



Safety First: Precautions for the Massive Weight Loss Patient

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Bariatric surgery has led to success in maintaining long-term weight loss and has become one of the best surgical options for morbidly obese patients.

From 1998 to 2006, the number of bariatric procedures increased from 13,000 to just less than 200,000. This likely represents just the tip of the iceberg as it becomes more available to the potential 15 million Americans who are now classified as morbidly obese (defined as a body mass index [BMI] >40 kg/m² or BMI >35 kg/m² with a major comorbid condition). A recent announcement by Medicare to expand coverage of this procedure is expected to increase demand further. The upward trend in bariatric surgery has led to a concomitant increase in postgastric bypass body-contouring procedures. Between 2000 and 2004, these procedures increased 77%, with approximately 106,000 body-contouring procedures performed in 2004.

The number of patients who have experienced massive weight loss is on the increase, and this growing population has special needs that must be addressed adequately to ensure that procedures

are performed safely. Patient safety is the highest priority of the body-contouring surgeon (Table 1).

Two groups of patients settle out in this evolving spectrum of patients who have lost weight. One group is the thin patient trapped in the sac of excess skin, a patient who has had successful bariatric surgery. They are healthier than they were. The second group has lost weight, but body-contouring surgery, such as panniculectomy, is a step toward a healthier self. Their preexisting conditions add issues. We present three case vignettes to illustrate this distinction and their inherent risks and perioperative concerns.

Preoperative precautions

Medical status

Patient safety starts with an emphasis on preoperative planning and strategy. Special attention must be addressed to the current medical status of the patient who has lost a massive amount of weight. An extensive history includes recording the patient's

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Box 1: Summary of safety precautions for the patient who has lost a massive amount of weight

Addressing underlying medical conditions
 Nutritional status and supplementation
 Infection control
 Patient positioning
 Prevention of hypothermia
 Meticulous surgical technique for wound healing
 Deep vein thrombosis prophylaxis

maximal weight and BMI, type of surgery or method of weight loss, and current stable weight and BMI. The type of procedure performed has implications for what type of nutritional deficiencies may be encountered, as seen in the difference between specific vitamin and mineral deficiencies in malabsorptive versus restrictive bariatric surgery. The preoperative work-up should include a panel of laboratory tests at least 2 weeks before any planned procedure to allow for enough time to address and correct any deficiencies. Most body-contouring procedures are performed between 12 and 18 months after weight loss surgery, and a documented constant weight for at least 3 months helps to ensure weight stabilization. The bariatric group commonly has underlying hypertension, undiagnosed diabetes, and heart disease with such manifestations as atrial fibrillation. Any history of deep venous thrombosis should have been addressed adequately; if it is warranted, the patient should be anticoagulated properly. Given the complexity of various diseases and comorbidities affecting the patient who has lost massive amounts of weight, a thorough preoperative clearance and cardiac evaluation by an internist and an experienced anesthesiology team is preferable to help optimize his/her medical condition. The history should include questions regarding drug allergies, continued use of diet pills (eg, phentermine), herbal supplementation that may affect anesthesia, and any medications used to treat autoimmune diseases (eg, steroids) that may contribute to poor incisional healing. Phentermine and fenfluramine, in alternating circulating serotonin levels, have been linked to aortic valve injury and pulmonary hypertension. Consequently, many patients may demonstrate the potential adverse effects of valvular heart disease.

The presence of a regular exercise program is a positive sign that can indicate that a patient is taking steps to preserve one's lean BMI. Smoking significantly decreases local cutaneous flow, and it should be documented, addressed, and strongly discouraged with the patient. We advise having

a detailed medical questionnaire specific to the patient who has lost a massive amount of weight (Fig. 1).

Nutritional deficiencies

Often, the patient's original gastric bypass procedure will have contributed to significant malabsorption and protein deficiencies. In addition to routine laboratory tests, such as electrolyte analysis and a complete blood cell count with differential, patients who have lost a massive amount of weight will need to have their ferritin, folate, calcium, vitamin B₁₂, prealbumin, and albumin levels checked (Table 1).

