

CATARACT SURGERY: CHALLENGES IN THE WAKE OF THE COVID-19 PANDEMIC

Nathan Radcliffe, MD The Covid pandemic of 2020 has profoundly changed the practice of ophthalmology. The availability of vaccines has greatly decreased the risk for infection in a large proportion of individuals in the United States, with 45.4% of the population having been fully vaccinated as of June 23, 2021.¹ Although we are gradually approaching a new normal, more than 50% of the US population remain at risk for infection, and it is still unclear to what extent fully vaccinated individuals spread the COVID-19 infection. Reviewing the lessons we have learned to date about providing patient care during the pandemic will help ophthalmologists further adapt to a changed clinical and surgical landscape.

Clinical practice for cataract surgery has already been dramatically altered by the pandemic. Ophthalmologists are making decisions on a wide range of issues, including protocols for the use of personal protective equipment (PPE), COVID-19 testing of staff, expectations regarding social distancing, and scheduling templates to accommodate new clinical protocols.²

Although multiple vaccines are now available, a large percentage of the population (~55% as of June 24, 2021) have not been vaccinated.¹ As a result, it is unlikely that ophthalmology practices will function in a pre-pandemic fashion in 2021.^{3,4} The use of masks and the requirements for social distancing are expected to continue for quite some time.⁵

ISSUES ENCOUNTERED IN RESUMING PRACTICE

The Office/Clinic

As clinics and physicians' offices reopen, all efforts should be focused, first and foremost, on managing the safety of patients and clinical staff. Minimizing the use of waiting areas, reducing to the greatest extent possible the number of friends/family members who accompany patients, and enforcing the use of PPE for patients and staff all remain important.⁶

Patient Selection

It is essential for eye care professionals to understand the limitations of SARS-Cov-2 testing and the subsequent implications for patient management. The American

Academy of Ophthalmology (AAO) has reported that reverse transcriptase polymerase chain reaction (RT-PCR) tests can remain positive for as long as 35 days after the onset of COVID-19 symptoms and that it is unlikely for an individual to remain infectious for this extended period. Deciding on how to manage individuals who have recovered from infection is also compounded by the fact that it is unclear whether the presence of neutralizing antibodies following a natural infection confers sufficient protection against reinfection.⁷ It has been suggested that it is important to evaluate neutralizing antibody titers over time for both naturally infected and vaccinated individuals, in order to determine when they fall below a threshold associated with vulnerability to reinfection. This interval and the threshold have yet to be determined.⁸

Ophthalmologists and their staff are also faced with a challenge when trying to identify those patients who most need medical treatment. Some patients seeking to schedule appointments may not actually require immediate medical care and may be putting themselves and others in harm's way. Although the number of patients seen by ophthalmology practices has been dramatically reduced in recent months, the staff must still conduct screening procedures of prospective patients via telephone. Prior to entering an office or a clinic, patients should be triaged to the latest possible date and all appointments reserved for those who are really in need of immediate medical care. For example, a patient with rapidly progressing glaucoma might be prioritized over a candidate for cataract surgery who still has adequate vision.

Ophthalmology practices that manage patients with glaucoma and those in need of cataract surgery face an

additional significant challenge: Many of these patients are elderly and thus at an increased risk for adverse outcomes following SARS-Cov-2 infection.⁹ To address this challenge, ophthalmologists should consider scheduling follow-up visits at longer intervals and should try to conduct visits remotely whenever possible. Telemedicine and tele-ophthalmology, in particular, had been used sparingly prior to the COVID-19 pandemic but have gained traction of late.^{10,11} Recent findings from 2 studies—a retrospective chart review and a cross-sectional survey—have demonstrated that many patients are receptive to virtual office visits.¹¹

Performing Elective Surgeries

During the initial surge in COVID-19 cases, it was recommended that elective surgeries be postponed in an attempt to "flatten the curve" and not overwhelm the health care system.^{12,13} In fact, visits and procedures for cataracts were reduced by 97% in March and April 2020 compared with the same period in 2019.¹⁴ Ophthalmologists have now returned to performing procedures, including cataract surgery, which is important for reducing the backlog of patients. The pandemic has already resulted in a large surgical backlog of patients who were supposed to receive interventions during the US lockdown, along with those who are waiting for health care systems to ramp up again.¹⁵

SEE INSIDE FOR:

Developing and Executing a Reopening Protocol in Response to COVID-19: Future Practice and Preparing for the Next Pandemic

Robert J. Weinstock, MD

TARGET AUDIENCE

This activity has been designed to meet the educational needs of cataract surgeons.

