modalities, the committee focused on laparoscopic Roux-en-Y gastric bypass (LRYGB) and laparoscopic sleeve gastrectomy (LSG), which are currently available as the standard treatments for morbid obesity patients in Thailand.

Results

The criteria used for considering the bariatric surgery for the treatment to reduce weight of obese patients[6,11-14]

1. The bariatric surgery should be considered as a treatment for those obese patients with a body mass index (BMI) of 32.5 kg/m² or more, who have co-morbidities that fail to achieve adequate control by full effort of any other methods; or a BMI of 37.5 kg/m² or more without co-morbidities.

2. The bariatric surgery should be considered as an option to treat diabetes type 2 or metabolic syndrome patients whose diseases cannot be controlled by lifestyle alternations and the standard treatment, and have a BMI of 30.0 kg/m² or more.

3. The bariatric surgery should be considered as an option for treating diabetes type 2 or metabolic syndrome patients whose diseases cannot be controlled by lifestyle alternations and the standard treatment, have a BMI of between 27.5 and 30.00 kg/m², need to be taken care strictly under the doctors' supervisions, needs to get consent from the patients, and needs to receive the approval from the institute ethics committee.

4. The bariatric surgeries that are recommended as standard treatment include the malabsorption procedure, such as LRYGB, and the restrictive procedure, such as LSG.

5. The patients receiving the bariatric surgery should be between 18- and 65-years-old. Patients with ages out of this range should be evaluated by a multidisciplinary team of doctors.

6. The doctor who performs the bariatric surgery needs to be specifically trained. The doctor needs to have the proper credential, could provide a quality bariatric surgical service in accordance with both the required level of skill and experience, and have the capability to integrate within the health care service.

7. Patients being treated for obesity and metabolic syndrome by bariatric surgery should be operated by skillful doctors and taken care by a multidisciplinary approach team, which include an endocrinologist, a dietitian, and others as needed.

8. Patient who meets the mentioned criteria, must show their intentions as follows:

8.1 Reduce their weight by 5 to 10% by the surgery date(s).

8.2 Appear to at least 80% of all appointments prior to the surgery.

8.3 Gain knowledge and understanding

about the surgery procedures and how to take care of themselves after the surgery thoroughly.

Preparations of a patient pre and post-surgery[15-50]

A doctor evaluates and prepares a patient according to criteria as follows:

A. The preparations of a patient for pre-surgery[15-33]

When a doctor plan a surgery for the obese patient, he must first recommend to the patient that they reduce of their body weight by 5 to 10% within 1 to 2 weeks to be able to do the surgery more easily as most obese patients have a fatty liver condition and their liver sizes are larger than normal, which will obscure the area that needs to be undergone the surgery. Therefore, the fast weight reduction within 1 to 2 weeks will help decrease the size of the liver to not obscure the area. This will help surgeons operate with less complications. Moreover, the weight loss will help improve the post-operative breathing and reduces respiratory complications.

The recommendations for the pre-operative weight reduction are as following[15-18]:

1. Eat less than 800 kilocalories of liquid food that has around 60 to 80 grams of high protein and drink at least 1.8 liters water per day (formula No.1).
2. Patients with a BMI of more than 50 need to follow the formula No.1 for about two weeks before the surgery.
3. Patients with a BMI of less than 50 need to follow the formula No.1 for about one weeks before the surgery.
4. Patients with diabetes need to take anti-hyperglycemic drugs or the insulin injections. They need to consult with an endocrinologist to adjust the levels of drugs during the diet controls and they must check the sugar levels from their fingertips constantly as there might be low blood sugar condition.

Prepare patients before surgery on the lists as shown in Table 1[18-33].

B. The preparations of a patient for post-surgery[31-50]

Patients need to understand the diet phases as follows:

1. Phase 1: Crystal liquid food
2. Phase 2: Thick liquid food
3. Phase 3: Soft food
4. Phase 4: Normal food

After surgery, on the first day, the doctor should put the patient on a crystal liquid food (Phase 1). If the patient can eat more, the doctor can change the diet to thick liquid food (Phase 2) on the second day after surgery.

