

OPTIMAL INJECTION TECHNIQUES FOR BEST DEXAMETHASONE INSTILLATION RESULTS

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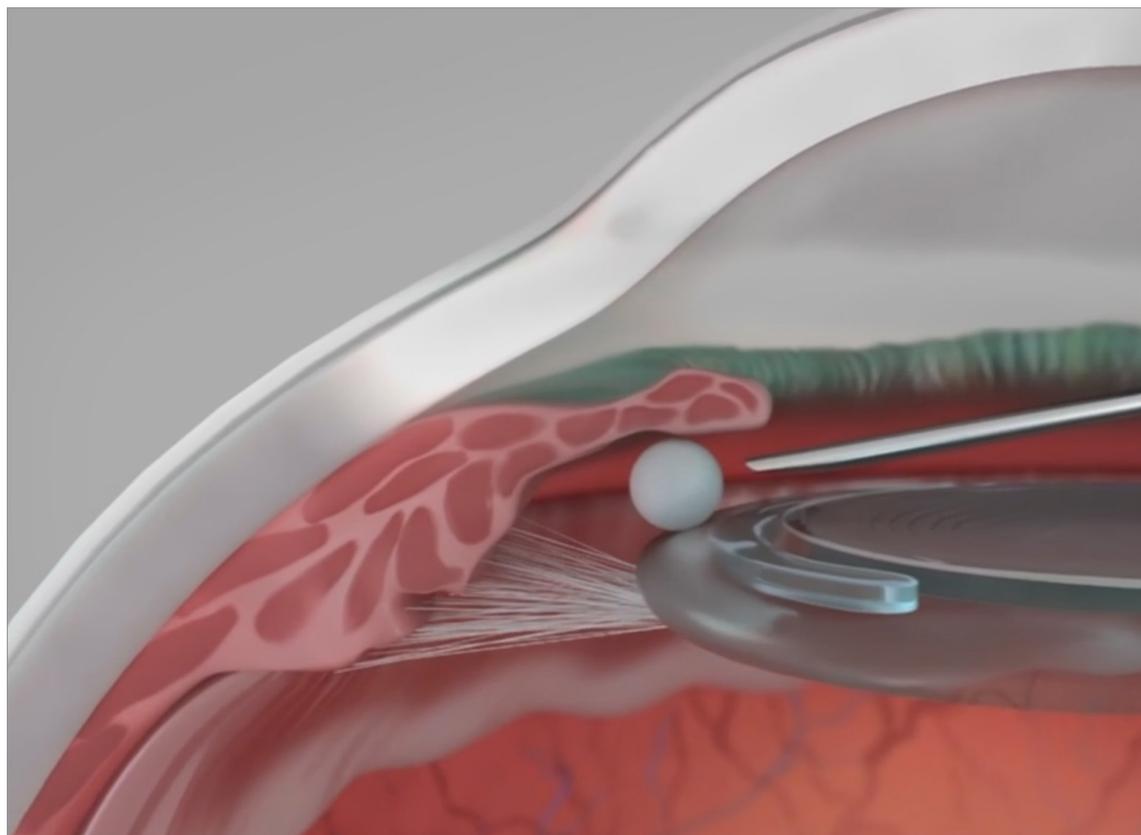


Control of inflammation after cataract surgery – the rationale for intracameral corticosteroids

Following cataract surgery, patients and caregivers are tasked with managing a complex postoperative regimen of eyedrops, including non-steroidal anti-inflammatory drugs (NSAIDs), antibiotics and corticosteroids. However, this patient group is often elderly, with co-existing medical issues and a high drug burden. Consequently, lack of adherence to post-surgical medication protocols is a significant problem.¹ Even in those patients and caregivers who are trying to be compliant with the prescribed therapy, mistakes are often made in terms of medication frequency, dosage and application technique. Contamination may occur as a result of patients touching the bottle tip to their eyelids or to the surface of their eye, in addition to irritating the ocular surface with topical medications.² In the context of the COVID-19 pandemic, the issues of dexterity and compliance are now being overshadowed by safety, with the knowledge that patients should avoid touching their face or having a family member, nurse or caregiver apply medication several times a day for a month. The use of eyedrops places the cataract surgery patient, who is generally elderly, at increased risk of being exposed to COVID-19 – converting a visual rehabilitation procedure into a risky contributor to the current epidemic.

