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Practice Advisory on Liposuction: Executive Summary

INTRODUCTION

As the number of procedures performed in office-based and ambulatory surgical facilities continue to expand, it is important that clinical as well as policy and regulatory decisions are based on a solid understanding of these procedures. This is particularly important in the case of liposuction as it is the most frequently performed plastic surgery procedure. In addition, it is commonly performed in the office-based surgery setting and many states either have or are considering specific liposuction regulations.

This executive summary provides an overview of the ASPS Practice Advisory on Liposuction, which has been submitted for publication in the journal, *Plastic and Reconstructive Surgery*[®]. The overview and recommendations provided are based on a thorough evaluation of the present scientific literature and relevant clinical experience. These recommendations are not intended to serve as standards or guidelines but they should generally meet the needs of most liposuction patients in most circumstances. The ultimate judgement regarding the care of a particular patient must be made by the physician in light of all of the circumstances presented by the patient.

BACKGROUND

Liposuction, the surgical intervention designed to treat superficial and deep deposits of subcutaneous fat, was introduced into the United States in 1982. Originally, liposuction was utilized to treat minor contour irregularities. As techniques have improved, recontouring of large or even multiple areas of the body are now possible, taking it from the realm of minor surgical procedure to that of a major surgery.

OVERVIEW AND RECOMMENDATIONS

Liposuction Techniques and Cannulas

No single liposuction technique or cannula is best suited for all patients in all circumstances. Factors such as the patient's overall health, the patient's body mass index, the estimated volume of aspirate to be removed, the number of sites to be addressed, and any other concomitant procedures to be performed should be considered by the surgeon to determine the best technique for the individual patient. Liposuction techniques available include:

- 1) The dry technique is performed without infiltrate solution. Due to the amount of blood loss associated with the technique, its use is not recommended except in limited applications with a volume of 100 cc total aspirate or less.
- 2) The wet technique entails injecting 200 - 300 cc's of infiltrate solution, with or without additives, into the operative field.
- 3) The superwet technique utilizes 1 cc of infiltrate solution (consisting of saline or Ringer's lactate with epinephrine and in some cases lidocaine), for each 1 cc of fat to be removed.
- 4) The tumescent technique involves infusing 3 to 4 cc's of infiltrate solution (0.025 – 0.1% lidocaine and epinephrine 1:1,000,000 in Ringer's lactate or saline) for each planned cc of aspirate.
- 5) Ultrasonic-assisted liposuction (UAL) uses a cannula or probe to deliver fat-liquefying ultrasound subcutaneously. The dry technique should never be used in conjunction with UAL.
- 6) External ultrasound assistance (EUA) delivers adjunctive ultrasound through an external paddle.

ANESTHESIA

Various anesthesia or anesthesia combinations are appropriate for liposuction including anesthetic infiltrate solutions, general anesthesia, intravenous and oral sedation, and in some cases, epidural anesthesia. The physician should select the method of anesthesia depending upon the overall health of the patient, the estimated volume of the aspirate to be removed and the postoperative dismissal plan.

- 1) Plastic Surgeons should utilize the ASA Guidelines for Sedation and Analgesia.
- 2) General anesthesia can be used safely in the office setting.
- 3) General anesthesia has advantages for more complex liposuction procedures that include precise dosing, controlled patient movement and airway management.

- 4) Epidural and spinal anesthesia in the office setting is discouraged because of the possibility of vasodilation, hypotension and fluid overload.
- 5) Moderate sedation/analgesia (intravenous or oral) augment the patient's comfort level and is an effective adjunct to anesthetic infiltrate solutions.