LEARNING OBJECTIVES

Upon completion of this activity, participants will be able to: **1. List** challenges in cataract patient management in the context of the COVID-19 pandemic. **2. Summarize** approaches to inflammation control after cataract surgery with the potential to simplify care and decrease risk for infection. **3. Explain** the benefits and risks of various dropless approaches to postop inflammatory control in cataract patients. **4. Describe** techniques for placing intracameral steroid injections in the eye. **5. Use** Create a surgical plan to implement dropless cataract surgery in practice.

COVID-19 FACULTY AND ADVISORS

Robert J. Weinstock, MD

Associate Clinical Professor Department of Ophthalmology, University of South Florida Tampa, Florida; Director of Cataract and Refractive Surgery, Eye Institute of West Florida, Largo FL

Nathan Radcliffe, MD

Associate Clinical Professor of Ophthalmology, The Mount Sinai Hospital; New York Eye and Ear Infirmary of Mount Sinai, New York, NY

Dr. Inder Paul Singh

Family practice physician in Lilburn, GA; President of The Eye Centers of Racine & Kenosha, Ltd.

Cataract Surgery: Challenges in the Wake of the COVID-19 Pandemic is jointly sponsored by Candeo Clinical/Science Communications, LLC, and the University of Florida College of

Medicine. This publication is administered by an independent editorial board and supported by an unrestricted educational grant from EyePoint Pharmaceuticals.

Copyright 2021 Candeo Clinical/Science Communications, LLC. All rights reserved. Neither the university of Florida nor Candeo Clinical/Science Communications, LLC, assumes any responsibility for injury or damage to persons or property arising from the use of information or ideas contained in this publication.

CME REVIEWER

Gibran Khurshid, MD

Associate Professor, Department of Ophthalmology University of Florida College of Medicine

Circumstances that delay planned surgeries are particularly important for patients who are scheduled to undergo combined cataract and minimally invasive glaucoma surgery, which has become common.¹⁶ Delays in such surgeries are quite problematic because of the progressive damage and visual field loss in patients with glaucoma that is not effectively controlled with medications, as well as in those who lost access to their medications during the pandemic.

Patients' conditions may be further complicated by referring physicians not yet having reopened their practices. For example, one patient was referred to our practice in March 2020 with high intraocular pressure but was not seen because the office was closed. Unfortunately, this patient was unaware of the urgency of his condition (and that treatment was available for him in an emergency setting). By the time our office reopened, he had lost some vision. During March and

April 2020, an 88% reduction in inpatient and outpatient encounters for glaucoma was reported compared with the same period last year.¹⁴ It is reasonable to assume that some of these individuals required urgent care during this time.

Managing Patient Concerns and Behavior

Despite the fact that a large percentage of the population has been vaccinated against SARS-Cov-2, addressing patients' fears surrounding COVID-19 remains critical. Even after vaccination, some people remain fearful of the infection. A survey conducted by the American Psychological Association revealed that 48% of respondents who had been vaccinated still felt uneasy about resuming normal in-person interactions.¹⁷ More educated patients may quite reasonably expect less crowding in the office/clinic and waiting areas,

shorter wait times, access to hand sanitizer and handwashing facilities, and consistent use of masks and face shields during medical examinations.²

It has been noted that preemptively identifying patient concerns about in-office visits, along with providing clear and concise information about the safeguards that are in place, can make patients feel more comfortable. These messages are particularly important for those whose age or comorbidities may place them in a higher-risk category.¹⁸ It is encouraging to note, though, that the vaccination rate in older individuals in the United States is very high. Information released by the American Association of Retired Persons (AARP) on June 1, 2021 indicated that 86% of individuals ≥ 65 years of age had received at least one dose of a COVID-19 vaccine.¹⁹

