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Review Article

A Review of The Toxicity of Lidocaine in Liposuction

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ABSTRACT

One of the most common cosmetic surgical procedures, liposuction, requires careful consideration of anesthetics. Especially in office settings, tumescent liposuction is a commonly used method. The volume of wetting solutions injected into the subcutaneous fat determines the classification of this technique, as well as super wet, wet, and dry procedures. The tumescent technique is the most often used of these because it uses large amounts of diluted local anesthetic, usually lidocaine, to decrease bleeding and provide good anesthesia. Lidocaine doses using this approach can be as high as 35–55 mg/kg.[24] The volume of fluid removed further categorizes liposuction treatments as either low-volume (<4,000 ml) or high-volume (>4,000 ml). However, there is a chance of systemic toxicity from using large amounts of lidocaine, which can be fatal in cases of tumescent liposuction.

INTRODUCTION

Because people are more aware of cosmetic surgery, liposuction is becoming the most popular plastic surgery technique. The technique known as liposuction involves using a cannula and powerful suction to remove fat from deposits beneath the skin.[6] More than 341,000 liposuction treatments were performed in the United States in 2008. Because of the possibility of adverse outcomes, the anesthesiologist should be well-versed in the physiology of obesity and fluid control during liposuction. In India, the prevalence of this treatment is rising, however precise figures are not available.[12] By injecting a high volume of diluted local anesthetic (wetting solution) into the fat to increase anesthesia and reduce blood loss, the tumescent treatment is one of the most widely used liposuction techniques.[18] A substantial lidocaine injection (35–55 mg/kg) might be administered. High volume (>4000 ml) and low volume (<4000 ml) liposuctions are distinguished by the volume of solution sucked. Local anesthetic (lidocaine) can be used for all small volume liposuction procedures. [22]

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Liposuction Procedure

A hollow stainless-steel tube known as a cannula is used in the surgical Technique known as liposuction. It is introduced through a tiny opening in the skin. Next, the cannula is used to suction extra fat from the tummy, hips, thighs, and buttocks, among other parts of the body.[10]

Step:1 Anesthesia

During the surgical procedure, you will be given medications to help you feel comfortable.[9] Among the possibilities are general anesthesia and intravenous sedation.

Step:2 The Incision

Liposuction is accomplished by making a tiny, discrete incision. To start, diluted local anesthetic is administered to lessen trauma and bleeding.[17] After that, a thin hollow tube is placed via an incision and moved carefully back and forth to remove extra fat. After that, the extra fat is suctioned out using a syringe that is connected to the cannula. [1, 11]

Step:3 The Result

When the swelling and fluid retention that follow liposuction go away with sustained exercise, a nutritious diet, and the permanent maintenance of the lost extra fatty tissue, you will see an improvement in your body counter. But put on a lot of weight.

Risks Of Liposuction

As with any surgery, liposuction has risk. These risks include.

• **Contour irregularities:** Scarring, poor skin elasticity, and uneven fat removal might cause your skin to appear withered, wavy, or bumpy.

• **Fluid buildup:** Seromas, which are transient pockets of fluid, may develop beneath the skin and may require needle drainage.

• **Numbness:** The treated areas may experience either transient or permanent numbness. There is also numbness in the surrounding nerves.

• **Infection:** Skin infections are uncommon but can happen. A serious infection of the skin could be fatal.[26]

• **Internal puncture:** Seldom, if the little tube used for the procedure goes too far. An internal organ may be punctured. The organ may need to be repaired with emergency surgery.[8]

• **Fat embolism:** Fat fragments may separate and lodge themselves inside a blood artery. Then, they can go to the brain or collect in the lungs. Fat embolism is a serious health concern.[7]

• **Issues with the kidneys and heart:** Fluid shift occurs when a high volume of lipoplasty is done. Possible life-threatening renal, heart, and lung issues may result from this. [19,28]

Lidocaine: A Local Anesthesia

Synthetic amino ethyl amid, or lidocaine, is a common local anesthetic that is generally well tolerated and regarded as being far less toxic than other local anesthetics. 28 mg/kg of tumescent lidocaine without liposuction and 45 mg/kg with liposuction is the highest safe dosage. [25] Serum lidocaine concentrations at this dosage are below those linked to mild toxicity and pose no considerable risk of harm to the patient due to delayed systemic absorption. [2, 3,13]

LIDOCAINE TOXICITY

The following three circumstances work together to cause extremely high blood levels of lidocaine, which in turn causes lidocaine toxicity.

- The patient receives an excessive dosage of local anesthetic medication.
- An ordinarily safe dosage of tumescent lidocaine is absorbed into the bloodstream from the fat where it was injected far too quickly.
- Lidocaine and another medication the patient are taking may interact in an unexpected way.

Signs Of Lidocaine Toxicity

Mild Signs

The following modest symptoms of lidocaine poisoning may be linked to tumescent liposuction: ataxia, mild disorientation, lightheadedness, and memory impairment.

Severe Signs

The main, serious symptoms of lidocaine poisoning that could have a harmful effect and cause complications that could lead to death.[23] Among the warning signs are the following:

• Hypotension
• Bradycardia
• Seizure and unconsciousness
• Pulmonary embolism

Cardiac Arrest In Liposuction

There was an instance where a patient who had undergone liposuction in a doctor's office under lidocaine anesthetic arrived at the emergency room in cardiac arrest. Without any apparent intraoperative problems, the patient received a subcutaneous dose of lidocaine equivalent to 71 mg/kg during thigh liposuction utilizing the power assisted technique.[14] Dizziness, a sharp deterioration in mental status, a tonic-colonic seizure, and cardiac arrest occurred two hours later.

Mechanism Of the Lidocaine Toxicity

Every adverse event linked to tumescent lidocaine anesthesia that has been documented has been caused by a mistake made by the doctor, such as accidentally administering tumescent solution intravenously.[16] Ignorance of medication interactions that lower lidocaine metabolism by affecting cytochrome p450 1A2 and 3A4 and miscommunication result in too much lidocaine in the tumescent lidocaine solution.[15]

CONCLUSION

Lidocaine is also used in liposuction, but it is effective both for local anesthesia and intraoperative blood reduction.[20] It also poses a risk if not administered within safety margins of dosages. The toxicity of lidocaine may be due to excessive systemic absorption, accidental intravascular injection, or impaired metabolism due to drug interactions or liver disease. With the elevation of lidocaine levels beyond therapeutic levels within the blood, it can lead to serious cardiovascular complications in the form of hypotension, bradycardia, and suppression of myocardial automaticity. These can progress to life-threatening arrhythmia or cardiac arrest unless promptly recognized and managed. [27] These hazards are compounded when they are used with large doses, as is the case with the tumescent method of liposuction. [21, 29] Therefore, rigid adherence to dosing guidelines, an awareness of possible drug interactions, and rigorous observation of the patient are necessary to avoid harm. [4,5] Lastly, though lidocaine is an important variable in many liposuction surgeries, excessive or improper use of this drug can cause serious, avoidable complications, emphasizing the importance of cautious and responsible practice.

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