ANESTHETIC INFILTRATE SOLUTIONS

- 1) In small volume liposuction, infiltrate solutions containing local anesthetic agents are often sufficient to provide adequate pain relief without the need for additional anesthesia measures.
- 2) Marcaine should be used cautiously as an additive in infiltrate solutions due to the severity of side effects, slow elimination and inability to reverse potential toxicity.
- 3) Lidocaine administered in wetting solutions to large or multiple regions of the body has the potential for systemic toxicity. Preventive measures include:
 - a) Limit lidocaine dose to safe levels of 35 mg/kg. This level may not be safe in patients with low protein and other medical conditions where the metabolic byproducts of lidocaine breakdown may reach problematic levels.
 - b) Calculate the dose on total body weight.
 - c) Reduce the concentration of lidocaine when necessary.
 - d) Utilize superwet rather than tumescent technique.
 - e) Consider not using lidocaine when general or regional anesthesia utilized.
- 4) Epinephrine use should be avoided in patients who present with pheochromocytoma, hyperthyroidism, severe hypertension, cardiac disease, or peripheral vascular disease. In addition, cardiac arrhythmias can occur in predisposed individuals or when epinephrine is used with halothane anesthesia.
- 5) Consider staging the infiltration of multiple anatomic sites to reduce possibility of excess epinephrine effect.

PATIENT/FACILITY SELECTION:

One of the most important aspects in the success of any surgical procedures is the physical condition of the patient at the time of surgery.

- 1) Even though liposuction is generally an elective procedure, the liposuction patient must be assessed by the same standards as anyone who is undergoing any surgery including a complete preoperative history and physical (H&P) examination.
- 2) Most liposuction procedures can be safely performed in an accredited office-based surgery facility or ambulatory surgery facility. Hospitalization may be required based on the patient's overall health, area(s) of the body treated and the volume of aspirate removed.
- 3) The body mass index (BMI) is a good method to assess the liposuction patient's relative risk/benefit for the procedure.
- 4) In obese patients requiring large volume liposuction, it may be necessary to modify the anesthetic infiltrate solution to prevent lidocaine toxicity.
- 5) Not all patients are appropriate liposuction candidates. These patients may wish to continue diet and exercise routines, seek medical intervention to treat existing condition(s), or, in the case of patients who have unrealistic expectations about their condition or potential outcomes, be referred for a psychiatric/psychological evaluation.

LIPOSUCTION VOLUME

There is no scientific data available that support a specific volume maximum at which point liposuction is no longer safe, although the risk of complications is unavoidably higher as the volume of aspirate and the number of anatomic sites treated increases.

- 1) It is important to note the distinction between total fat removed and total aspirate removed. Total aspirate is defined as the combination of total fat and fluid removed during liposuction. Total aspirate should be the method used when tracking the volume of liposuction removed.
- 2) Regardless of the anesthetic route, large volume liposuction (greater than 5,000 cc total aspirate) should be performed in an acute-care hospital or in a facility that is either accredited or licensed. Postoperative vital signs and urinary output should be monitored overnight in an appropriate facility by qualified and competent staff who are familiar with perioperative care of the liposuction patient.

- 3) Under certain circumstances, it may be in the best interest of the patient to perform large volume procedures as separate serial procedures and avoid combining with additional procedures.

MULTIPLE PROCEDURES

Limited liposuction aspiration volumes are routinely and safely performed in combination with additional plastic surgery procedures.

- 1) *Large* volume liposuction combined with certain other procedures has resulted in serious complications and such combinations should be avoided.
- 2) Individual patient circumstances may warrant performing liposuction as a separate procedure.

FLUID MANAGEMENT

Profound metabolic alterations accompany large volume liposuction. Because of the increasingly large volume of infiltrate used in larger volume liposuction, careful attention must be paid to all fluid infused and whether it is part of the infiltrate solution or part of IV fluids administered during the procedure.

- 1) Accurate intake and output monitoring of all fluids utilized in the operative and postoperative periods.
- 2) Communication with the anesthesia care provider on fluid management is critical.
- 3) Fluid management in liposuction surgery must account for maintenance requirements, preexisting deficits and intraoperative losses of aspirated tissue and third space deficits.
- 4) Preexisting fluid deficits should be minimal after an overnight fast.
- 5) Blood loss estimates should be made and confirmed with pre- and postoperative hemoglobin measurements. However, due to fluid shifts, hemoglobin levels may not be reliable during the first 24 hours postoperative period.
- 6) Calculation of residual fluid volumes after liposuction is helpful in planning postoperative care.