Cataract Surgery: Challenges in the Wake of the COVID-19 Pandemic

STATEMENT OF NEED

#1 Identified Need: Best practices for cataract surgery continue to change in response to the COVID-19 pandemic

Desired Result: Safe, effective surgical procedures that minimize risk of COVID-19 transmission

Learning Objective: List challenges in cataract patient management in the context of the COVID-19 pandemic

#2 Identified Need: Existing challenges related to perioperative cataract surgery drug regimens may be intensified by the COVID-19 pandemic

Desired Result: Evidence-based postoperative regimens that are simple for patients to adhere to

Learning Objective: Summarize approaches to inflammation control after cataract surgery with the potential to simplify care and decrease risk for infection

#3 Identified Need: Multiple options exist for providing post-cataract inflammation control and infection prophylaxis while minimizing the use of topical drops

Desired Result: Improved health outcomes (visual recovery, inflammation management) while minimizing risk and burden to patients

Learning Objective: Explain the benefits and risks of various dropless approaches to postinflammatory control in cataract patients

#4 Identified Need: Several techniques have been developed for delivering intraocular corticosteroid

Desired Result: Clarity and confidence on the part of surgeons in administering novel intraocular steroids for postoperative inflammation control

Learning Objective: Describe techniques for placing intracameral steroid injections in the eye

#5 Identified Need: Surgeons require recent evidence and insight for the selection of novel intraoperative drug regimens

Desired Result: Selection of treatment regimens that are effective, safe, and appropriate for each patient

Learning Objective: Create a surgical plan to implement dropless cataract surgery in practice

OFF-LABEL USE STATEMENT

This work may discuss off-label uses of medications.

GENERAL INFORMATION

This CME activity is sponsored by the University of Florida College of Medicine and is supported by an unrestricted educational grant from EyePoint.

The University of Florida College of Medicine designates this enduring material for a maximum of **1 AMA PRA Category 1 Credit™**. There is no fee to participate in

this activity. In order to receive CME credit, participants should read the report, and then take the posttest.

A score of 80% is required to qualify for CME credit. Estimated time to complete the activity is 60 minutes. On completion, take the test online at <https://cme.ufl.edu/online-cme/tadd/>

System requirements for this activity are:

For PC users: Windows® 2000, XP, 2003 Server, or Vista; Internet Explorer® 6.0 or newer, or Mozilla® Firefox® 2.0 or newer (JavaScript™ and Java™ enabled).
For Mac® users: Mac OS® X 10.4 (Tiger®) or newer; Safari™ 3.0 or newer, Mozilla® Firefox® 2.0 or newer; (JavaScript™ and Java™ enabled).

DATE OF ORIGINAL RELEASE

October 2021. Approved for a period of 12 months.

ACCREDITATION STATEMENT

This activity has been planned and implemented in accordance with the accreditation requirements and policies of the Accreditation Council for Continuing Medical Education (ACCME) through the joint providorship of the University of Florida College of Medicine and Candeo Clinical/Science Communications, LLC. The University of Florida College of Medicine is accredited by the ACCME to provide continuing medical education for physicians.

CREDIT DESIGNATION STATEMENT

The University of Florida College of Medicine designates this enduring material for a maximum of **1 AMA PRA Category 1 Credit™**. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

FACULTY AND DISCLOSURE STATEMENTS

Weinstock, Radcliffe, Singh, and Kurshid as seen below:

Activity Director: Robert J. Weinstock, MD
Cataract Specialist, The Eye Institute of West Florida

Robert J. Weinstock, MD, has a financial interest/relationship or affiliation in the form of: Consultant for Bausch + Lomb; Alcon Laboratories, Inc.; Omeros Corporation; LENSAR; Johnson & Johnson Vision Care; and EyePoint Pharmaceuticals. Speaker for Bausch + Lomb; and Omeros Corporation. Stock Shareholder for TrueVision, RxSight, Inc.; RPS; EyeSafe, Inc.; PogoTec, Inc.; uBeam (sonicEnergy); and TissueTech.