After leaving the hospital, the patient can adjust the food condition to soft food (Phase 3) for the first two to four weeks after surgery. Moreover, the patients need to consume about 60 grams per day of protein.

One month after surgery, the patient can adjust their food intake to normal food, in small amount in each meal totaling around 1,000 kilocalories per day.

Prepare the patients after surgery by checking the lists as shown in Table 2.

The criteria used as consideration to redo a surgery as a revision or conversion surgery in the case of patients that could not reduce their weight to meet the criteria or if their weights increased[51-58]

1. A patient had the bariatric surgery done at least two years ago.
2. The weight was decreased less than 50% of the excessive weight.
3. The weight is still over 30% for the ideal weight.
4. A repeated surgery for any other reasons, should be considered by a multidisciplinary team.

Discussion

Adult patients with BMI greater than or equal to 40 or BMI greater than or equal to 35 with obesity-related comorbid conditions meet the basic criteria for surgery according to the recommended AHA/ACC/TOS guidelines. However, Asian populations have been shown to have elevated risk of type 2 diabetes, hypertension, and hyperlipidemia at a relatively low level of BMI. Therefore, the BMI cutoff points for bariatric surgery should be lower for Asian populations than the European populations.

There is a need to have regular follow-ups of a patient post-surgery to evaluate the success of the procedure. Adequate weight loss should be more than or equal to 50% of their excessive weights in the first year after surgery. However, the aim, target weight, or worthiness of the procedure may be subject to discussion between patient and care provider before the operation.

The present guideline is not intended to provide rigid rules nor to be used as a legal standard of care. Ultimately, there are various appropriate treatment modalities that should be adjusted for each patient, situation, and surgeon's experience. The surgeon should select and discuss with the patient the best treatment from the different feasible options.

Table 1. The lists of preparation the patients before surgery

1. Perform diagnostic tests for patients
    1.1 Other sign and symptoms of co-morbid diseases
    1.2 Causes of obesity
    1.3 Weight and BMI
    1.4 Other weight control treatment histories
    1.5 Set up joint agreements (commitment)
    1.6 Exclusions related to surgical risk
2. Check the laboratory values
    2.1 Fasting blood sugar level
    2.2 Kidney function
    2.3 Liver function
    2.4 Blood lipid level examination
    2.5 Urine examination
    2.6 INR examination or the work of prothrombin
    2.7 Blood group examination
    2.8 Checking the integrity of red blood cells (CBC)
3. Nutrition screening and special consideration in patients undergoing surgery to reduce the absorption of nutrients according to the symptoms and risks of illness
    3.1 Iron examination
    3.2 Vitamin B12 examination
    3.3 Folic examination
    3.4 May consider the levels of folate, homocysteine, and methylmalonic acid
    3.5 Vitamin D 25(OH) examination
    3.6 Vitamin A and E (optional)
4. Evaluation of the heart and lung systems by screening for sleep apnea such as
    4.1 Electrocardiogram (ECG)
    4.2 Chest radiography (CXR)
    4.3 Echocardiogram if there are clinical indications or sign of pulmonary hypertension
    4.4 Assessments of venous thrombosis if there are clinical indications
5. Gastrointestinal assessments
    5.1 Screening of *Helicobacter pylori* infection in high risk areas
    5.2 Assessment of gallbladder by ultrasound and endoscopy of the stomach if there are clinical indications
6. Endocrine assessments
    6.1 Checking the HbA1C level, if a patient is diagnosed with diabetes
    6.2 Thyroid stimulating hormone examination; if there is a symptom or risk of thyroid disease
    6.3 Sex hormone examination (total/bioavailable testosterone, DHEAS, Δ4-androstenedione) if suspected of polycystic ovary syndrome (PCOS)
    6.4 Cushing's syndrome screening if there is any clinical doubt
7. Nutrition assessments by a dietitian
8. Mental and social behaviors assessments
9. Necessary medical documents for bariatric surgery
10. Letters of acknowledgment and consent
11. Provide information about expense and other related costs
12. Proceed on losing weight continuously before a surgery
13. Control a proper blood sugar level
14. Provide advices related to pregnancy
15. Provide advices related to smoking cessation
16. A cancer screening examination by a specialist doctor