Intracameral corticosteroids provide a steady, self-tapering delivery of non-preserved medication, rather than the peaks and troughs of topical application.³ Replacing postoperative steroid drops with a sustained-release intracameral corticosteroid administered at the end of surgery has the potential to provide the surgeon with greater control over the patient's care and eliminate the need for patient compliance with a complex eyedrop regimen.^{3,4} As a result, recovery from cataract surgery may be more successful and, in today's environment, safer.

Figure 1. Placement of dexamethasone intraocular suspension behind the iris in the inferior portion of the posterior chamber. Image courtesy of EyePoint Pharmaceuticals



Introduction to dexamethasone intraocular suspension

Dexamethasone intraocular suspension (Dexycu[®]; Icon Bioscience, Inc., Watertown, MA, USA) 9% is a corticosteroid indicated for the treatment of postoperative inflammation following cataract surgery.⁵ It is designed to be administered as a single dose, intraocularly in the posterior chamber at the end of surgery. The dose is 0.005 ml of dexamethasone 9% (equivalent to 517 μg).⁵

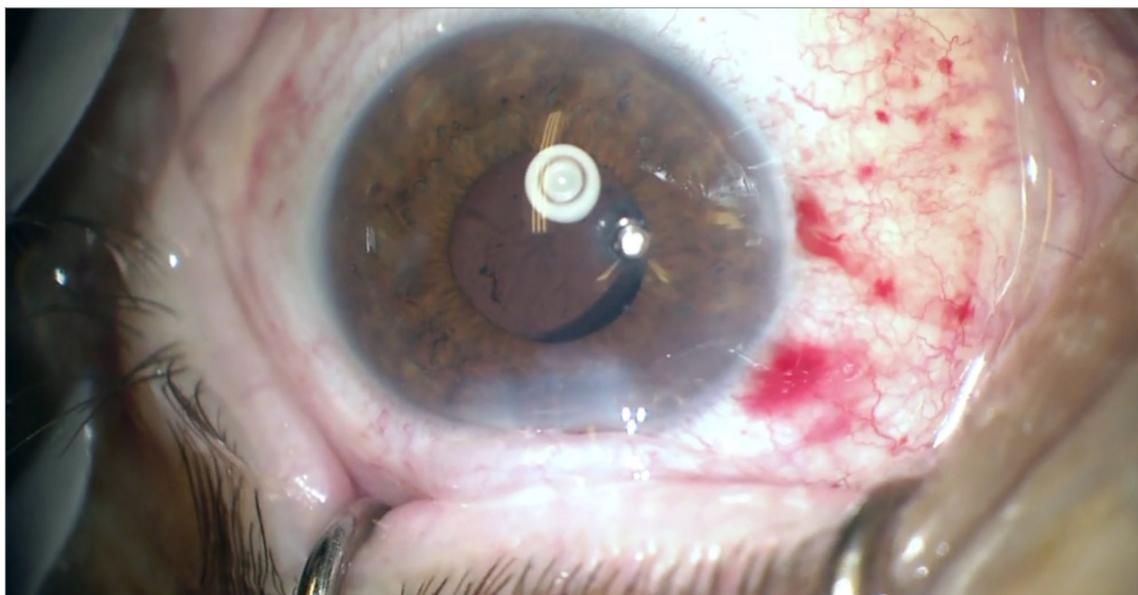
Dexamethasone intraocular suspension is provided in a kit along with a sterile 1 ml syringe, 18-gauge needle and 25-gauge cannula. A sterile syringe guide and syringe ring are also included to ensure that the correct medication volume is delivered at the conclusion of surgery.⁵ According to the product information insert, the vial of dexamethasone should be shaken vigorously for at least 30 seconds and then used immediately. The 18-gauge needle is used to draw the dexamethasone into the syringe, then the needle is replaced with the cannula provided for instillation of the drug in a single motion behind the iris in the inferior portion of the posterior chamber (see **Figure 1**).⁵