Chair: Nathan Radcliffe, MD
Glaucoma Specialist, New York Eye Surgery Center Bronx, NY

Nathan Radcliffe, MD, has a financial interest/relationship or affiliation in the form of: Consultant for Aerie Pharmaceuticals; Alcon Laboratories, Inc.; Alimera Sciences, Inc.; Allergan; Bausch + Lomb; Beaver-Visitec International, Inc.; Carl Zeiss Meditec; CATS; Ellex; ELT Sight; Equinox; EyePoint Pharmaceuticals; Glukos

Corporation; IRIDEX; Ivantis; Kala; Lumenis, Inc.; New World Medical Inc.; Novartis Pharma AG; Ocular Science; Ocular Therapeutix; Omeros Corporation; Quantel Medical; Reichert, Inc.; Santen, Inc.; Shire; Sight Sciences; Spyglass; THEA; and ViaLase. Speaker for Aerie Pharmaceuticals; Alcon Laboratories, Inc.; Alimera Sciences, Inc.; Allergan; Bausch + Lomb; Beaver-Visitec International, Inc.; Carl Zeiss Meditec; CATS; Ellex; ELT Sight; Equinox; Glukos Corporation; IRIDEX; Ivantis; Kala; Lumenis, Inc.; New World Medical Inc.; Novartis Pharma AG; Ocular Science; Ocular Therapeutix; Omeros Corporation; Quantel Medical; Reichert, Inc.; Santen, Inc.; Shire; Sight Sciences; Spyglass; THEA; and ViaLase.

Planning Committee Member: Inder Paul Singh, MD
President, The Eye Centers of Racine & Kenosha

Inder Paul Singh, MD, has a financial interest/relationship or affiliation in the form of: Consultant for Aerie Pharmaceuticals; Alcon Laboratories, Inc.; Allergan; Ellex; EyePoint Pharmaceuticals; New World Medical; Nova Med; Glaukos; Omeros Corporation; Novartis; Bausch + Lomb; Tracey Technologies; Zeiss; Sight Sciences; Ivantis; Ocular Therapeutix; Sun Ophthalmics; ACE vision; and Visus. Speaker for Aerie Pharmaceuticals; Alcon Laboratories, Inc.; Allergan; EyePoint Pharmaceuticals; New World Medical; Nova Med; Glaukos; Omeros Corporation; Novartis; Bausch + Lomb; Tracey Technologies; Zeiss; Sight Sciences; Ivantis; Ocular Therapeutix; Sun Ophthalmics; ACE vision; and Visus.

CME Content Reviewer: Gibran Khurshid, MD
Associate Professor, Department of Ophthalmology, University of Florida College of Medicine

Gibran Khurshid, MD, has no financial interests/relationships or affiliations in relation to this activity.

CME ADVISORY COMMITTEE DISCLOSURE

Conflict of interest information for the CME Advisory Committee members can be found on the following website: <https://cme.ufl.edu/disclosure/>. All relevant financial relationships have been mitigated.

DISCLAIMER

Participants have an implied responsibility to use the newly acquired information to enhance patient outcomes and professional development. The information presented in this activity is not meant to serve as a guideline for patient care. Procedures, medications, and other courses of diagnosis and treatment discussed or suggested in this activity should not be used by clinicians without evaluation of their patients' conditions and possible contraindications or dangers in use, applicable manufacturer's product information, and comparison with recommendations of other authorities.

COMMERCIAL SUPPORTERS

This activity is supported by an unrestricted educational grant from EyePoint.

It is important to note that the AAO continues to recommend that practices and clinics mandate social distancing in waiting rooms as well as the wearing of face coverings by both patients and caregivers.²⁰ Patients need continuing education about this requirement, particularly since masks may no longer be required in other settings and they may not understand the need to continue wearing a mask in health care settings.

Addressing Staff Issues

The COVID-19 pandemic has the potential to affect office/clinic staff in a number of different ways. For example, some staff may not want to return to work because they have added childcare responsibilities at home. Some staff who want to return to work may no longer have a job available to them because of the practice's lost revenue. Unfortunately, many practices are facing the possibility of bankruptcy or incurring tremendous debt, and staff reductions may be necessary for them to remain open.