Table 2. The lists of preparation the patients after surgery

Lists to be checked	Details	Surgery methods	
		LSG	LRYGB
First period of post-surgery			
1	If there is high chance of having ischemic heart disease, check a patient's electro-cardiogram at least 24 hours.	✓	✓
2	The patterns of the diet phases adjust under the controls of nutritionists.	✓	✓
3	Providing knowledge of food consumption by nutritionists.	✓	✓
4	Providing multivitamin and extra nutrients (the minimum number of tablets that should be provided).	2 tablets	2 tablets
5	Calcium citrate; 1,200 to 1,500 mg per day.	✓	✓
6	Vitamin D at least 3,000 units per day to increase the level until over 30 ng/ml.	✓	✓
7	May consider to give vitamin B12 to maintain the normal level.	✓	✓
8	Maintain the level of water in a body; normally sip water over 1.5 litres a day.	✓	✓
9	Check and follow-up the blood sugar level, the diabetes conditions or advice symptoms of low blood sugar level.	✓	✓
10	Suction secretion, check lungs conditions, and prevent venous thrombosis conditions.	✓	✓
11	If a patient has abnormal heath conditions, should be aware of pulmonary embolism (PE) and leakage of anastomosis (IL).	PE	PE/IL
12	If suspecting of rhabdomyolysis conditions, check enzyme CPK.	✓	✓
Follow-up lists			
1	A duration of a follow-up appointment in the first period, the period turning into a stable body weight and after a stable body weight.		
	• Surgeons (week, month, year)	1,1,1	1,1,1
	• Dietitian or nutritionists (month)	1,3,6,9,12	1,3,6,9,12
2	Follow-up the progress of the weight loss and the complications in each appointment.	✓	✓
3	Check to find the antibodies of non-striated muscles (SMA-21), red blood cells or platelets in each follow-up (may consider monitoring Iron level before and after surgery).	✓	✓
4	Avoid using non-steroidal anti-inflammatory drugs (NSAIDs).	✓	✓
5	Adjust the treatment after sugary to suit each patient.	✓	✓
6	Consider to prevent gout disease and gallstones.	✓	✓
7	Consider to adjust antihypertensive drug in each appointment.	✓	✓
8	Evaluate the lipid levels every 6 to 12 months according to risk and treatment.	✓	✓
9	Follow-up regularly in a recommended exercise.	✓	✓
10	Evaluate the necessity in doing "Friends help friends" group therapy.	✓	✓
11	Check bone density (DXA) at the 2nd year after surgery	✓	✓
12	Check 24 hours calcium in urine at the 6th month after the surgery then follow-up yearly.	✓	✓
13	Check vitamin B12 level every year or every 3 to 6 months if there is an extra pre-scription to provide (may consider to check the homocystine level and methylmalonic acid level).	✓	✓
14	Check folic, iron, vitamin D 25(OH), parathyroid hormone (iPTH) levels (may consider to check the folate level)	×	✓
15	Check vitamin A level (for the beginning and then every 6 to 12 months)	×	May consider as an option
16	Evaluate copper ions, zinc ions, and selenium ions that can be found specifically.	×	✓
17	Evaluate vitamin B1 level that can be found specifically.	✓	✓
18	Consider the recontouring surgery when it needed	✓	✓