Clinical evidence for dexamethasone intraocular suspension

The clinical efficacy of dexamethasone was first evaluated in a prospective, randomized, double-masked, placebo-controlled trial in patients undergoing cataract surgery who received either dexamethasone intraocular suspension (342 μg , n=158; 517 μg , n=156) or placebo (a vehicle administered by a physician at the end of the surgical procedure; n=80).^{3,4} The primary endpoint was the proportion of patients with complete anterior chamber cell clearing (cell score=0) on postoperative day 8.⁴

The study results showed that anterior chamber cell clearing on postoperative day 8 was achieved in 25.0% of eyes in the placebo group and in 63.1% and 66.0% of eyes in the 342 μg and 517 μg treatment groups, respectively ($p < 0.001$).⁶ Adverse events were similar between all groups, and no serious ocular adverse events were reported up to day 90.⁶

Figure 2. Dexamethasone intraocular suspension in the anterior chamber. Image courtesy of Eric Donnenfeld



A second prospective, randomized, double-masked controlled clinical trial evaluated dexamethasone intraocular suspension versus topical prednisolone acetate 1%, reporting no significant difference in the control of inflammation between the two groups.⁷

insights for successful use of dexamethasone intraocular suspension

Patient selection

Dexamethasone intraocular suspension is suitable for use in a wide range of patients. It can be used in routine cases as well as challenging cases involving uveitis, diabetes and complex cataract surgery. It may be particularly beneficial in eyes that are already inflamed prior to surgery. It is not limited to cataract surgery; it is also indicated for other intraocular ophthalmic procedures.

Managing patient expectations

It is important to educate patients and caregivers about what to expect following treatment with dexamethasone intraocular suspension, to avoid unnecessary concern. Following instillation, dexamethasone intraocular suspension has the potential to migrate in front of the iris and become visible to the patient or their caregiver. Assure patients that if they see a 'small white ball' in their eye after surgery, it is their dexamethasone intraocular suspension medication, which will resorb over a few weeks as the drug biodegrades (see **Figure 2**).

Preparing for instillation of dexamethasone intraocular suspension

Optimise the choreography of the surgical team prior to instillation: while the surgeon is implanting the intraocular lens and irrigating the viscoelastic, the circulating nurse should be shaking the vial (for a full minute to ensure thorough mixing) and the scrub technician should then draw the product into the syringe to avoid any delays when the surgeon is ready to deliver the dexamethasone into the eye.

Advise the scrub nurse to wipe the tip of the cannula with a sterile, non-fibrous instrument wipe, as the product has a high surface tension and may form an adherent droplet at the cannula tip. This may lead to the delivery of too high a dose if not removed. In passing the syringe to the surgeon, take care not to draw air into the tip of the cannula; air bubbles in dexamethasone intraocular suspension make it difficult to release the droplet from the tip of the cannula after instillation.

Instillation of dexamethasone intraocular suspension

Instillation should be the last step in surgery, with no other intraocular treatment to follow it. The lens should be centred, the main incision well hydrated and the globe adequately pressurised. After delivering the dexamethasone intraocular suspension into the sulcus, make sure the incision is properly sealed to avoid a wound leak, which will cause the intracameral corticosteroid to be drawn out from behind the iris.