Long-term and acute nutritional status should be assessed (optimal albumin is >3.5 g/dL or total lymphocyte count >1500). Any detected deficiencies are corrected immediately to prevent incisional healing delays. Patients who are not regularly following up with their bariatric physician may signal a noncompliant patient or it may reflect a lack of appropriate postoperative care by the bariatric surgeon. Patients who have undergone gastric bypass rarely receive adequate dietary calcium without supplementation. In malabsorptive bypass procedures, the bowel does not readily absorb calcium, and the stomach is shortened drastically, resulting in less opportunity for calcium uptake. Twice-daily chewable calcium supplements along with a regular exercise program promote calcium build-up. Common vitamin-replacement regimens include a multivitamin, zinc, and protein. Absence of luminal intrinsic factor after gastric bypass surgery can lead to a diminished vitamin B₁₂. Decreased vitamin B₁₂, folate, or both were observed in 88% of patients who underwent jejunoileal bypass surgery for morbid obesity. Therefore, all patients should be supplemented with vitamin B₁₂ and folate, a key step to lowering blood levels of homocysteine, which has been linked to cardiovascular disease. Patients who are deficient in thiamine (vitamin B₁) may exhibit signs of limb weakness, gait instability, and confusion. These symptoms are manifestations of Wernicke's encephalopathy, which may, although rare, progress to permanent neuropathies and coma, referred to as Korsakoff's syndrome.

During body-contouring procedures, large areas of well-vascularized excess skin excision can lead to excessive and significant blood loss that warrants adequately addressing a preoperative anemia and offering the banking of blood for a likely operative transfusion. Underlying anemia may be the result of deficiencies in folate and vitamin B₁₂, a consequence of gastric bypass procedures that use small stomach pouches. Chromagen Forte (Savage Laboratories, Melville, New York) is a common supplementation that is used for vitamin B₁₂, folate, and

**MEDICAL QUESTIONNAIRE
FOR MASSIVE-WEIGHT-LOSS PATIENTS**

Name _____ Date _____

How old are you? _____

How tall are you? _____

How much did you weigh at your greatest weight? _____

How much do you weigh now? _____ How long have you been that weight? _____

Do you have any of the following medical problems?

- Heart disease No _____ Yes _____
- Lung disease No _____ Yes _____
- High blood pressure No _____ Yes _____
- Diabetes No _____ Yes _____
- Intestinal problems No _____ Yes _____
- Kidney or liver problems No _____ Yes _____
- Ovary or uterine problems (if female) No _____ Yes _____
- Bleeding disorders No _____ Yes _____
- Thyroid disease No _____ Yes _____
- History of depression, anxiety, or psychosis No _____ Yes _____
- History of seizures No _____ Yes _____

Do you smoke? No _____ Yes _____

Do you drink a lot of alcohol? No _____ Yes _____

Have you had any surgeries, especially abdominal surgeries? No _____ Yes _____

Where are the scars? _____

Do you take any medicines regularly? Please list them.

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Are you allergic to any medicines? Please list them.

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Questionnaire for the patient who has lost a massive amount of weight. (From Aly AS, editor. *Body contouring after massive weight loss*. St. Louis (MO): Quality Medical Publishing; 2006. p. 55; with permission.)

vitamin C. Some severe deficiencies may warrant vitamin B₁₂ injections.

A 45-year-old woman with a BMI of 30 kg/m² and status postgastric banding presented for body-contouring surgery after an approximately 140-lb weight loss. Her requests included mastopexy with augmentation and a lower body lift. Preoperative evaluation showed that the patient's health concerns were now limited to a vitamin B₁₂ deficiency for which she received subcutaneous injections every 12 hours. The patient was able to give directed blood donations and underwent uneventful

surgery. This patient represents the first group: post-bariatric surgery.

Diabetes

There is particular concern for underlying medical conditions related to morbid obesity, such as diabetes. Diabetic patients have a depressed immune response and, hence, have increased susceptibility to infection and are especially prone to *Streptococcus* and *Staphylococcus* skin infections. Diabetes and perioperative hyperglycemia were shown independently to increase the prevalence of surgical site infections (SSIs). A history of diabetes was shown to increase the risk for SSIs by as much as

Table 1: Preoperative laboratory tests

Test	Rationale
Total protein and albumin	3-wk nutrition marker
Prealbumin	3-d nutrition marker
Total lymphocyte count	Acute nutrition marker
Ferritin	Iron deficiency
Hemoglobin	Anemia
Calcium	Mineral deficiency
Vitamin B ₁₂ and folate	Vitamin deficiency

2.7-fold. Similarly, the risk for SSIs and nosocomial infections correlates with the degree of glucose elevation. Waiting until the diabetes is controlled may not be possible, and bariatric surgery may improve glucose tolerance.

