

## Surgical Technique

# Use of Topical Ice for Local Anesthesia for Intravitreal Injections

Lucas B. Lindsell, OD, MD; Daniel M. Miller, MD, PhD; Jennifer L. Brown, BS

**Topical anesthetic allergy** is a rare but recognized entity for which incidence is difficult to calculate owing to the difference between a perceived and true allergic response. Allergic episodes attributed to topical anesthetics are typically adverse reactions, such as a vasovagal event, rather than the development of hypersensitivity.<sup>1</sup> However, several articles place the likely incidence of topical anesthetic allergy at less than 1% of the general population.<sup>1</sup>

The earliest description, to our knowledge, of a topical anesthetic allergy during ophthalmic use occurred in 1968 when an ophthalmologist developed a contact dermatitis on his thumb and forefinger caused by proparacaine hydrochloride although he had no sensitivity to tetracaine.<sup>2</sup> Documented cases of contact dermatitis caused by proparacaine and tetracaine have been reported in patients as well as ophthalmologists.<sup>3</sup> Unfortunately, there is little published about alternatives to topical anesthetics to achieve adequate analgesia during in-office examination or office-based surgical procedures. Here we describe the use of ice topical anesthesia for an intravitreal injection in a patient with a history of severe allergy to local anesthetics.

## Methods

### Report of a Case

The patient is woman in her 60s who had vision loss in the right eye. Her medical history was remarkable for presumed anaphylaxis or a severe anaphylactoid reaction to lidocaine. Since that episode, she has not received any local anesthetics and has undergone other minor procedures, including an episiotomy with suture repair and laceration repair. On presentation, her visual acuity was 20/200 OD and 20/20 OS. Ophthalmoscopy identified moderate drusen, retinal pigment epithelium atrophy, and a temporal perifoveal subretinal hemorrhage with pigment epithelium detachment and subfoveal fluid in the right eye. There was moderate drusen and retinal pigment epithelium atrophy in the left eye. Fluorescein angiography confirmed a diagnosis of neovascular age-related macular degeneration in the right eye and drusen without neovascularization in the left eye. Treatment options were discussed and treatment with intravitreal bevacizumab was planned.

The following technique was used to achieve adequate local anesthesia for this patient's intravitreal injection.

### Surgical Technique

Before the instillation of povidone-iodine, a sterile glove was filled with small ice cubes or ice chips to create an ice pack (Figure 1). The ice pack was then applied to the closed temporal aspect of the lower eyelid and held in place for 1 to 2 minutes or until the patient felt the eyelid was sufficiently numbed. Next, the patient was asked to look up and one of the glove fingers filled with ice was directly applied to the inferotemporal bulbar conjunctiva (Figure 2) and held in po-

Figure 1. Ice-Filled Sterile Glove



Sterile glove filled with crushed ice.

sition for approximately 2 minutes for anesthesia before the injection was given. A standard intravitreal injection was then performed.<sup>4</sup>

## Discussion

Topical anesthetic allergy is encountered uncommonly in clinical practice. Most allergic events are generally related to toxicity of the medication, vasovagal events, or a reaction and/or allergy to the preservative rather than a true allergy. When the clinician encounters a patient with a previous allergic response to topical anesthetics, there are some options to consider before abandoning their use altogether. The first question to ask is what specific anesthetic caused the allergic reaction. An allergy to lidocaine does not always translate to an allergy to proparacaine or tetracaine owing to differences in the chemical structure of the various anesthetics. Local anesthetics are separated into 2 primary classes, ester and amide anesthetics, based on their intermediate chain linkage. Cross-reactivity between the classes is exceedingly rare but not impossible, and case reports do exist.<sup>5</sup> Even within a particular class, such as the ester class, sensitivity to one agent does not imply sensitivity to other agents, though this possibility is certainly greater than cross-reactivity between classes.<sup>3,6</sup>

If the allergic response to the offending anesthetic is not anaphylaxis, then the practitioner may consider a trial of anesthetic from the opposite class. Alternatively, skin patch testing by an allergy specialist can also be performed to both confirm a true allergy to the original offending agent and/or to ensure safe use of an anesthetic

Figure 2. Ice Pack Held Against the Inferotemporal Bulbar Conjunctiva



Sterile glove held against anticipated injection site.

from the other class. Another consideration when encountering a topical anesthetic allergy is whether the actual allergy is to the anesthetic or the preservative. The ester-type anesthetics are metabolized to a para-aminobenzoic acid (PABA) metabolite, which is considered to have strong sensitizing ability.<sup>3,7</sup> In addition, the amide anesthetics are often preserved with methylparaben, which is also metabolized to PABA. Consequently, patients with a PABA allergy may manifest as sensitive to both classes of

anesthetic. When a PABA allergy is known, a preservative-free anesthetic, such as lidocaine hydrochloride gel, 3.5% (Akten), or a compounded preservative-free anesthetic would be the drug of choice for ophthalmic use.