LSG=laparoscopic sleeve gastrectomy; LRYGB=laparoscopic Roux-en-Y gastric bypass; DXA=dual-energy X-ray absorptiometry; ✓=perform; ×=don't have to perform

Conclusion

The prevalence of obesity is increasing in Thailand. TSMBS aim to improve the management of obesity through continuing education and the development of the clinical treatment guidelines. In the present first practice guideline, the criteria for patient selection is established. Furthermore, the guideline provides details about standard of care, divided in pre-, peri-, and post-operative phases. The present committee emphasized the importance of comprehensive approaches to behavioral adjustment, diet, and physical activity together with the surgical procedure using a coordinated multidisciplinary treatment team. These guidelines are not mandated, and should be interpreted with clinical judgment. Future research is needed to gather more evidence and study clinical outcomes for the development of future practice guidelines.

What is already known on this topic?

Bariatric surgery is the gold standard procedure for morbid obesity treatment and proven to effectively decreasing co-morbidity. Many CPG from the American Society for Metabolic and Bariatric Surgery, European or International Federation for the Surgery of Obesity and Metabolic Disorders' guidelines have been reported but there are many variations. Moreover, there is lack of updated treatment guideline in Thailand.

What this study adds?

This practice guideline standardizes the bariatric surgery protocols in Thailand, It acknowledged definite criteria for patient selection and provide particular details about standard of care divided in pre, peri, and post-operative phase. This guideline also emphasized the importance of behavioral adjustment, nutrition management, and physical activity under coordinated multidisciplinary treatment teams. The recommendations were developed following a review of the evidence on a search performed for existing guidelines and available data.

What are the implications for public health practice?

This guideline may help in procedure selection, as well as create a standard and improve the good clinical practice in the management of obese patients in Thailand.

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Conflicts of interest

The authors declare no conflict of interest.

References

1. Aekplakorn W, Inthawong R, Kessomboon P, Sangthong R, Chariyalertsak S, Putwatana P, et al. Prevalence and trends of obesity and association with socioeconomic status in Thai adults: National Health Examination Surveys, 1991-2009. J Obes 2014;2014:410259.
2. Aekplakorn W, Mo-Suwan L. Prevalence of obesity in Thailand. Obes Rev 2009;10:589-92.
3. Pitayatienanan P, Butchon R, Yothasamut J, Aekplakorn W, Teerawattananon Y, Suksomboon N, et al. Economic costs of obesity in Thailand: a retrospective cost-of-illness study. BMC Health Serv Res 2014;14:146.
4. Jitnarin N, Kosulwat V, Rojroongwasinkul N, Boonpraderm A, Haddock CK, Poston WS. Prevalence of overweight and obesity in Thai population: results of the National Thai Food Consumption Survey. Eat Weight Disord 2011;16:e242-9.
5. Viratanapanu I, Romyen C, Chaivanijchaya K, Sornphiphatphong S, Kattipatanapong W, Techagumpuch A, et al. Cost-effectiveness evaluation of bariatric surgery for morbidly obese with diabetes patients in Thailand. J Obes 2019;2019:5383478.
6. Kasama K, Mui W, Lee WJ, Lakdawala M, Naitoh T, Seki Y, et al. IFSO-APC consensus statements 2011. Obes Surg 2012;22:677-84.
7. Mechanick JI, Youdim A, Jones DB, Garvey WT, Hurley DL, McMahon MM, et al. Clinical practice guidelines for the perioperative nutritional, metabolic, and nonsurgical support of the bariatric surgery patient--2013 update: cosponsored by American Association of Clinical Endocrinologists, the Obesity Society, and American Society for Metabolic & Bariatric Surgery. Endocr Pract 2013;19:337-72.
8. Ryan DH, Kahan S. Guideline recommendations for obesity management. Med Clin North Am 2018;102:49-63.
9. Seo MH, Lee WY, Kim SS, Kang JH, Kang JH, Kim KK, et al. 2018 Korean Society for the Study of Obesity guideline for the management of obesity in Korea. J Obes Metab Syndr 2019;28:40-5.
10. Kim J, Eisenberg D, Azagury D, Rogers A, Campos GM. American Society for Metabolic and Bariatric Surgery position statement on long-term survival benefit after metabolic and bariatric surgery. Surg Obes Relat Dis 2016;12:453-9.
11. Kashyap SR, Bhatt DL, Schauer PR. Bariatric surgery