INTRAOPERATIVE CARE

There are several precautions that can be taken intraoperatively to maximize the postoperative recovery.

- 1) Preserve body core temperature with approved warming devices.
- 2) Position patients properly on padded operating table with knees slightly flexed so as to maximize blood flow through the popliteal vein.
- 3) Intermittent pneumatic compression devices should be used intraoperatively to prevent deep vein thrombosis, particularly with patients at moderate to high risk of blood clots. Low molecular weight heparin may also be administered to those patients at higher risk.

POSTOPERATIVE CARE

All patients, regardless of the anesthesia method utilized, should receive appropriate post-anesthesia management.

- 1) Immediate postoperative care should include assessment of fluid and electrolyte balance and administration of replacement fluids and/or red blood cells as needed.
- 2) Depending on the volume of aspirate removed, the patient needs to be monitored for several hours or possibly overnight.
- 3) Before the patient is discharged, he/she must be alert and oriented with stable vital signs.
- 4) The patient should expect significant bruising and swelling for at least the first 48-72 hours.
- 5) Compression garments and elastic stockings are generally used for several weeks.

POSSIBLE COMPLICATIONS

Serious medical complications are rare following liposuction though their frequency increases with the number of sites treated and the volume of fat aspirated.

- 1) Minor complications that resolve on their own or with little additional treatment include: small hematomas, seromas and minor contour irregularities.
- 2) More severe complications include: lidocaine toxicity, fluid overload, infection, skin perforations, major contour defects, skin necrosis, thermal injury, adverse anesthesia reaction, pulmonary embolus, and fat embolus.
- 3) Some severe complications may require additional surgery or hospitalization and in rare cases, result in death.

TRAINING AND QUALIFICATIONS

- 1) Physicians performing liposuction must be trained as surgeons. A surgeon's scope of practice is defined by one of the 10 surgical boards recognized by the American Board of Medical Specialties (ABMS).
- 2) Surgeons performing procedures outside of his/her area of training, defined by the surgeon's specialty, must obtain additional education, certification and experience. The ABMS surgeon must have liposuction and body contouring training as well as operate in his/her area of anatomic expertise. The physician who performs liposuction in any surgical setting must meet all of the following minimal formal training requirements:
 - a. Basic Education: M.D. or D.O.
 - b. Be qualified for examination or be certified by a surgical board recognized by the ABMS: **and**
 - i. Complete training in liposuction/body contouring during an accredited residency or fellowship; or
 - ii. Complete an eight-hour liposuction/body contouring training course approved for Category I CME credit with at least three hours of hands-on bio-skills cadaver training and a comprehensive instructional program on fluid replacement. Observation by a proctor with liposuction privileges for the first three clinical procedures is recommended.
 - c. Operate within his/her area of training and area of anatomic expertise, which is defined by his/her ABMS Surgical Specialty Board.
- 3) A physician should have the primary responsibility for providing and/or supervising anesthesia. All anesthesia should be ordered by a physician. Anesthetics may be administered by either a qualified physician, a CRNA under physician supervision, or by another qualified health care provider under the supervision of a qualified physician as required by law. The responsible physician must be physically present in the operating room throughout the conduct of the anesthetic.

FACILITY REQUIREMENTS

In addition to the training and qualifications of the physician performing the liposuction, the location where the surgical procedure is performed is very important. Plastic surgery, including liposuction, performed under anesthesia other than minor local anesthesia and/or minimal oral tranquilization, should be performed in a surgical facility that meets at least one of the following criteria:

- Accredited by a national or state-recognized accrediting agency/organization such as: American Association for Accreditation of Ambulatory Surgery Facilities (AAAASF); Accreditation Association for Ambulatory Health Care (AAAHC); American Osteopathic Association (AOS); or Joint Commission on Accreditation of Healthcare Organizations (JCAHO)
- Certified to participate in the Medicare program under Title XVIII
- Licensed by the state in which the facility is located

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Prepared by the ASPS Committee on Patient Safety