

Pulmonary Embolism after Liposuction Totally by Tumescant Local Anesthesia in a Patient with Large Uterine Fibroids

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Summary: A fatal pulmonary embolism occurred in a 43-year-old black woman after tumescant liposuction totally by local anesthesia. An autopsy revealed large uterine fibroids, peri-uterine vascular thrombi, and a large saddle pulmonary embolism. Large uterine fibroids are a risk factor for postsurgical venous thromboembolism. Fatal outcomes after tumescant liposuction totally by local anesthesia are exceedingly rare. (*Plast Reconstr Surg Glob Open* 2023; 11:e4876; doi: 10.1097/GOX.0000000000004876; Published online 13 March 2023.)

The risk of fatal postsurgical pulmonary embolism (PE) concerns all surgeons. Deep vein thrombosis (DVT) of the lower extremities is the most common cause of PE. Venous thromboembolism (VTE) associated with large uterine fibroids is increasingly recognized as a significant risk factor for PE.¹ Among liposuction-associated deaths, PE is the leading cause, with an incidence of 23%.² To the best of our knowledge, there are no published reports of fatal PE following liposuction totally by tumescant epinephrine lidocaine (TEL) local anesthesia. We report a unique case of fatal PE after Vaser (ultrasound)-assisted liposuction accomplished totally by TEL local anesthesia in a patient of African descent with large asymptomatic uterine fibroids. We discuss reports of liposuction-associated fatal PE and the antithrombotic effects of TEL.

CASE REPORT

A 43-year-old black woman was found unresponsive 36 hours after an uncomplicated office-based 120-minute TEL liposuction of the abdomen. Two weeks previously, she had an uneventful in-office 90 min liposuction of her back and flanks.

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The patient history included migraines, gastroesophageal reflux disease, allergic rhinitis, cesarean section, tubal ligation, and inguinal hernia repair. She denied using tobacco, illicit drugs, or birth control medications. There was no family or personal history of bleeding/clotting disorders or uterine fibroids.

The patient weighed 145 lbs (BMI 24.9). Preoperative medications included triazolam (0.25 mg PO) for anxiolysis. TEL infiltration was accompanied by inhalation of a 50%–50% admixture of nitrous oxide and oxygen. The volume of TEL for the second procedure was 4208 mL, and the volume of the aspirate was 3500 mL (1575 mL fat and 1925 mL TEL solution). TEL volume for the first procedure was 3738 mL, and the aspirate was 3000 mL (1250 mL fat, 1750 mL TEL solution). Elastic compression garments were applied to the treated areas after each surgery. Elastic compression stockings were not used. The postoperative course was uneventful. After each liposuction, the patient was ambulatory, returned home, and did not require opioids.

The patient was found unresponsive 36 hours after abdominal liposuction. An autopsy revealed a large, non-chronic saddle pulmonary embolus. The endometrial cavity was compressed by multiple subserosal and intramuscular leiomyomata measuring 1.4 to 7.0 cm. The peri-uterine vasculature contained two focal thrombi measuring up to 1.5 cm. Lower extremity veins were not examined because of constraints imposed by “donor tissue procurement.”

DISCUSSION

Uterine fibroids (leiomyomas, myomas, or fibromas) are benign neoplasms that arise from the abnormal proliferation of uterine smooth muscle cells and extracellular matrix. Most women with uterine fibroids are asymptomatic. These tumors occur in up to 70% of women by age 50.³ Uterine fibroids are more prevalent, tend to be larger,

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and are associated with more severe symptoms in women of African descent.⁴ Estrogen and progesterone influence the growth of uterine fibroids. The size of uterine fibroids varies widely. At certain sizes, subserosal fibroids can exert pressure resulting in pelvic discomfort.

Large uterine fibroids contribute to an increased prevalence of venous thromboembolism owing to extrinsic compression of the peri-uterine or pelvic veins and significant venous stasis.⁵ DVT most commonly occurs within the deep veins of the lower extremities; however, DVT can occur in other locations, including the pelvis. The patient in this report may have had other unknown risk factors. In some circumstances, allowing for more than 2 weeks between sequential liposuctions may be prudent.

At autopsy, multiple intramuscular and subserosal uterine fibroids (one at 7 cm) were found and determined by the medical examiner to have contributed to PE secondary to peri-uterine vascular thrombi formation. A lower extremity DVT cannot be ruled out without an examination of lower extremity veins at autopsy. The presence of two focal thrombi (measuring up to 1.5 cm) distending the right-sided peri-uterine vasculature implicates large, compressive uterine fibroids in the development of PE.

There has been an absence of fatal PE reported for liposuction under TEL. In two large surveys of liposuction complications, all PE were associated with general anesthesia (GA).^{2,6} Liposuction surgical complications are often multifactorial. Further investigation is warranted to delineate the discrepancy between the significant incidence of fatal PE for liposuction under GA and the novelty of fatal PE with liposuction under TEL.

Tumescent lidocaine and detumescence after TEL infiltration augment lidocaine bioavailability and anti-thrombotic effects of lidocaine. Lidocaine inhibits platelet activation as a function of lidocaine bioavailability [(concentration) × (volume) × (duration of tissue exposure)].⁷ The lidocaine concentration in a TEL solution (>600 mg/L) is always sufficient to achieve this effect. The duration of fat exposure to lidocaine and volume of TEL is insufficient when liposuction is initiated immediately after tumescent infiltration. Liposuction under GA may utilize reduced volumes of TEL and underutilize detumescence. With minimal volumes of TEL, liposuction under GA can begin immediately after infiltration without waiting for detumescence. Liposuction exclusively under true TEL utilizes higher volumes of TEL, higher lidocaine concentrations (mg/L), higher lidocaine dosages (mg/kg),

and a longer duration of detumescence.⁸ With liposuction totally by TEL, the liposuction is delayed for 1 to 2 hours to allow for sufficient detumescence and to increase local lidocaine bioavailability.

The lower extremity calf muscle pump is functionally eliminated with liposuction under GA. This may contribute to an increased risk of PE.⁹ Increased volumes and prolonged exposure to TEL may reduce this risk.

CONCLUSIONS

Liposuction surgeons and prospective patients should be aware that large uterine fibroids are a risk factor for postoperative PE and require further investigation. Liposuction-associated deaths under TEL local anesthesia are exceedingly rare.¹⁰

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