The impact of the pandemic on ophthalmology practices is evident in a survey of AAO members in private practice (from April 9 to 13, 2020).²¹ Survey results indicated that 89% of practices are applying for payroll protection through the Coronavirus Aid, Relief and Economic Security (CARES) Act and other resources. In addition, a majority of respondents believed that without substantive federal grants and loans, their practices would be smaller, financially unhealthy, or both by the end of 2020: 47% will be smaller and financially unhealthy; 26% will return to pre-COVID-19 size and volume but will be financially unhealthy; 14% will be smaller but financially healthy; 6% will no longer practice ophthalmology; and 2% of practices will be sold.²¹

All office and clinic personnel require training for their own protection as well as that of their patients. For obvious reasons, staff must be aware of COVID-19 symptoms and procedures for personal protection, including wearing masks, cleaning equipment, and using face shields.²⁰ Health care professionals, like anyone else, can deny illness and ignore symptoms.

One might think that the need for attention to potential symptoms and personal protection would have diminished importance with the availability of vaccines, but this is not the case. Results from a Kaiser Family Foundation survey of 1327 health care workers that was conducted from February 11 to March 7, 2021 indicated that only 52% had received at least one dose of a COVID-19 vaccine.²² In addition, more than one-third of health care workers who had not received the vaccine indicated that they did not plan to be vaccinated.²²

Thus, a very important consideration for ophthalmology practices is the appropriate management of eye care professionals and staff who refuse to be vaccinated against SARS-CoV-2. The American Medical Association has taken an appropriately strong position with respect to this issue:²³

“Physicians and other health care workers who decline to be immunized with a safe and effective vaccine, without a compelling medical reason, can pose an unnecessary medical risk to vulnerable patients or colleague.”²³

“When there's a safe, effective vaccine to help prevent spread of a pandemic disease, physicians without a medical contraindication have an ethical duty to become immunized.”²³

“Physician practices and health care institutions have a further responsibility to limit patient and staff exposure to individuals who are not immunized, which may include requiring unimmunized individuals to refrain from direct patient contact.”²³

Practical strategies for addressing this issue include education and identifying champions for vaccination among the peers of individuals with vaccination hesitancy. Education should

debunk myths but also should acknowledge unknowns about vaccines (eg, long-term safety). The ethical responsibility of health care professionals to become vaccinated should also be emphasized.^{23,24}

SURGERY

Planning surgery is iterative, with a number of tasks leading up to and beyond the procedure itself. This includes the preoperative visit, the actual surgery, and the postoperative care and management. The AAO has also provided updated guidance with respect to these issues, which has remained largely unchanged from that published at the time when ophthalmology practices were just reopening.⁷

Patient Screening

A careful screening process is an essential part of all medical practices, including ophthalmology. Patients should have their temperature taken upon arrival for surgery and should fill out a questionnaire about their health status. Questions should include: Have you had a fever? Do you feel ill? Do you have a cough? This questionnaire can be modeled after other surveys used to identify patients with possible exposure to or symptoms of COVID-19.²⁵ Patients with symptoms or a history suggestive of COVID-19 should be referred for appropriate testing and notification should be sent to both infection control personnel at the health care facility and the relevant health departments.²⁵

It is also important to provide information about a patient's COVID-19 status to other practices to which he or she may be referred. All health care practitioners have the responsibility to protect their colleagues to the maximum extent possible. The challenge is that patients may not be aware of their own risk status. Guidance from the AAO states that in regions currently managing significant outbreaks of COVID-19, it is safest to assume that any patient could be infected and to proceed accordingly.²⁰

The SARS-CoV-2-positive Patient

Performing surgery in a SARS-CoV-2-positive patient is highly problematic and should be avoided if at all possible. Surgery in a patient with an active infection places everyone involved at risk and requires a tremendous amount of effort and resources to keep everyone involved safe during the procedure. The challenge is in delaying the surgery for as long as possible in infected patients, but not for so long that it might result in adverse clinical outcomes.²⁶

Guidance from the AAO suggests that SARS-CoV-2-positive patients should quarantine at home, as specified by the Centers for Disease Control and Prevention, state public health authorities, or institutional guidelines. Nonurgent treatment should be deferred until after quarantine and when a patient's symptoms have resolved.⁷ When surgery on an RT-PCR-positive patient is necessary because of the potential for permanent loss of vision or loss of life if delayed, the choice of anesthesia may be impacted by the patient's overall medical condition. The surgeon and operating room staff should wear N95 masks and eye protection and/or face shields.⁷ It may be appropriate for infected patients to be managed in a hospital or other setting that is equipped to provide both eye care and medical care to patients with COVID-19.