vs. advanced practice medical management in the treatment of type 2 diabetes mellitus: rationale and design of the Surgical Therapy And Medications Potentially Eradicate Diabetes Efficiently trial (STAMPEDE). Diabetes Obes Metab 2010;12:452-4.
12. Fried M, Yumuk V, Oppert JM, Scopinaro N, Torres A, Weiner R, et al. Interdisciplinary European guidelines on metabolic and bariatric surgery. Obes Surg 2014;24:42-55.
13. Chang SH, Stoll CR, Song J, Varela JE, Eagon CJ, Colditz GA. The effectiveness and risks of bariatric surgery: an updated systematic review and meta-analysis, 2003-2012. JAMA Surg 2014;149:275-87.
14. Schwarz AC, Billeter AT, Scheurlen KM, Bluher M, Muller-Stich BP. Comorbidities as an indication for metabolic surgery. Visc Med 2018;34:381-7.
15. Shilton H, Gao Y, Nerlekar N, Evennett N, Ram R, Beban G. Pre-operative bariatric clinic attendance is a predictor of post-operative clinic attendance and weight loss outcomes. Obes Surg 2019;29:2270-5.
16. Conaty EA, Bonamici NJ, Gitelis ME, Johnson BJ, DeAsis F, Carbray JM, et al. Efficacy of a required preoperative weight loss program for patients undergoing bariatric surgery. J Gastrointest Surg 2016;20:667-73.
17. Leahy CR, Luning A. Review of nutritional guidelines for patients undergoing bariatric surgery. AORN J 2015;102:153-60.
18. Ohta M, Seki Y, Wong SK, Wang C, Huang CK, Aly A, et al. Bariatric/metabolic surgery in the Asia-Pacific Region: APMBSS 2018 survey. Obes Surg 2019;29:534-41.
19. de Raaff CAL, Gorter-Stam MAW, de Vries N, Sinha AC, Jaap BH, Chung F, et al. Perioperative management of obstructive sleep apnea in bariatric surgery: a consensus guideline. Surg Obes Relat Dis 2017;13:1095-109.
20. de Raaff CAL, de Vries N, van Wagensveld BA. Obstructive sleep apnea and bariatric surgical guidelines: summary and update. Curr Opin Anaesthesiol 2018;31:104-9.
21. Kositanurit W, Muntham D, Udomsawaengsup S, Chirakalwasan N. Prevalence and associated factors of obstructive sleep apnea in morbidly obese patients undergoing bariatric surgery. Sleep Breath 2018;22:251-6.
22. Sogg S, Lauretti J, West-Smith L. Recommendations for the presurgical psychosocial evaluation of bariatric surgery patients. Surg Obes Relat Dis 2016;12:731-49.
23. Schlottmann F, Nayyar A, Herbella FAM, Patti MG. Preoperative evaluation in bariatric surgery. J Laparoendosc Adv Surg Tech A 2018;28:925-9.
24. Sztuczka E, Zukowska W, Jackowski M, Janik MR, Pasnik K, Michalik M. Recommendations for the standards of equipping of the Bariatric and Metabolic Surgery Center. Pol Przegl Chir 2018;90:52-6.
25. Venclauskas L, Maleckas A, Arcelus JI. European guidelines on perioperative venous thromboembolism prophylaxis: Surgery in the obese patient. Eur J Anaesthesiol 2018;35:147-53.
