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Regional Anesthesia for Liposculpture: A Secure Option Review

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Review Article

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Abstract

Liposculpture is becoming more and more a common procedure, it is the second more frequent aesthetic procedure, therefore the anesthesiologist has had the necessity to make a comprehensive and dynamic approach to ensure the best result for the patient. Nowadays there are different anesthetic approaches for this kind of procedures, each of them has their advantages and disadvantages. Enhaced Recovery After Surgery Protocols (ERAS) used in all kinds of surgical procedures describe regional anesthesia as part of the multimodal approach for a faster patient recovery and this could be applicable for aesthetic surgery also. Therefore regional anesthesia should be taken in consideration as a possibility for the anesthetic approach in liposculpture.

Keywords: Regional anesthesia; Liposculpture; Aesthetic surgery

Abbreviations: ERAS: Enhaced Recovery After Surgery Protocols; ISAPS: International Society of Plastic and Aesthetic Surgery.

Introduction

Liposculpture is becoming a more common procedure, it ranks second in aesthetic procedures with 15.1% during 2020 globally, it is only below breast augmentation surgery with 16%, it is thought that the numbers are undervalued due to the low statistical recording of these kind of surgeries. According to the International Society of Plastic and Aesthetic Surgery (ISAPS) during 2018 there was an increase of 9% compared to the previous year in the performance of liposuction and abdominoplasty and ranked Mexico as the third country where more aesthetic procedures are performed. We know that the demand for this kind of surgeries increases every day and with it the universe of patients who wish to undergo cosmetic surgery, with women between 35 and 50 years of age being the group with the highest demand [1]. For this reason, the anesthesiologist has the need to carry out a comprehensive approach and management to ensure the best patient outcome.

In this review, the anesthetic techniques used during liposuction will be detailed in a general way, with special emphasis on regional anesthesia and its description as a safe technique for use in liposuction as cosmetic surgery.

There are multiple techniques used in liposuction, including infiltrative, intravenous, inhalation anesthesia and regional anesthesia.

The protocols for accelerated recovery after surgery (ERAS) [1] used in the different branches of surgery, describe, among other things, the use of regional anesthesia as a

strategy for prompt recovery, strategies that could be useful in the field of cosmetic surgery [1,2].

Historical Background

The first documented case of liposuction was performed during a uterine curettage by Dr. Charles Dujarrier in 1921, the surgeon removed fat from the patient's thighs using a hollow cannula and accidentally injured the femoral artery, since he did it with a cutting cannula, this injury caused limb loss, it was not until the 1970s, 50 years later, that a French dermatologist popularized modern liposuction using a hollow, blunt-tipped cannula combined with a suction mechanism [1].

Due to its complexity and lack of knowledge of this technique, it was not incorporated into plastic surgery programs until 1980, when the American Society of Liposuction was founded and with it the beginning of a process of improving the procedure with a safer method.

This led to the development of Klein's solution in 1988, a new formula that allowed the surgeon to infiltrate large amounts of local anesthetic of approximately 35mg/kg with small doses of epinephrine without the need for sedation. The argument for the use of this type of solution lies in the decrease in blood loss because of the addition of epinephrine and better pain control due to the amount of lidocaine infused.

Before the appearance of the tumescent technique, blood loss was the main risk factor for patient safety. An article from 1992 described 108 cases of large-volume liposuction without the tumescent technique, where 25% of the aspirated volume was blood and 100% of patients undergoing surgery required transfusion of blood products secondary to hypovolemia [1].

For all these reasons, the tumescent technique with its different variations is currently preferred for infiltration of the patient, talking about the anesthetic techniques for performing these procedures painlessly and with the best possible safety margin, several options are proposed [2].

Pre-Anesthetic Assessment

The correct pre-anesthetic assessment of the patient is of utmost importance, the success of the procedure will depend on it. It is necessary to carry out a comprehensive clinical approach to know the current state of health of the patient from previous pathologies, cardiovascular health, nutritional status, ventilatory mechanics, etc., to achieve adequate decision-making of the correct technique for the patient.

According to ISAPS data, we know that the age group of 35 to 50 years is the one that most requests this type of surgery, and within the 10 leading causes of morbidity in Mexico are: diabetes mellitus, hypertension, tumors and cardiovascular diseases in female patients according to statistical records during 2020, so we have to carry out an adequate clinical scrutiny that allows us to identify previous pathologies, both diagnosed and newly discovered, as well as their control and evolution to have the best result of the surgical procedure and the fewest number of complications or adverse events [2].

It is important to recognize the elective nature of this class of procedures since, strictly speaking, they are procedures that are not necessary for the function or life of the patient, but rather are performed to improve aesthetics solely according to the patient's self-perception, which is why it is expected of these procedures to have an optimal result and without complications, a situation that cannot be guaranteed in any kind of procedure, however, it is possible to reduce the possible risk factors with an adequate evaluation, a previous preparation that takes into account the findings found in this evaluation, an adequate surgical planning that considers risks and benefits of the patient individually, a performance that minimizes transoperative risks and finally an adequate follow-up after surgery [2,3].

Anesthetic Techniques in Liposuction

Currently, different anesthetic techniques are used for this type of procedure, each one has its advantages and disadvantages [4]. The patient's comorbidities and the individual characteristics of each of them are an important guideline for decision-making regarding the technique to be used, as well as a predictor of morbidity and mortality. It is also important to consider the physical space where the procedure will be performed, the surgical preferences of the surgeon and the skills of the anesthesiologist, as well as the comfort of the patient and their disposition with the anesthetic-surgical plan [3].