To instil dexamethasone intraocular suspension, place the tip of the cannula under the iris in the posterior chamber. Note that instilling the dexamethasone through the side port rather than through the main surgical incision can reduce the risk of it escaping through the opening. Either a 27-gauge cannula or the 25-gauge cannula included in the kit may be used for the delivery. Dexamethasone intraocular suspension can also be injected into the capsular bag. This is typically accomplished by crossing over the implant optic and directing the cannula toward the capsular equator.

One useful technique to successfully deposit the dexamethasone intraocular suspension is to sweep the cannula tip around parallel to the limbus in the direction of the incision. Once the tip is in motion, begin instilling the dexamethasone by depressing the syringe plunger, like laying a strip of toothpaste onto a toothbrush. Another delivery technique is to place the cannula tip under the iris, inject the drug, then quickly snap the cannula out through the side port incision. In either case, stop injecting before withdrawing the cannula from the incision.

Following instillation

When hydrating the incision after instillation, do so with a minimum of turbulence to avoid dislodging the spherule. At times, the dexamethasone intraocular suspension may become adherent to the intraocular lens, but this is not a problem as it will dissolve in time.

A possible concern with intracameral delivery is toxic anterior segment syndrome (TASS), a sterile postoperative inflammatory reaction; however, TASS has not been reported with dexamethasone intraocular suspension to date. A second potential concern is elevated intraocular pressure (IOP), but due to the self-tapering effects of dexamethasone intraocular suspension in both US Food and Drug Administration (FDA) trials, elevated IOP was not seen and there was no statistical difference between the dexamethasone and the control groups.^{6,7} Another potential adverse event is corneal oedema. If this occurs, it is localized and will resolve spontaneously. Again, in the FDA trial there was no significant difference in endothelial cell loss between the dexamethasone and the control groups.⁷

Conclusions

Instillation of dexamethasone intraocular suspension is a simple technique that can be learned by any surgeon with a little practice. While the goal is to deposit dexamethasone behind the iris, it does not matter if the product migrates into the anterior chamber. However, it is important to make the patient, the caregivers, and/or the co-managing optometrist aware in advance that this may happen and is no cause for concern.

Further information

The following resources may be useful to provide further guidance regarding optimal instillation of dexamethasone intraocular suspension.

- How to get started with Dexycu – EyePoint Pharmaceuticals. Available at: www.dexycu.com/how-to-get-started-with-dexycu-treatment
- New Dexycu Injection Technique for Cataract Surgery – Dr Eric Donnenfeld. Available at: www.youtube.com/watch?v=yiwwtVDAIOc
- Dexycu Injection Technique – Dr John Hovanesian. Available at: www.youtube.com/watch?v=nPSFInT_MQ
- Dexycu Injection Pearls – Dr John Hovanesian. Available at: www.youtube.com/watch?v=J46PdBT8IOg
- Tips for Dexycu injection – Dr John Hovanesian. Available at: www.aao.org/clinical-video/tips-dexycu-injection