CATARACT SURGERY

The AAO has provided guidance on the use of surgical masks, eye protection, and face shields. Most importantly, every patient should be placed in a surgical mask during any ophthalmic procedure, in order to prevent asymptomatic transmission to the surgeon and the staff.⁷

Concern has been raised regarding the transmission of SARS-CoV-2 via contact with the ocular mucosa, tears, or subsequent fomites,²⁷ but it remains unknown whether infectious SARS-CoV-2 can be present in the anterior

chamber.⁷ Currently, little or no evidence exists to indicate that the eyes are a major reservoir of SARS-CoV-2 or a significant source of infection. Results from a recent study of 72 patients with laboratory-confirmed COVID-19 revealed that 2 individuals reported conjunctivitis, with 1 of them testing positive for SARS-CoV-2 via RT-PCR evaluation of a sample obtained with a conjunctival swab.²⁸

It seems likely that this concern developed as a result of observations that the SARS-CoV-2 virus uses the angiotensin-converting enzyme-2 (ACE2) receptors present on human cells to bind to them and are primed to do so by the serine protease TMPRSS2.²⁹ Although ACE2 receptors are present in both the lung and the conjunctiva, the priming protease is not present in the conjunctiva; thus, it should not be possible for the SARS-CoV-2 virus to bind to the ocular surface and to initiate infection.^{29,30} Furthermore, it seems unlikely that the use of phacoemulsification during cataract surgery will result in aerosolization of the virus, even if it is present.⁷

Available data strongly support the view that droplets, rather than aerosols, are the main source of infection and that wearing a high-quality surgical mask provides protection against infection via this route.³¹ All personnel should avoid touching their faces and should exercise hand hygiene by using an alcohol-based sanitizer product or handwashing with soap and water.³²

Postsurgical Management and Follow-up

Simplifying patient management following cataract surgery is important for minimizing the risk for infection. We cannot repeatedly bring elderly patients and those at high risk into the office/clinic for follow-up visits. The need exists to consider approaches to management that keep patients at home and safe.

Standard practice for prophylaxis against postoperative inflammation following cataract surgery has typically involved the application of perioperative eyedrops, such as those that contain corticosteroids.^{33,34} The issue of eyedrop contamination is of particular concern in the context of the COVID-19 pandemic and its aftermath given the possibility that transmission may occur via contact with the conjunctiva.^{28,35} Even before the pandemic began, though, the limitations associated with the use of postoperative eyedrops for protection against inflammation had prompted interest in dropless approaches, such as those in which long-acting corticosteroid and antibiotic injectable formulations are administered at the conclusion of cataract surgery.^{33,36}

The postsurgical regimen can be simplified with the elimination of eyedrops. Not only do patients often have to go to the pharmacy to obtain their eyedrop prescriptions, but they also then forget to use them.³⁵ Utilization of a slow-release intracameral corticosteroid eliminates the need for patients to use eyedrops after cataract surgery. Recently, the US Food and Drug Administration (FDA) approved DURYSTA™ (bimatoprost 10 mcg intracameral implant; Allergan Pharmaceuticals, Madison, NJ) for the treatment of glaucoma or ocular hypertension.^{37,38} Placement of this implant can allow patients with glaucoma to go 4 to 6 months without applying eyedrops or visiting the pharmacy, which has helped me keep my patients treated and at home during the pandemic.

One novel corticosteroid that has been used effectively in dropless cataract surgery is dexamethasone intraocular suspension 9% (DEXYCU®; EyePoint Pharmaceuticals, Watertown, MA), which is a sustained-release formulation designed to be administered via injection into the inferior portion of the posterior segment at the conclusion of ocular surgery—most often, cataract extraction and intraocular lens (IOL) implantation.³⁹ More recently, dexamethasone intraocular suspension has been successfully administered directly into the capsular bag adjacent to the IOL. Dexamethasone intraocular suspension has been shown to be safe and effective for treatment of the inflammation that

occurs following cataract surgery and may be an alternative to corticosteroid drop instillation in this patient population.^{40,41} It also has the potential to decrease the risk for infection that may be associated with the use of contaminated eyedrops as well as to reduce patient visits and associated complications, such as time spent in the waiting room and management of any individuals who may accompany patients to the clinic.