There will be circumstances when the patient is truly allergic to local anesthetics or simply has a fear due to a previous severe adverse reaction. Either scenario creates a great deal of difficulty in performing a routine eye examination, let alone an ophthalmic procedure such as an intravitreal injection. Ice may be an effective alternative, and has long been recognized for its anesthetic properties.<sup>8,9</sup> Dermatologists, for instance, use ice for injections such as lip fillers with success.<sup>8</sup>

Analgesia via ice appears multifactorial, with the chief effect coming from slowed or reduced nerve conduction due to cooling.<sup>10</sup> Ice also causes localized vasoconstriction, which may interfere with the release of local pain substances and may potentiate the release of endorphins, which, collectively, results in analgesia.<sup>8</sup> Ice typically achieves anesthesia quickly and is sustained for at least 5 to 10 minutes, with articles describing sufficient pain control for up to 15 minutes.<sup>10</sup> This period of time provides more than enough opportunity to adequately perform the steps for intravitreal injection. This form of anesthesia has been used for our patient in 3 injections. Although this is a single case and we cannot assess formally the pain tolerance of this patient, our patient described minimal to no discomfort with this technique. We believe this is a simple and inexpensive alternative in the rare situation in which a patient has an allergy to or fear of topical anesthetics.

#### ARTICLE INFORMATION

**Author Affiliations:** Department of Ophthalmology, University of Cincinnati, Cincinnati, Ohio (Lindsell, Miller); Cincinnati Eye Institute, Cincinnati, Ohio (Miller, Brown).

**Corresponding Author:** Daniel M. Miller, MD, PhD, Cincinnati Eye Institute, 1945 CEI Dr, Cincinnati, OH 45242 (dmiller@cincinnatieye.com).

**Submitted for Publication:** June 2, 2013; final revision received January 17, 2014; accepted January 17, 2014.

**Published Online:** June 19, 2014.  
doi:10.1001/jamaophthalmol.2014.1397.

**Author Contributions:** Drs Miller and Brown had full access to all the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis.

**Study concept and design:** All authors.

**Acquisition, analysis, or interpretation of data:** Miller, Brown.

**Drafting of the manuscript:** All authors.

**Critical revision of the manuscript for important**

**intellectual content:** Lindsell, Miller.

**Administrative, technical, or material support:**

All authors.

**Study supervision:** Miller.

**Conflict of Interest Disclosures:** None reported.

#### REFERENCES

1. Amsler E, Flahault A, Mathelier-Fusade P, Aractingi S. Evaluation of re-challenge in patients with suspected lidocaine allergy. *Dermatology*. 2004;208(2):109-111.
2. March C, Greenwood MA. Allergic contact dermatitis to proparacaine. *Arch Ophthalmol*. 1968;79(2):159-160.
3. Dannaker CJ, Maibach HI, Austin E. Allergic contact dermatitis to proparacaine with subsequent cross-sensitization to tetracaine from ophthalmic preparations. *Am J Contact Dermat*. 2001;12(3):177-179.
4. Fagan XJ, Al-Qureshi S. Intravitreal injections: a review of the evidence for best practice. *Clin Experiment Ophthalmol*. 2013;41(5):500-507.
5. Johnson WT, DeStigter T. Hypersensitivity to procaine, tetracaine, mepivacaine, and methylparaben: report of a case. *J Am Dent Assoc*. 1983;106(1):53-56.
6. Amado A, Sood A, Taylor JS. Contact allergy to lidocaine: a report of sixteen cases. *Dermatitis*. 2007;18(4):215-220.
7. Eggleston ST, Lush LW. Understanding allergic reactions to local anesthetics. *Ann Pharmacother*. 1996;30(7-8):851-857.
8. Smith KC. Ice anesthesia for injection of dermal fillers. *Dermatol Surg*. 2010;36(suppl s1):812-814. doi:10.1111/j.1524-4725.2010.01549.x.
9. Sarifakioglu N, Sarifakioglu E. Evaluating the effects of ice application on the pain felt during botulinum toxin type-a injections: a prospective, randomized, single-blind controlled trial. *Ann Plast Surg*. 2004;53(6):543-546.
10. Ernst E, Fialka V. Ice freezes pain? a review of the clinical effectiveness of analgesic cold therapy. *J Pain Symptom Manage*. 1994;9(1):56-59.