26. Abuoglu HH, Muftuoglu MAT, Odabasi M. A new protocol for venous thromboembolism prophylaxis in bariatric surgery. Obes Surg 2019;29:729-34.
27. Mocanu V, Dang JT, Switzer N, Skubleny D, Shi X, de Gara C, et al. The effect of helicobacter pylori on postoperative outcomes in patients undergoing bariatric surgery: a systematic review and meta-analysis. Obes Surg 2018;28:567-73.
28. Bennett S, Gostimir M, Shorr R, Mallick R, Mamazza J, Neville A. The role of routine preoperative upper endoscopy in bariatric surgery: a systematic review and meta-analysis. Surg Obes Relat Dis 2016;12:1116-25.
29. Yuce TK, Khorfan R, Soper NJ, Hungness ES, Nagle AP, Teitelbaum EN, et al. Post-operative complications and readmissions associated with smoking following bariatric surgery. J Gastrointest Surg 2019 Dec 17. doi: 10.1007/s11605-019-04488-3.
30. Spaniolas K, Yang J, Crowley S, Yin D, Docimo S, Bates AT, et al. Association of long-term anastomotic ulceration after roux-en-y gastric bypass with tobacco smoking. JAMA Surg 2018;153:862-4.
31. Nightingale CE, Margarson MP, Shearer E, Redman JW, Lucas DN, Cousins JM, et al. Peri-operative management of the obese surgical patient 2015: Association of Anaesthetists of Great Britain and Ireland Society for Obesity and Bariatric Anaesthesia. Anaesthesia 2015;70:859-76.
32. Alvarez A, Goudra BG, Singh PM. Enhanced recovery after bariatric surgery. Curr Opin Anaesthesiol 2017;30:133-9.
33. Thorell A, MacCormick AD, Awad S, Reynolds N, Roulin D, Demartines N, et al. Guidelines for perioperative care in bariatric surgery: Enhanced Recovery After Surgery (ERAS) Society recommendations. World J Surg 2016;40:2065-83.
34. Bellamy MC, Margarson MP. Designing intelligent anesthesia for a changing patient demographic: a consensus statement to provide guidance for specialist and non-specialist anesthetists written by members of and endorsed by the Society for Obesity and Bariatric Anaesthesia (SOBA). Perioper Med (Lond) 2013;2:12.
35. Mahawar KK, Aggarwal S, Carr WR, Jennings N, Balupuri S, Small PK. Consensus statements and bariatric surgery. Obes Surg 2015;25:1063-5.
36. Dang JT, Szeto VG, Elnahas A, Ellsmere J, Okrainec A, Neville A, et al. Canadian consensus statement: enhanced recovery after surgery in bariatric surgery. Surg Endosc 2019 Jun 17. doi: 10.1007/s00464-019-06911-x.
37. Toh SY, Zarshenas N, Jorgensen J. Prevalence of nutrient deficiencies in bariatric patients. Nutrition 2009;25:1150-6.
38. Gudzune KA, Huizinga MM, Chang HY, Asamoah V, Gadgil M, Clark JM. Screening and diagnosis of micronutrient deficiencies before and after bariatric surgery. Obes Surg 2013;23:1581-9.

