Anesthesia Options in Endoscopic Forehead Lifting

85

Andrew S. Eiseman

The decision to use general anesthesia or local anesthesia with monitored anesthesia care is usually left up to the patient. The procedure can be completed quite comfortably with intravenous sedation. However, if the endoscopic forehead elevation surgery is to be combined with other procedures, general anesthesia may be a better choice simply because of the length of time the patient will have to remain still if awake. Even if general anesthesia is chosen, local anesthesia is infiltrated under the forehead region to aid in hemostasis and to provide postoperative analgesia. There are two main options when administering the local anesthetic. The first option is local infiltration of the entire forehead region. The second option is a tumescent technique that places dilute anesthetic in the subperiosteal plane centrally and under the superficial temporal fascia laterally.

Local Infiltration

If local infiltration is to be used, the entire forehead flap should be anesthetized. A 25-gauge needle is used to block the supraorbital and supratrochlear nerves, the superior orbital rims, and the lateral orbital rims with either 1 % lidocaine or 0.5 % lidocaine with 1:200,000 epinephrine. Some surgeons use 0.5 % bupivacaine with 1:200,000 epinephrine to provide some postoperative analgesia as well. A slightly higher concentration of local anesthetic is used in these areas because they are typically the areas that cause the most discomfort for the patient during endoscopic dissection. The rest of the forehead flap and the scalp incisions are then anesthetized with 0.25 % lidocaine with 1:400,000 epinephrine (Kopelman 1996). One slight alteration to the above technique is to create a "vasoconstrictive" tourniquet by infiltrating 1 % lidocaine with 1:200,000 epinephrine along the zygomatic arches and along the coronal line (Kopelman 1996) Then, 0.25 % lidocaine with 1:200,000 epinephrine is infiltrated beneath the forehead and temporal scalp (Kopelman 1996). Finally, some bupivacaine 0.5 % with 1:200,000 epinephrine can be infiltrated along the superior orbital rims (Kopelman 1996). Fifteen to 20 min is then allowed to pass before dissection ensues to allow time for the epinephrine to take effect.

Tumescent Technique

The tumescent technique of infiltrating anesthetic for endoscopic forehead surgery has the benefit of not needing to repeatedly penetrate the scalp with a 25-gauge needle. Additionally, it can facilitate dissection by establishing the

A.S. Eiseman, MD
Department of Ophthalmology,
Medical University of South Carolina,
Storm Eye Institute, Charleston, SC, USA
e-mail: Eiseman@musc.edu

M.E. Hartstein et al. (eds.), *Pearls and Pitfalls in Cosmetic Oculoplastic Surgery*,
DOI 10.1007/978-1-4939-1544-6_85, © Springer Science+Business Media New York 2015

correct plane. To perform the tumescent technique, a dilute solution of local anesthetic is mixed by adding 50 ml of 2 % lidocaine with 1:100,000 epinephrine to a liter of normal saline. This creates a mixture of local anesthetic with 0.1 % lidocaine (1 mg/cc) and 1:2,000,000 epinephrine (0.5 μg/cc). Before this mixture is utilized, the superior orbital rims, the lateral orbital rims, and the supraorbital and supratrochlear nerves are anesthetized with either 1 % lidocaine with 1:200,000 epinephrine or 0.5 % bupivacaine with 1:200,000 epinephrine. A small amount of this solution is also infiltrated around the central scalp incision and the two temporal incisions. A liposuction straight punch (Pocar, Tulip Medical) is used to create an opening in the central scalp incision through periosteum. A 3.0-mm spatulated liposuction cannula is then placed on a Toomey syringe filled with 40 cc of the dilute mixture. The cannula is placed in the subperiosteal plane, and approximately 120 cc of dilute local anesthetic is delivered to the central forehead region. Confirmation that the cannula is delivering the solution in the correct plane is achieved when a globular elevation of the area is noted. If the elevation appears to have multiple lobules, the plane is probably too shallow. A similar technique is then utilized in both temporal regions. The straight punch is used to create openings along the temporal incision lines down to the level of the deep temporal fascia. A 2.5-mm standard liposuction cannula is then used to infiltrate approximately 20 cc in each temporal region. Attention is then addressed back to the central region where the local anesthetic solution that is in the subperiosteal plane is milked inferiorly by applying pressure with both thumbs and pushing inferiorly. When this is complete, 15–20 min is allowed to pass to allow time for the epinephrine to take effect.

