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Patient management after LAP-BAND placement

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Severe obesity is a chronic disease requiring continuing care. Optimal outcomes of laparoscopic adjustable gastric banding using the LAP-BAND (INAMED Health, Santa Barbara, CA) depend on accurate placement of the band and excellent postplacement care, which requires a long-term commitment from both the patient and the bariatric surgical team. Adjustability is a key feature of the LAP-BAND system, and knowing when and how much to adjust requires careful judgment. Two methods of approaching the art of adjustment are described: the office adjustment and the radiologic adjustment. A properly placed and adjusted band produces prolonged satiety after a small meal, facilitating a major reduction in dietary intake leading to weight loss. Healthy food choices, increased activity and exercise, and the behavioral changes necessary to achieve these are essential elements of all weight loss programs. The LAP-BAND program is no exception. Follow-up requires monitoring of the comorbidities of obesity and metabolic and nutritional status. Communication and collaboration with the patient's primary care provider are important. All of the elements above are necessary to provide the comprehensive care that contributes to optimal patient outcomes.

Optimal outcome following placement of the LAP-BAND (INAMED Health, Santa Barbara, CA) requires that both physician and patient understand the follow-up care process. Adherence to a well-structured postsurgical management plan is at least as important as proper surgical technique in achieving long-term success. The various components of a well-designed, appropriate plan are described. A limited number of studies have been performed to evaluate some of the steps of the follow-up process. The remaining steps are recommended on the basis of the extensive clinical experience of the authors.

Introduction of food after surgery

Clear dietary guidelines are an important requirement both in the immediate postoperative period and for the long term. During the first 2 to 4 weeks following surgery, the patient is instructed to take only fluids, the definition of fluids being any food that can be drawn up a straw. It would be expected that the total daily caloric intake during this period would be 800 calories or less. Initially, the patient has little appetite and therefore copes with the restriction. Over the following 2 to 4 weeks, there is a transition phase from liquids to soft foods to solid food.

The intention of this starting schedule is to avoid any feeling of undue fullness or vomiting at a time when the band is settling into position and a membrane is forming around the band. The schedule evolved in response to an initial high rate of gastric prolapse associated with the LAP-BAND [1] [2] . The subsequent marked reduction in this complication may be attributed, at least in part, to avoidance of vomiting or excessive strain on the proximal stomach in relation to the LAP-BAND by liquid and soft food intake initially, thus permitting the band to settle securely into position with membrane formation over the device during the initial 4 to 8 weeks.

Rules regarding eating and activity: rationale and advice

The most important effect of the LAP-BAND is the achievement of a sense of satiety, which facilitates compliance with the “eating rules” without undue difficulty (Table 1). The subsequent loss of weight then facilitates increased activity and exercise. Because the patient’s eating capacity is substantially reduced by LAP-BAND placement, the diet must include adequate content of protein and complex carbohydrates, and therefore must be relatively low in fats and not include simple sugars. Previous analysis of food intake with these rules indicated a daily consumption of between 800 and 1,200 calories [3] .

Table 1. Key eating and activity rules for patients
•Eat 3 small meals per day.
•Eat only good, solid food.*
•Eat slowly; stop when comfortable.
•There must be no eating between meals.
•Take no liquids with the meal.
•All liquids must be 0 calories.
•Exercise for at least 30 minutes per day.
•Be active throughout each day.

* “Good” refers to foods that are high in protein or complex carbohydrates; “solid” means not liquid. The food should be of sufficient texture to pass only slowly through the banded area.

The food consumed needs to be solid so that it will not rapidly pass across the banded area and a sense of satiety can occur and persist. The patient should be cautioned to eat slowly, ideally requiring one-half hour to finish a small plateful of food. The food should be chewed thoroughly, and no liquid should be taken with the meal because liquefying the food makes it easier for the food to pass through the band. Liquids may be consumed up to 10 minutes before a meal but not for at least 90 minutes after the meal. Liquids should contain no calories; the options, therefore, are limited to water, mineral water, tea,

coffee, or low-calorie soft drinks. An exception is a modest alcohol intake (2 to 4 glasses per week), preferably of wine because this has been shown to be associated with improved weight loss and other health benefits [4] . Many patients experience difficulty with certain foods, such as red meat and bread. Less often there is difficulty with dry chicken, rice, and certain vegetables. Normally, a broad range of food can be tolerated.

Increased activities and exercise are considered as important as reduced caloric intake in achieving positive outcomes and maintaining weight loss [5] . Patients should be encouraged to establish some regular physical routine, usually walking, and to look for ways to build increased activity into daily life. Many severely obese patients are physically disabled, and exercise advice often needs to be tailored to the individual. The literature reports incidental but extensive benefits to health and well-being derived from exercise and activity. These include increased cardiorespiratory fitness, with or without weight loss [6] [7] [8] , leading to improvements in mood, self-esteem, physical function in daily activities, and ultimately, quality of life [9] ; reductions in elevated cardiovascular risk factors, including blood pressure and triglycerides; increased high-density lipoprotein cholesterol; and improved glucose tolerance [6] [10] . Exercise also plays an important role in retaining muscle and, therefore, lean body mass during a period of significant, sustained weight loss [11] [12] .

Adjustment schedule

The key benefit of the LAP-BAND is its adjustability, and optimal use of this feature is integral to success. The determinants of the need for adjustments are the rate of weight loss, the degree to which satiety has been induced, and the presence of symptoms that may suggest obstruction.

At the completion of the surgical placement of the LAP-BAND, no additional saline should be added. The initial addition of fluid most commonly occurs at the 5- to 7-week postoperative patient visit. However, if at this time the weight loss is good and there is no lessening of the sense of satiety, the initial adjustment can be delayed further. The principles that guide our decision making regarding adjustment are outlined in Table 2 . In normal practice, 3 to 6 adjustments would be expected to occur in the first year.

