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## Discussion

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### Lipoaspiration and Its Complications: A Safe Operation

*Discussion by Rod J. Rohrich, M.D., and Jeffrey E. Janis, M.D.*

Dr. Cárdenas-Camarena reports his group's experience with 1047 cases of liposuction both alone and with concomitant procedures during an 8-year period between 1994 and 2001. His described technique involves a two-surgeon approach performed under epidural anesthesia using the tumescent technique (no lidocaine) and suction-assisted liposuction without ultrasound assistance. He describes a 21.7 percent minor complication rate (palpable and visible irregularities, seromas, hyperpigmentation, cutaneous slough, and local infection) and a 0.38 percent major complication rate (fat embolism syndrome, cutaneous necrosis, and "extended infection"). On the basis of these data, the author details suggestions on how to avoid potential complications, specifically mandatory 24-hour (at least) hospitalization, larger incisions for the cannulas, gentle tissue handling, careful fluid administration and autotransfusion (when required), the use of drains to avoid seromas, two surgeons to decrease operative time, the use of external ultrasound to decrease irregularities postoperatively, and postoperative lower extremity compression and ambulation to avoid deep venous thrombosis. He ultimately reinforces the concept that liposuction is, indeed, a safe procedure.

While we agree with the major tenet that liposuction is a safe procedure if performed by qualified individuals, there are several issues with the author's described technique that warrant closer review and discussion.

The reported range of lipoaspirate in the study was 500 to 22,200 cc, with a median of 6230 cc. By definition, this places most of the patients in the "large-volume liposuction" category, as the total amount of lipoaspirate is more than 5 liters. The tumescent technique of infiltration was used, although the specific ra-

tio of infiltrate to lipoaspirate was not stated; therefore, we do not know the actual amount of infiltrate administered to the patients or whether it was a standardized ratio across all patients. The author mentions, however, that the incidence of complications, specifically palpable or visible contour irregularities and seromas, *increased* with the use of the tumescent technique, which was used to "improve lipoaspiration." The seromas, in turn, necessitated the routine use of drains, with ascending drain infection mentioned as one of the minor complications. The routine use of drains (and therefore their potential morbidity) is avoidable in most patients. In our experience<sup>1,2</sup> and that of other plastic surgeons,<sup>3-7</sup> the tumescent technique can have a higher incidence of potential complications relative to the superwet technique, including fluid overload, congestive heart failure, and seromas, while offering no distinct advantage in ultimate aesthetic contour or blood loss. The amount of wetting solution infiltrated using the tumescent technique is substantial, especially in large-volume liposuction. Although this study indicates no problems with fluid overload, the potential for untoward complications in this patient population must be indicated to the reader. Furthermore, while the author does not use lidocaine in his wetting solution and thereby avoids the issue of potential lidocaine toxicity, he does not fully substantiate his rationalization for the use of the tumescent technique. In an article attempting to validate the safety of liposuction, Dr. Cárdenas-Camarena's data support a potential *increase* in complications with the tumescent technique.

A second essential point that cannot be overemphasized is that there is no substitute for proper patient selection. Given the available description in this article, it is uncertain

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whether several of the patients were, indeed, good candidates for the volume of liposuction performed. The author states, "... the irregular cutaneous retraction, especially in patients who have large major flaccidity or in those who have had large volumes liposuctioned, is the most common cause of irregularities and should not be considered as a complication but as a concomitant consequence of the procedure in this type of patient." Patients with poor skin elasticity ("large major flaccidity") who undergo large-volume liposuction are destined to have a suboptimal outcome with a high incidence of irregularities, and thus they are questionable candidates for this procedure. Patients (especially for large-volume liposuction) should be classified as American Society of Anesthesiologists' class I and should be within 30 percent of their ideal body weight.<sup>1,2,8</sup> In this manner, potential complications, both local and systemic, can be avoided.

Cutaneous hyperpigmentation is usually a preventable complication that should be rare (more rare than almost 5 percent) if the proper technique is used. Gentle tissue handling is also essential to prevent some of the complications ("cutaneous compromise") mentioned by the author. We concur with the author that the incision sites for cannula access should be large enough to easily accommodate the caliber of the cannula used to minimize friction injury.

We also agree with the author that large-volume liposuction patients should be hospitalized at least overnight for monitoring and observation, with volume administration performed according to previously published formulas guided by urinary output and hemodynamic parameters.<sup>2</sup> Close communication with the anesthesiologist is imperative in managing these patients successfully. Patients should not be discharged if there is any question of volume depletion or if there is inability to tolerate liquids or solid food.

In all, we support the assertion that liposuction is a safe procedure in the right hands. Preoperative evaluation and proper patient selection are paramount to a successful outcome. In general, the patient who presents for liposuction must have a treatment plan outlined that incorporates not only the surgical procedure but also proper diet, exercise, and lifestyle changes. Excellent intraoperative technical execution is a necessity adhering to the

well-accepted principles of liposuction that have been described previously,<sup>9-12</sup> including selecting the proper caliber of cannula, choosing the correct plane, and adhering to the proper endpoints. Postoperative care is also essential with close monitoring of hemodynamics and fluid status. We encourage the routine use of compression garments, sequential compression devices, and early ambulation.<sup>10</sup> If these principles are adhered to, liposuction is a safe procedure, with an excellent satisfaction rate.

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