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Disclosures: Cynthia Matossian has acted as consultant for: Aerie Pharmaceuticals, Alcon, Allergan, Bausch + Lomb, Bruder Healthcare, Checked-Up, Conclusn, Dompé, EyePoint, EyeVance, Glint Pharmaceuticals, Guardian Health Services, Imprimis Pharmaceuticals, Johnson & Johnson, Kala Pharmaceuticals, Lacriscience, Lenstec, Lumenis, Marco, MBackline, Novartis, NuSight Medical, Ocular Science, Olympic, Omeros, Osmotica Pharmaceuticals, Physician Recommended Nutriceuticals, Quidel, StepWise Medical, Sun Pharmaceuticals, TearLab, TearScience (J&J), TissueTech, Zeiss. Investor in: Checked-Up, Physician Recommended Nutriceuticals, Strathspey Crown, Veterinarian Recommended Solutions. Member of Speakers Bureau for: Alcon, Allergan, Bausch + Lomb, EyePoint, EyeVance, Guardian Health Services, Imprimis Pharmaceuticals, Johnson & Johnson, Kala Pharmaceuticals, Lacriscience, Lumenis, Novartis, NuSight Medical, Olympic, Omeros, Physician Recommended Nutriceuticals, Sun Pharmaceuticals, TearLab, TearScience (J&J), TissueTech, Zeiss. Has received research funding from: Dompé, Imprimis Pharmaceuticals, Johnson & Johnson, Novartis. Eric Donnenfeld has acted as consultant for: Allegro, Allergan, Alcon, Avedro, Avellino Labs, Bausch & Lomb, CorneaGen, Covalent, CRST, BVI, Blephex, Dompe, Elenza, ELT Sight, EyePoint Pharma, Foresight, Glaukos, Icon Biosciences, Johnson & Johnson, Kala, Katena Lacripen, LensGen, Mati Pharmaceuticals, MBackline, Merck, Mimetogen, Nanowafer, Novabay, Novartis, Novaliq, Ocular Innovations, Oculis, Odyssey, Omega Ophthalmics, Orasis, Oyster Point Therapeutics, Pfizer, Pogotec, Ocuhub, Omeros, PRN, RegenerEyes, ReTear, RPS, Shire, Strathspey Crown, SUN, Surface, Tearlab, Thea, TLC Laser Centers, Veracity, Versant Ventures, Visionary Venture, Zeiss. John Hovanesian has acted as consultant for: Aerie, Alcon, Allergan, Azura Ophthalmics, Cord, LLC, Eyedetec, EyePoint, Glaukos, Guardian Health Sciences, Ingenoeye LLC, Ivantis, Johnson & Johnson Vision, Kala, Novaliq, Novartis, Ocular Therapeutix, Oculis, Omeros, Refocus Group, Research InSight LLC, SightLife, Sun Ophthalmics, Tearlab, Vindico Medical Education, Zeiss. Medical advisory board member for: Bausch & Lomb, BlephEx, Eyedetec, EyePoint, Glaukos, Guardian Health Sciences, Katena, Mbackline, Novartis, Ocular Therapeutix, Omeros, Sight Sciences, SightLife, Sun Ophthalmics, Zeiss. Has received research funding from: Alcon, Allergan, Bausch & Lomb, Cord, LLC, EyePoint, Glaukos, Ingenoeye LLC, Johnson & Johnson Vision, Katena, Novartis, Ocular Therapeutix, Omeros, Research InSight LLC, Sun Ophthalmics, Zeiss. Has equity interest in: Alcon, Alicia Surgery Center, Allegro Ophthalmics, Allergan, Cord, LLC, Equinox, Eyedetec, Guardian Health Sciences, Harvard Eye Associates, Ingenoeye LLC, Johnson & Johnson Vision, Mbackline, Novartis, Ocular Therapeutix, Research InSight LLC, RxSight, Sight Sciences, SightLife, Tear Clear. Karl Stonecipher has acted as consultant for: Advanced Eye Care, Alcon, Allergan, Bausch and Lomb, Espansione, EyeVance, EyePoint, Nidek, Pogotec, Presbia, Refocus, Shire; lecture fees from Advanced Eye Care, Alcon, Allergan, Bausch and Lomb, Espansione, EyeVance, EyePoint, Innovamed, J + J, Lombart, Nidek, Refocus, Shire; has conducted research for Alcon, Allergan, Espansione, Nidek, Presbia, Refocus; owner/equity shares in Alphaeon, Pogotec, Strathspey Crown.

Acknowledgments: Medical writing assistance was provided by Jennifer Green of Touch Medical Communications (TMC).

Support: This activity has been funded by an educational grant from EyePoint Pharmaceuticals, Inc. EyePoint Pharmaceuticals, Inc. provided financial support and had no input into the selection of the faculty and/or the detailed project scope. This activity is provided by Touch Medical Communications (TMC) for touchOPHTHALMOLOGY.

Published: November 2020

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