We place patients on low-dose insulin sliding scales and Accu-checks with meals and at night. For patients with a demonstrated hemoglobin A1c of greater than 7%, low-carbohydrate meals and an insulin drip are initiated upon admission to the hospital for strict glycemic control. Daily management of glycemic control, which is burdensome and time consuming, has shown its efficacy in the short- and long-term prevention of morbidity.

The goals of intensive therapy should be preprandial glucose concentrations between 70 and 120 mg/dL and postprandial concentrations of less than 180 mg/dL. Any patients who have hemoglobin A1c greater than 6.05% or hyperglycemia during the perioperative period require appropriate follow-up with formal testing for diabetes.

Case 2 graphically illustrates the surgical risks in this patient group.

A 63-year-old woman lost 75 lbs to stabilize her BMI at 54.9 km/m². She had a medical history significant for breast cancer, diabetes, chronic obstructive pulmonary disease (COPD) on continuous oxygen, hypertension, lymphedema, and hypothyroidism. She presented with a significant amount of excess skin and large lymphadenomous sacs on the inner portion of both thighs. She was a smoker and had undergone a previous right mastectomy and panniculectomy. During her hospital course, she was placed on an insulin drip for control of diabetes. The leg masses were staged with partial closure and vacuum assisted closure (V.A.C., Kinetic Concepts, Inc., San Antonio, Texas) dressing application. Second-stage closure of the left thigh was performed with a concurrent ventral hernia repair performed by general surgery. The postoperative course resulted in an acute COPD exacerbation that

required a short ICU stay. She was followed as an outpatient by an infectious disease physician for significant postoperative wound infections requiring prolonged intravenous antibiotics. Approximately 7 months later, the patient underwent a third stage involving resection of the right thigh mass. Her wounds have now resolved and are well healed. This patient represents the second group of body contouring patients with significant comorbidities (Table 1).

Peri- and intraoperative precautions

Antibiotic prophylaxis and infection control

For longer, multistage procedures, the risk for infection increases. In part, this can be a consequence of nutritional deficiencies leading to impaired immune states, as well as underlying skin infections, such as candidal colonization manifested by intertrigo, and red rashes between folds. To decrease skin bacterial counts, we advocate washing twice daily with a topical broad-spectrum soap, such as chlorhexidine, starting 3 days before a procedure. Patients are given scrub sponges at their preoperative appointment. Topical and oral antifungals, such as fluconazole, are added to this regimen as appropriate.

Our surgery center strives for a goal of antibiotic prophylaxis administration 1 hour before a procedure. A cephalosporin with good coverage of gram-positive bacteria and skin flora, such as cephazolin, should be dosed and then redosed every 3 and 6 hours during the procedure and adjusted according to the patient's obesity and blood loss. Antibiotic prophylaxis continues for an additional 24 hours postoperatively; however, a common practice among many plastic surgeons is to maintain patients on antibiotics until their drains are removed. Additional measures that we have implemented include intraoperative clipping, rather than shaving, of patients to avoid small cuts and thorough scrubbing with 4% chlorhexidine gluconate during the surgical preparation.

Anesthesia evaluation

Patients who have lost massive amounts of weight may require a complete evaluation by an anesthesiologist because they can be difficult to intubate and sometimes require additional measures, such as fiber-optic intubation or intravenous neck lines. All patients who have lost a massive amount of weight should be questioned regarding a history of gastroesophageal reflux disease, snoring, difficulty sleeping, and whether they have been diagnosed with obstructive sleep apnea to generate an Apnea Screening Index or likelihood of an event. All of these may put the patient at increased risk for aspiration during the procedure. Patients