An alternate tumescent technique can be utilized if liposuction cannulas are not available. A 22- or 23-gauge 3-in. spinal needle can be used to deliver the dilute anesthetic solution. Instead of using a syringe to inject the solution, the solution can be delivered by placing the bag of dilute anesthetic in the pressurized bag used by anesthesia to push fluids. The entire forehead, temporal area, and scalp can be tumesced with a continuous delivery device through several injection sites. Additional more concentrated anesthetic like 1 % lidocaine with 1:100,000 epinephrine is still given along the superior orbital rims. When using this alternative technique, remember that the spinal needle has a sharp end and care must be taken to prevent inadvertent damage or bleeding during the administration of the anesthetic.

Avoiding Anesthetic Toxicity

To avoid toxicity from either the local anesthetic or from the epinephrine in the solution, the surgeon must keep track of the total dose administered. The maximum dose of lidocaine that can safely be administered is 4.5 mg/kg which is approximately 300 mg for a 70-kg subject. If epinephrine is added to the lidocaine, 7 mg/kg can be safely used which is approximately 500 mg for a 70-kg subject (Physicians' Desk Reference 2000). A safe dose of epinephrine in the absence of an inhalational anesthetic is 3–5 μg/kg/h (Steinsapir et al. 1998). For a 70-kg subject, this would equate to 210–350 ml/h of a 1:1,000,000 solution of epinephrine that contains 1 μg/ml of epinephrine.

Local Infiltration Technique

If the local infiltration technique is used, the lidocaine component will become toxic before the epinephrine component for 1 and 2 % lidocaine with 1:200,000 epinephrine. For 0.5 and 0.25 % lidocaine with 1:200,000 epinephrine, the epinephrine component will become toxic before the lidocaine will. Table 85.1 gives the maximum safe doses for different concentrations of lidocaine with 1:200,000 epinephrine.

Table 85.1 Maximum safe doses of local anesthetics

Anesthetic solution	Maximum safe dose (cc)
2.0 % lidocaine with 1:200,000 epinephrine	25[a]
1.0 % lidocaine with 1:200,000 epinephrine	50[a]
0.5 % lidocaine with 1:200,000 epinephrine	70[b]
0.25 % lidocaine with 1:200,000 epinephrine	70[b]

[a]Dose limited by lidocaine toxicity
[b]Dose limited by epinephrine toxicity

Tumescent Technique

If the tumescent technique is used, the epinephrine becomes toxic before the lidocaine does if 1:1,000,000 epinephrine is used. Up to 350 cc/h of 0.1 % lidocaine with 1:1,000,000 epinephrine can be safely utilized. If 1:2,000,000 epinephrine is used, the lidocaine will become toxic before the epinephrine. Up to 500 cc/h of 0.1 % lidocaine with 1:2,000,000 epinephrine can be safely utilized. When the tumescent technique is used, the adjunctive local anesthetic that was injected into the superior orbital rims and along the supraorbital and supratrochlear nerves must also be added to the amount of tumescent solution used to prevent toxicity. Usually, 140–180 cc of tumescent solution is all that is needed to anesthetize the forehead region. This amount of tumesceut solution added to the amount of more concentrated local anesthetic given around the orbital rims and incisions falls well short of the maximum safe dose.

References

Kopelman JE. Endoscopic forehead and eyebrow elevation. American Academy of Ophthalmology 1996; Skills transfer course: 20.

Steinsapir KD, Shorr N, Hoenig J, Goldberg RA, Baylis HI, Morrow D. The endoscopic forehead lift. Ophthal Plast Reconstr Surg. 1998;14(2):107–18.

Xylocaine and xylocaine with epinephrine. In: Physicians' desk reference. 54th ed. Montvale: Medical Economics Company; 2000. p. 638.