39. Bazuin I, Pouwels S, Houterman S, Nienhuijs SW, Smulders JF, Boer AK. Improved and more effective algorithms to screen for nutrient deficiencies after bariatric surgery. Eur J Clin Nutr 2017;71:198-202.
40. Galtier F, Pattou F, Czernichow S, Disse E, Ritz P, Chevallier JM, et al. Bariatric surgery and the perioperative management of type 2 diabetes: Practical guidelines. J Visc Surg 2020;157:13-21.
41. Zaman JA, Shah N, Leverson GE, Greenberg JA, Funk LM. The effects of optimal perioperative glucose control on morbidly obese patients undergoing bariatric surgery. Surg Endosc 2017;31:1407-13.
42. Isom KA, Andromalos L, Ariagno M, Hartman K, Mogensen KM, Stephanides K, et al. Nutrition and metabolic support recommendations for the bariatric patient. Nutr Clin Pract 2014;29:718-39.
43. O'Kane M, Barth JH. Nutritional follow-up of patients after obesity surgery: best practice. Clin Endocrinol (Oxf) 2016;84:658-61.
44. Parrott J, Frank L, Rabena R, Craggs-Dino L, Isom KA, Greiman L. American Society for Metabolic and Bariatric Surgery Integrated Health Nutritional Guidelines for the Surgical Weight Loss Patient 2016 Update: Micronutrients. Surg Obes Relat Dis 2017;13:727-41.
45. Montastier E, Chalret du RM, Tuyeras G, Ritz P. Long-term nutritional follow-up post bariatric surgery. Curr Opin Clin Nutr Metab Care 2018;21:388-93.
46. Kim J, Azagury D, Eisenberg D, DeMaria E, Campos GM. ASMBS position statement on prevention, detection, and treatment of gastrointestinal leak after gastric bypass and sleeve gastrectomy, including the roles of imaging, surgical exploration, and nonoperative management. Surg Obes Relat Dis 2015;11:739-48.
47. Busetto L, Dicker D, Azran C, Batterham RL, Farpour-Lambert N, Fried M, et al. Obesity management Task Force of the European Association for the Study of Obesity released "practical recommendations for the post-bariatric surgery medical management". Obes Surg 2018;28:2117-21.
48. Busetto L, Dicker D, Azran C, Batterham RL, Farpour-Lambert N, Fried M, et al. Practical recommendations of the obesity management Task Force of the European Association for the Study of Obesity for the Post-Bariatric Surgery Medical Management. Obes Facts 2017;10:597-632.
49. O'Kane M, Parretti HM, Hughes CA, Sharma M, Woodcock S, Puplampu T, et al. Guidelines for the follow-up of patients undergoing bariatric surgery. Clin Obes 2016;6:210-24.
50. Colquitt JL, Pickett K, Loveman E, Frampton GK. Surgery for weight loss in adults. Cochrane Database Syst Rev 2014;(8):CD003641.
51. van de Laar AW, van Rijswijk AS, Kakar H, Bruin SC. Sensitivity and specificity of 50% excess weight loss (50%EWL) and twelve other bariatric criteria for weight loss success. Obes Surg 2018;28:2297-304.
52. Landecho MF, Valenti V, Moncada R, Fruhbeck G. Eligibility and success criteria for bariatric/metabolic surgery. Adv Exp Med Biol 2017;960:529-43.
53. Vij A, Malapan K, Tsai CC, Hung KC, Chang PC, Huang CK. Worthy or not? Six-year experience of revisional bariatric surgery from an Asian center of excellence. Surg Obes Relat Dis 2015;11:612-20.
54. Lee WJ, Lee YC, Ser KH, Chen SC, Chen JC, Su YH. Revisional surgery for laparoscopic minigastric bypass. Surg Obes Relat Dis 2011;7:486-91.
55. Switzer NJ, Karmali S, Gill RS, Sherman V. Revisional bariatric surgery. Surg Clin North Am 2016;96:827-42.
56. Tran DD, Nwokeabia ID, Purnell S, Zafar SN, Ortega G, Hughes K, et al. Revision of Roux-En-Y gastric bypass for weight regain: a systematic review of techniques and outcomes. Obes Surg 2016;26:1627-34.
57. Brethauer SA, Kothari S, Sudan R, Williams B, English WJ, Brengman M, et al. Systematic review on reoperative bariatric surgery: American Society for Metabolic and Bariatric Surgery Revision Task Force. Surg Obes Relat Dis 2014;10:952-72.
58. Segal-Lieberman G, Segal P, Dicker D. Revisiting the role of BMI in the guidelines for bariatric surgery. Diabetes Care 2016;39 Suppl 2:S268-73.