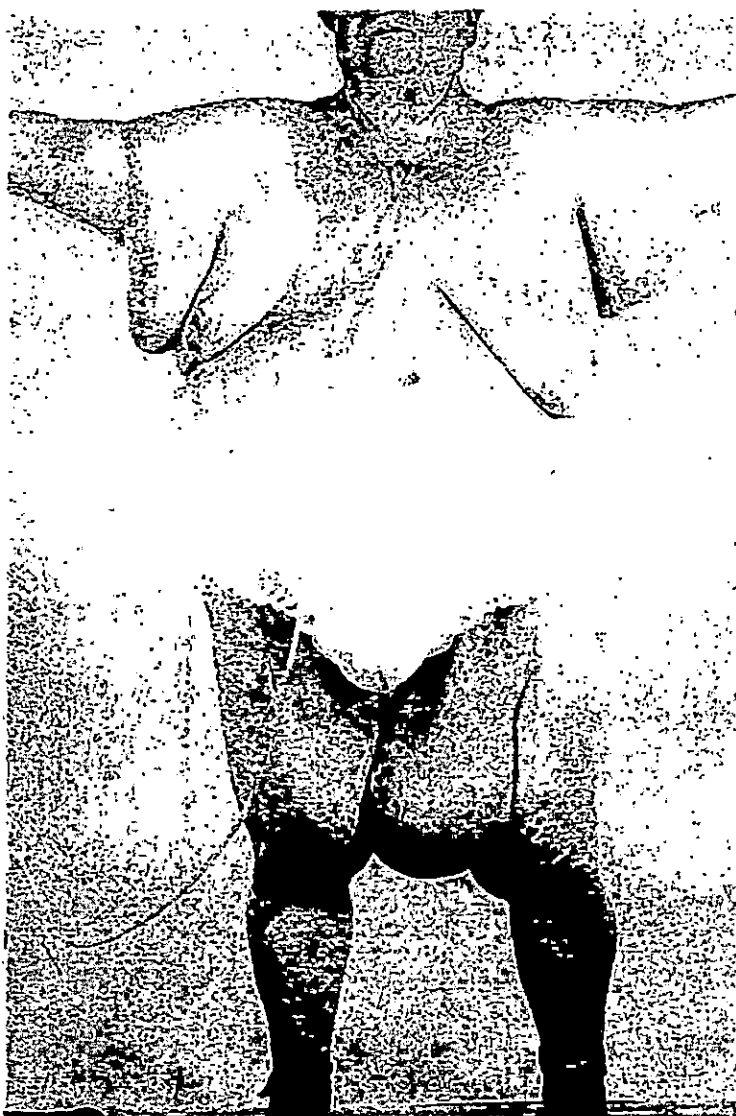


Fig. 2. Preoperative photographs of a 63-year-old woman with a BMI of 54.9 kg/m² who presented with lymphadenomas on the inner portion of both thighs. Postoperative complications included COPD exacerbation requiring an ICU stay and significant wound infections requiring prolonged intravenous antibiotics.

who have lost a massive amount of weight have higher rates of sleep apnea than does the general population, and this is characterized by repetitive episodes of upper airway obstruction. Consider using continuous positive airway pressure or an oral appliance while under sedation. Peripheral procedures may be performed safely under an epidural or spinal anesthesia. Monitoring of sleep apnea should continue into the postoperative period, with continuous monitoring of pulse oximetry, ventilation, and cardiac rhythm, and the surgeon should be wary of the respiratory-depressant effects of anesthetics and the overzealous use of narcotics, benzodiazepines, and barbiturates. The decision to supplement with oxygen or

observe with pulse oximetry should have a low threshold.

Positioning

Patients who have lost massive amounts of weight frequently require prone positioning for access to the back and circumferential body contouring; however, this action carries with it risks for neural and vascular compression. Possible described complications include vertebral artery occlusion with associated stroke, vision loss, brachio-plexopathies, and shoulder impingement leading to pain and neuropraxias, permanent and temporary.