Local Technique and Sedation

In this technique, local anesthetic and vasoconstrictor drugs are infiltrated, which reduces bleeding and increases the quality of intraoperative analgesia. It is recommended to warm intravenous solutions to prevent hypothermia [5]. In some cases, this technique implies lower costs and reduces recovery time. However, has several disadvantages: infiltration can result in a partial blockage of pain, being extremely annoying for the patient, hypovolemia can occur, since the lack of trained personnel to monitor the patient's hemodynamics, the losses presented may not be replaced

or the other extreme an excess of fluids that can lead to overload or edema, vagal reactions, intoxication by local anesthetics, etc. We must consider the administered doses of local anesthetics, above 35 to 55 mg/kg of lidocaine during infiltration can lead to toxicity [2,3].

If performed, it is important to closely monitor the patient and choose a safe environment, considering a nearby oxygen source as well as an intravenous line to administer drugs if fluid therapy is required, also it is important to have drugs on hand that may be needed during performing the procedure either way.

General Anesthesia

It is a good option for any surgical procedure if the patient's characteristics allow it, in addition to providing adequate ventilation and hemodynamic control, it is a suitable option for long-term liposuction, or those associated with other surgical procedures. It has the disadvantage of raising costs as well as those inherent to general anesthesia, related to hemodynamics, thermoregulation, cerebral and renal perfusion, increased risk of thrombosis secondary to venous stasis, and loss of ventilatory mechanics. Requires a space with very particular characteristics to provide patient safety [3,6].

Regional Anesthesia and Sedation

Regional anesthesia or neuraxial blocks for performing liposuction offer us an option that, under proper care, presents a safe anesthetic technique.

Epidural and spinal anesthesia are anesthetic techniques that block the transmission of painful stimuli from a surgical site to the brain at the level of the spinal cord. One of the main advantages of this technique is that the patient remains conscious and preserves his ventilatory function while allowing the surgical team to perform the relevant procedures [7].

It is well known that during the practice of neuraxial blockade, hemodynamic variables decrease due to the sympathetic blockade carried out, the magnitude of this will depend on the type and level of blockade, the drugs used, the concentration of the anesthetic and the volume administrated, currently there are drugs that behave with greater hemodynamic stability as is the case of Ropivacaine, presenting a possible option [8].

In the case of the level reached with the administration, it normally extends from two to six dermatomes above the sensory level, causing venous vasodilation, thus reducing peripheral resistance by 15 to 18% and only 10% of cardiac output in normotensive patients. These changes can be counteracted with the use of vasopressors and/or fluid therapy with adequate restoration of hemodynamic balance [5,8].

Regarding the ventilatory changes presented during regional anesthesia, they will depend directly on the level of the blockade; however, with levels of sympathetic blockade in T4, the patients preserve the tidal volume, although they present a decrease in the vital capacity, secondary to a reduction of expiratory reserve volume due to paralysis or decreased strength of the abdominal muscles involved in forced expiration, preserving phrenic function, thus the possibility of respiratory complications decreases significantly since physiological ventilatory mechanics are preserved.

In a study carried out by Cochrane, it is established that regional anesthesia is less related to comorbidities during the postoperative period, they make reference to the fact that when epidural or spinal anesthesia was used to replace general anesthesia, mortality during the first postoperative hours and at 30 days subsequent years, was reduced by approximately 29%. In addition, the risk of developing pneumonia was reduced in 55% of patients. Another study conducted by the University of Texas in which women between 29 and 40 years old underwent liposuction under general anesthesia, highlighted a significant increase in heart rate above 100 bpm in the first 8 hours after the procedure, a decrease in blood pressure 23% below its baseline value and temperature decrease 1°C every 1-2hrs of the procedure, recovering normothermia at the end of general anesthesia, with these data at hand we can think that regional anesthesia presents a smaller drop in hemodynamic variables, also has the most convenient thermoregulation and a protective factor against thrombosis in long-term surgeries since it eliminates stasis within the triad of hypercoagulability [6,7].

Fluid Therapy Management

Despite the infiltration techniques aimed to reducing blood loss, it must be acknowledged that liposculpture involves the loss of large volumes of fluid in two ways: the first is with the volume loss with fat and bleeding, as well as with the volume that it is trapped by edema in response to trauma and sequestered in an extravascular space that is slowly absorbed during its infiltration [9]. All these losses become a difficult task at first to estimate and then difficult to compensate or replace, previously it was calculated that 1% of the extracted volume extracted counted for blood loss, however it has been shown that it is an inaccurate calculation so current trends promote fluid replacement based on the patient's clinical data or the so-called goal-guided fluid therapy [1], it is important to take into account that the

infiltrated solutions will not be completely extracted, it is estimated that approximately 70% [2] is reabsorbed within the first 24 hours of the procedure, therefore, restrictive fluid management and adequate analysis and monitoring of clinical variables are recommended, which allow us to determine the adequate restitution of the patient's fluids and infer the patient's hemodynamic status dynamically [10].

Conclusions

According to the above, liposuction is a procedure that is performed very frequently and that since its introduction has been very popular, the anesthesiologist as well as the rest of the surgical team must adapt and make use of the knowledge available to ensure the best result for patients, according to the characteristics of each one of them, we can realize that there is a wide range of situations that will influence the decision-making regarding the anesthetic technique.

Regional anesthesia in the hands of a trained anesthesiologist results in a viable and safe option for patients who, due to their clinical characteristics, allow its use and therefore should be considered within the range of possibilities to manage these procedures [4,11].

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