Table 2. Principles of adjustment
•The level of adjustment should be sufficient to achieve a prolonged sensation of satiety in the patient.
•Weight loss should be steady and progressive, with the early rate of weight loss ideally being >0.5 kg but <1 kg/week.
•Adjustment should induce no restrictive symptoms, ie, heartburn, vomiting, discomfort, excessive difficulty with eating a normal range of food.
•Loss of excess weight should be planned to occur gently over a period of 18 months to 3 years, depending on initial weight.

The initial adjustment should consist of 1 mL of fluid. After that visit, patients are reviewed on a 4- to 6-week cycle, and further adjustments are made as determined by weight loss, volume of food intake, and symptoms (Table 3). Each additional adjustment should be no more than 0.3 to 0.5 mL, unless there is radiographic monitoring of tightness, in which case no more than 1 mL should be inserted.

Table 3. Indicators for adjustment of the LAP-BAND in the office		
Consider adding fluid	**Adjustment not required**	**Consider removing fluid**
Inadequate weight loss	Adequate rate of weight loss	Vomiting, heartburn, reflux into the mouth
Rapid loss of satiety after meals	Eating reasonable range of food	Coughing spells, wheezing and choking, especially at night
Increased volume of meals	No negative symptoms	Difficulty coping with broad range of foods
Hunger between meals		Maladaptive eating behavior*

* Usually characterized by the consumption of high-calorie liquid or very soft foods, and is often induced by an overly tight band.

The adjustability of the LAP-BAND offers an additional advantage in situations such as pregnancy, the presence of acute or serious illness, a need for major surgery, or travel to remote locations where temporary removal of the fluid and release of the gastric restriction can be very helpful.

Approaches to adjustment

There are 2 approaches to determining the need for and extent of adjustment of the LAP-BAND. The first of these—the office adjustment—involves making adjustment decisions on the basis of weight loss and the symptoms of the patient (Table 3). The second—the radiographic adjustment—involves making decisions that also incorporate the additional information derived from barium swallow examination (Table 4). The issue of office versus radiographic adjustment remains controversial. The relative cost-effectiveness has not been measured in a comparative study. Reports of patient outcomes from comparable series using one or the other technique, however, do not appear to differ [2] [13] .

Table 4. Radiographic criteria for adjustment	
Consider removing fluid	**Consider adding fluid**
Stenosis of the outlet (with maladaptive eating behavior*)	Wide outlet (>8 mm)
Esophageal dilatation (>2×)	Immediate passage of the barium swallow (1 peristaltic wave)
Esophageal atony	
Esophageal emptying of the barium swallow in >4–5 peristaltic waves	
Reflux	
Pouch dilatation with insufficient emptying	

* Usually characterized by the consumption of high-calorie liquid or very soft foods, and is often induced by an overly tight band.

Office adjustment is simple, quick, cheap, and effective. The additional benefit to the patient for the addition of the barium swallow, with its price of extra time, discomfort, irradiation, and cost, remains to be established.

Office adjustment

The key value of the LAP-BAND is its adjustability, and the office adjustment technique allows easy and frequent application of this benefit. Decisions regarding the addition or removal of saline from the band are based on factors listed in Table 3 .

During the office visit, the access port can be entered by simple palpation and needling as long as the port is fixed securely on the surface of the anterior rectus sheath. On occasions, if too much subcutaneous fat is present to permit palpation, radiographic screening will be required for localization of the port. The procedure is completed as follows. After standard skin preparation, a noncoring needle (Huber tipped needle) is passed into the port. All fluid is aspirated to check constancy of volume of fluid. The existing fluid plus any planned additional fluid is then instilled, and the needle is withdrawn. The entire procedure usually takes 2 to 3 minutes.

Radiographic adjustment

Radiographic adjustment permits the surgeon to ascertain immediately the status of the esophagus, pouch, and diameter of the outlet, and provides important information (anatomy and function) on the entire system. Radiographic criteria for adjustment are shown in Table 4 . Importantly, the presence of complications such as outlet stenosis, esophageal dilatation/atony, pouch dilatation, reflux, gastric prolapse, erosion, or malpositioned band can be clearly detected. As a consequence, the surgeon can take immediate corrective steps—usually fluid removal from the LAP-BAND—to treat the complication. It should be kept in mind that adjusting the system with reliance only on clinical criteria could be misleading. Once the port is localized, the surgeon proceeds as with the office visit (ie, skin preparation, insertion of the noncoring needle, etc).

Follow-up protocol and comorbidity assessment

The patient should be seen every 4 to 6 weeks during the first postoperative year and then every 3 to 6 months for 2 additional years. After this period, yearly visits may occur if all is stable. This schedule may vary depending on the need for adjustment, with the patient generally being reviewed within 1 month following an adjustment.

Medical conditions associated with obesity, such as diabetes, hypertension, sleep apnea, and asthma, may change dramatically with weight loss. These conditions should be monitored and their management appropriately modified when necessary. Weight loss may also have an impact on the treatment for other conditions, such as epilepsy and major psychiatric disorders, and dosage adjustments to medications used to treat conditions may be required. Therefore, communication and collaboration with the patient’s primary care provider is essential in managing these comorbid conditions.

Follow-up should also involve assessment of the patient’s metabolic and nutritional status, including fasting plasma glucose, lipid profile, liver function tests (protein), iron, vitamin B_{12}, folate, homocysteine, and protein levels. This postoperative care is mandatory, and is continued for as long as the LAP-BAND remains in the patient. For the patient, this is a lifelong commitment.

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