To avoid these sequelae, the head and chest should be in a slightly flexed position with the

liberal use of pillows, egg crates, gel mattresses, and foam padding at all nerves and bony prominences, such as the iliac crest, to prevent skin necrosis. The cervical spine should be in a neutral position, and torsion of the spinal cord should be kept to a minimum to prevent trauma to the carotid or vertebral arteries, which are particularly susceptible to subintimal dissection at the atlanto-axial joint. The arterial and venous channels of the eye are at risk for tamponade and collapse, which can lead to temporary or permanent blindness. Particular attention to the face is essential; ocular lubricants, taping for eye protection, and a prone pillow or foam cutout that does not compress the nose or ears should be used. Despite meticulous care in set-up, the best reassurance comes from periodic checking of the face throughout the procedure.

The glenohumeral joint of the shoulder should be supported with an axillary roll to prevent subluxation. The arms are susceptible to ulnar, radial, and medial brachial nerve compression and require well-padded boards with foam crates at the elbows and forearms. Once a patient has been placed prone, one always should check the placement of the breasts and nipple position for adequate padding. Pressure is kept off the abdomen in the prone position by placing dual-support rolls from clavicle to pelvic rim. This prevents compression of the chest and the abdominal contents. In the lateral decubitus position, one should place an axillary roll using a rolled blanket or liter bag of saline.

Please note the following illustrative case of multiple complications, including an iatrogenic neuroparaxia secondary to malpositioning of the patient intraoperatively for one's initial bariatric procedure. This patient was a bleeding risk secondary to anticoagulation from fen-phen-related valve replacement and had suffered two size-related complications: nerve entrapment and a decubitus ulcer.

Case three

A 58-year-old man had a decrease in BMI from 50.2 kg/m² to 35.1 kg/m² following gastric bypass. The patient was 5'10" tall, had lost 105 lbs, and presented at 245 lbs. Medical history was significant for insulin-dependent diabetes and aortic valve replacement for which he was anticoagulated on coumadin. After his gastric bypass procedure, the patient sustained a cardiac arrest, underwent a short ICU stay, and subsequently developed a stage 4 gluteal decubitus ulcer. The patient also sustained a left radial nerve and a left common peroneal nerve neuropathy at the fibular head secondary to improper prone positioning without sufficient padding (). Postoperatively, the patient demonstrated an absence of radial nerve function, paralysis of the extensors of the left arm, and paralysis of left foot

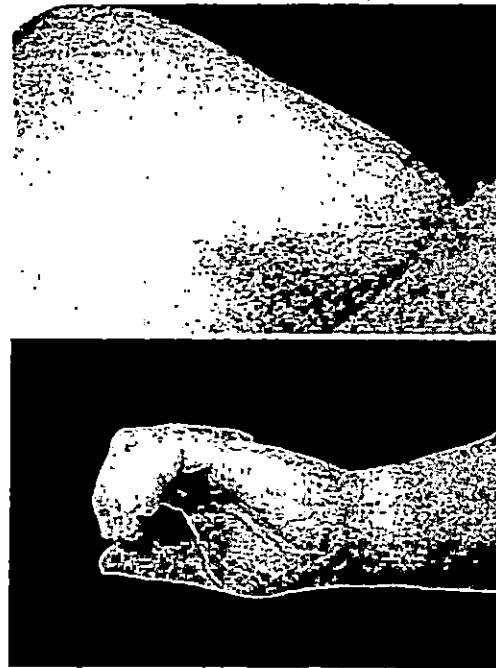


Fig. 3. Postoperative photographs of a 58-year-old man who sustained an iatrogenic nerve paralysis due to improper positioning during a gastric bypass surgery. (Top) Postoperative ecchymoses on the patient's dorsal forearm over the radial nerve. (Bottom) Note the absence of radial nerve function, with paralysis of the extensors.

dorsiflexion with a burning sensation and paresthesias. Because of the patient's unilateral symptoms, the first assumption was that of stroke, a diagnosis that perpetuated for months until the patient sought a second opinion for the decubitus. After multiple debridements, the patient underwent repair of the decubitus ulcer with a local rotational flap and in a separate procedure, nerve decompression surgery by a peripheral nerve specialist. Immediately postoperatively, the patient developed a hematoma under the pedicle flap secondary to anticoagulation for his fen-phen-related heart valve replacement. This required operative evacuation; however, at 6 months follow-up, the sacral ulcer had healed, and he had regained most muscle function.

Hypothermia

Large amounts of uncovered skin surface during body-contouring procedures can lead to precipitous decreases in core body temperature, contributing to patient instability. Ideally, ambient room temperatures of at least 70°F should be maintained, and as much of the body should be covered as possible. The use of warming air blankets also can be helpful. When turning a patient, warming blankets

and sterile towels should be replaced as quickly as possible. Warming equipment for blankets and pre-warmed intravenous fluids should be at or above body temperature before administering to the patient. Our surgical center has found great success with head and foot stockings as well as cutaneous warming devices (Bair Huggers, Augustine Medical, Inc., Eden Prairie, Minnesota) and forced air warming blankets started well before surgery in the pre-operative waiting area.

Incisional closure

For all body-contouring procedures, complications have been estimated at around 14.4% for wound problems, 12.9% for seromas, and 2.9% for skin infections. A meticulous multilayered closure is one of the best defenses against incisional dehiscence and infection. Closures should minimize tension. For body lifts, patients should be maintained in a slightly flexed position in bed and during transfers. Postoperatively, patients should not be manipulated until they are completely awake and alert because that is the time at which they can protect themselves. Seromas in potential anatomic planes can be reduced by adequate drain placement and by suture quilting the superficial fascial system to the deep fascial system. When the suspicion of bacterial contamination is high, we have seen some efficacy with using antibacterial triclosan-coated sutures (Monocryl[®] Plus and Vicryl[®] Plus, Ethicon Endo-Surgery, Inc., Cincinnati, Ohio), which inhibited suture colonization. After separate suture closures of the fascia, dermis, and finally, epidermis, we advocate using a topical skin adhesive (Dermabond) as a final layer of skin sealant and microbial barrier. This also effectively eliminates the need for dressings that may contribute to dermatitis and skin blistering. Although there is no exact maximal amount of time for body-contouring procedures, a prudent and conservative approach should be taken when deciding how much surgery is safe to perform. There is no single accepted algorithm, but in general, a smaller body mass allows for more procedures to be performed safely at one time. More procedures can be undertaken at one time if a team is used. With a team approach, procedures commonly combined include circumferential body lift with liposuction of thighs, upper body lift with arms, or thigh lift with minor revisions. When combining procedures, performing surgery on multiple distant body parts within a single-stage may predispose patients to problems, because the additional skin exposure increases the likelihood of hypothermia. Surgeries should be kept short enough to prevent significant blood loss and significant hypothermia. A commonly used threshold is to limit surgery to 6 hours,

although this certainly is not universally accepted as a limit. It should be thought of as a guideline, not a standard, which is modifiable by physician and patient comfort levels. Pre- and postoperatively, patients should receive thorough oral education and written instructions about wound care and the signs and symptoms of possible complications.

Postoperative precautions

The use of light-compression garments is an accepted practice for some body-contouring surgeons to prevent seroma and hematoma, despite a paucity of long-term outcome studies. Although we have not found any compromise of skin flaps and support the use of light-compression abdominal binders after liposuction and circumferential torso-plasty, many surgeons believe that the use of compression garments could compromise skin flap blood supply if already made tenuous by extensive undermining and tension closures. If compression garments are used, drain tubes should be moved to avoid pressure necrosis.

Some surgical centers, including ours, are beginning to incorporate ventral hernia repair procedures with body-contouring procedures, such as panniculectomy. This is a safe and effective option in the properly selected patient. We emphasize that the body-contouring surgeon must be aware and vigilant to the theoretic doubling of potential complications with combined surgeries.

Deep vein thrombosis and pulmonary embolism prophylaxis

The risk for deep vein thrombosis (DVT) and pulmonary embolism (PE), estimated at approximately 1.4%, is small, but remains a significant and dreaded complication for the body-contouring surgeon. Certain procedures, such as belt lipectomy, have rates as high as 9.3%. It is important to determine an event probability for a patient based on one's contributing risk factors. Factors associated with thromboembolic phenomena include the use of oral contraceptives, obesity, pregnancy, advanced age, recent surgery, underlying coagulation abnormalities, and prolonged immobilization.

Based on the likelihood of an event, patients may be stratified into four risk categories: low, moderate, high, and highest. In short, the low-risk group consists of patients younger than 40 years of age who are undergoing minor surgery, and have no prior risk factors. The moderate-risk group includes patients aged 40 to 60 years with no risk factors who are undergoing minor procedures or patients younger than 40 years who are undergoing a major surgery. High-risk patients are those older than 60 years who are undergoing a minor procedure or

those who are older than 40 years, have one risk factor, and are undergoing a major surgery. The highest-risk group are those patients undergoing major surgery after the age of 40 years with a known history of a venous thromboembolic event, hypercoagulable state, hip and knee arthroplasty, major trauma, or spinal cord injury. Recommendations for the prevention of DVTs and PEs is summarized in Table 1. Note that certain risks potentiate the effects of other risks. The consequence is that a patient's overall risk may be significantly higher than simply his/her individual risks combined. We have devised a plastic surgery risk-assessment model based on risk profile with appropriate postoperative order selections (Table 2) and suggest referencing this system when evaluating a patient initially.

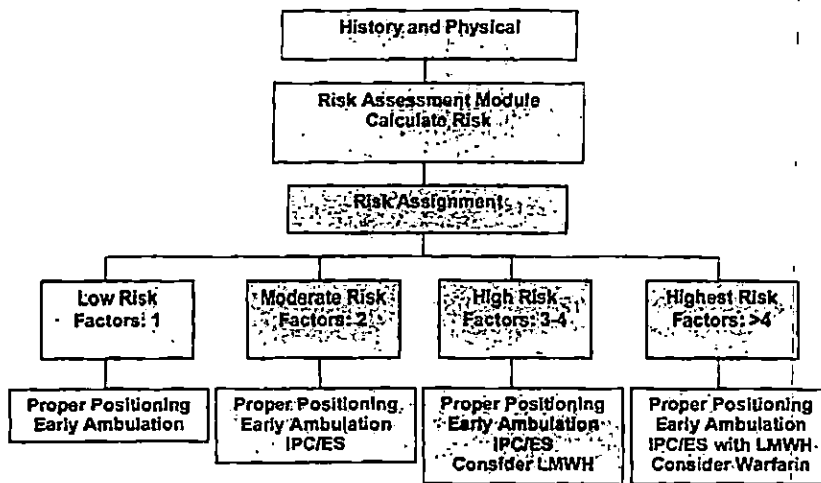
Elastic and mechanical compression stockings or venous foot pumps are suitable for all patients who are undergoing procedures longer than 1 hour and should be applied preoperatively before beginning anesthesia. The best preventative measure is early ambulation; however, if this is not possible, heparin or low molecular weight heparin (LMWH) should be initiated 30 to 60 minutes preoperatively or 12 hours postoperatively for patients in the high- and highest-risk categories. Both agents work through a similar mechanism by inhibiting Xa and IIa (thrombin), important factors in the coagulation cascade. We find that a 12-hour wait before chemoprophylaxis dosing is the best balance of hematoma risk. LMWH has the added benefits of higher bioavailability, a more predictive dose response, once a day dosing, and a significantly lower incidence of heparin-induced thrombocytopenia. The

surgeon must determine whether this offsets its significant additional expense.

Patients in the highest-risk group may warrant the administration of warfarin; however, this agent has a delayed onset of action compared with LMWH and requires frequent laboratory monitoring. Its role in venous thromboembolic event prophylaxis is limited to patients who refuse LMWH. Current studies are underway to evaluate the effectiveness of new emerging drugs. Fondaparin, a heparin pentasaccharide analog that indirectly inhibits FXa and was approved in 2004 for DVT prophylaxis in orthopedic surgery, has showed early promise in the prevention of thromboembolic events.

The use of aspirin has been shown to decrease the incidence of venous thromboembolism in orthopedic and general surgery patients; however, this reduction was significantly less than that achieved by the previously mentioned agents and did not offset its high-risk profile for gastrointestinal and wound-related bleeding.

The use of epidurals for neuraxial blockade was shown in the orthopedics literature to decrease postoperative mortality and other serious complications, such as DVT, PE, and myocardial infarction. Although the overall benefit likely is small, PE after total hip replacement surgery was significantly lower in patients who were given continuous lumbar epidural anesthesia compared with general anesthesia. This research may translate to some indications for its use in the difficult patient who has lost a massive amount of weight.



Algorithm for venous thromboembolism prevention in patients who undergo plastic surgery. ES, elastic compression stockings; IPC, intermittent pneumatic compression stockings; LMWH, low molecular weight heparin. (From Davison SP, Venturi ML, Attinger CE, et al. Prevention of venous thromboembolism in the plastic surgery patient. *Plast Reconstr Surg* 2004;114:43; with permission.)

Step I Total = _____

Exposing Risk Factors			
Check the box corresponding to each condition			
1 Factor	2 Factors	3 Factors	5 Factors
Minor surgery <input type="checkbox"/>	*Major surgery <input type="checkbox"/>	Previous myocardial infarction <input type="checkbox"/>	Hip, pelvis, or leg fracture <input type="checkbox"/>
	Immobilizing plaster cast <input type="checkbox"/>	Congestive heart failure <input type="checkbox"/>	Stroke <input type="checkbox"/>
	Patient confined to bed for > 72 hrs <input type="checkbox"/>	Severe sepsis <input type="checkbox"/>	Multiple trauma <input type="checkbox"/>
	Central venous access <input type="checkbox"/>	Free flap <input type="checkbox"/>	Acute spinal cord injury <input type="checkbox"/>

*Major surgery is defined by the use of general anesthesia or any procedure lasting longer than 1 hour.

Step II Total = _____

Predisposing Risk Factors		
Check the box corresponding to each condition		
Clinical Setting	Inherited	Acquired
Age 40 to 60 (1 Factor) <input type="checkbox"/>	Any genetic hypercoagulable disorder (3 Factors) <input type="checkbox"/>	Lupus anticoagulant (3 Factors) <input type="checkbox"/>
Age > 60 (2 Factors) <input type="checkbox"/>		Antiphospholipid antibodies (3 Factors) <input type="checkbox"/>
History of DVT/PE (3 Factors) <input type="checkbox"/>		Myeloproliferative disorders (3 Factors) <input type="checkbox"/>
Pregnancy or < 1 month postpartum (1 Factor) <input type="checkbox"/>		Heparin-induced thrombocytopenia (3 Factors) <input type="checkbox"/>
Malignancy (2 Factors) <input type="checkbox"/>		Hyperviscosity (3 Factors) <input type="checkbox"/>
Obesity > 20% IBW (1 Factor) <input type="checkbox"/>		Homocystinemia (3 Factors) <input type="checkbox"/>
Oral contraceptive / hormone replacement therapy (1 Factor) <input type="checkbox"/>		

Step III Total Step I and Step II = _____ Factors

Step IV. Orders

1 Factor	Low risk	Ambulate patient TID <input type="checkbox"/>
2 Factors	Moderate risk	Intermittent pneumatic compression stockings with elastic compression stockings on at all times when not ambulating <input type="checkbox"/>
3-4 Factors	High risk	Intermittent pneumatic compression stockings with elastic compression stockings on at all times when not ambulating <input type="checkbox"/>
> 4 Factors	Highest risk	Intermittent pneumatic compression stockings with elastic compression stockings on at all times when not ambulating <input type="checkbox"/> + 1. Enoxaparin (Lovenox) 40mg SQ once daily post op <input type="checkbox"/>

For 1 : Give first dose 12 hours Post Op

Signature _____
Print Name _____

Date/Time _____
Pager # _____

Plastic surgery venous thromboembolism order form. IBW, Ideal body weight; SQ, subcutaneously; TID, three times a day. (From Davison SP, Venturi ML, Attinger CE, et al. Prevention of venous thromboembolism in the plastic surgery patient. *Plast Reconstr Surg* 2004;114:43; with permission.)

Summary

The increase in bariatric procedures will continue to drive the rapidly expanding field of body-contouring surgery. Patients who have undergone bariatric surgery are an inherently difficult patient

population whose comorbid conditions must be addressed to perform safe and cautious procedures. The patient who has undergone bariatric surgery and has lost a massive amount of weight is healthier, but still presents risks that should be addressed. As the case studies illustrate, preoperative screening

and postoperative care may require consultation and a team approach to manage these deserving patients most safely. DVT prophylaxis is particularly paramount. This systematic review of safety precautions is presented in an effort to reduce the risks and complications of body-contouring surgery.

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