Other anti-inflammatory treatments that may circumvent the limitations of conventional topical anti-inflammatories have been recently approved by the FDA for use in patients undergoing cataract surgery. Two topical formulations of loteprednol etabonate are now available: loteprednol etabonate ophthalmic suspension 1% (INVELTYS™; Kala Pharmaceuticals, Waltham, MA),⁴² which offers improved bioavailability via proprietary mucus-penetrating particle technology,⁴³ and loteprednol etabonate ophthalmic gel 0.38% (LOTEMAX™ SM; Bausch + Lomb, Bridgewater, NJ),⁴⁴ which delivers a submicron particle size for faster drug dissolution in tears and greater penetration to the aqueous humor.⁴⁵ In addition, cataract surgeons now have the option of using the dexamethasone ophthalmic insert 0.4 mg (DEXTENZA™; Ocular Therapeutix, Bedford, MA)⁴⁶—a dexamethasone-eluting punctal plug that provides tapered drug delivery to the ocular surface over a 30-day period, after which it dissolves and clears via the nasolacrimal system.^{46,47}

CONCLUSIONS

We have all been living through the COVID-19 pandemic for more than 18 months, and it is becoming clear that we will be dealing with this virus for some time to come. Although there is bound to be frustration regarding the effects on our medical practices, we need to remember that our patients and colleagues are also dealing with a new normal that may be with us for several years. We may have to slow down in our practices, but we should appreciate what we are doing for our patients and persevere in our efforts.

REFERENCES

1. Adams K. Becker's Hospital Review. States ranked by percentage of population fully vaccinated: June 24. ASC Communications 2021. Accessed June 24, 2021. <https://www.beckershospitalreview.com/public-health/states-ranked-by-percentage-of-population-vaccinated-march-15.html>

2. Parke DW II. Ophthalmology after coronavirus disease 2019 (COVID-19): transition back to patient care. *JAMA Ophthalmol*. 2020;138(6):599-600. doi:10.1001/jamaophthalmol.2020.2004

3. Koirala A, Joo YJ, Khatami A, Chiu C, Britton PN. Vaccines for COVID-19: the current state of play. *Paediatr Respir Rev*. 2020;35:43-49. doi:10.1016/j.prrv.2020.06.010

4. Parke DW II. Returning to ophthalmology practice. April 17, 2020. American Academy of Ophthalmology. Accessed June 17, 2021. <https://www.aao.org/about/governance/academy-blog/post/returning-to-ophthalmology-practice>

5. Borracci RA, Giglio ND. Forecasting the effect of social distancing on COVID-19 autumn-winter outbreak in the metropolitan area of Buenos Aires. *Medicina (B Aires)*. 2020;80 (suppl 3):7-15.

6. Hutton D. COVID-19: what the reopening of ophthalmology could look like. April 24, 2020. Accessed June 23, 2021. <https://www.ophthalmologytimes.com/view/covid-19-what-reopening-ophthalmology-could-look>

7. American Academy of Ophthalmology. Special considerations for ophthalmic surgery during the COVID-19 pandemic. May 27, 2020. Updated March 22, 2021. Accessed June 17, 2021. <https://www.aao.org/headline/special-considerations-ophthalmic-surgery-during-c>

8. Shi AC, Ren P. SARS-CoV-2 serology testing: progress and challenges. *J Immunol Methods*. 2021;494:113060. doi:10.1016/j.jim.2021.113060

9. Zhang S, Guo M, Duan L, et al. Development and validation of a risk factor-based system to predict short-term survival in adult hospitalized patients with COVID-19: a multicenter, retrospective, cohort study. *Crit Care*. 2020;24(1):438. doi:10.1186/s13054-020-03123-x

10. Sharma M, Jain N, Ranganathan S, et al. Tele-ophthalmology: need of the hour. *Indian J Ophthalmol*. 2020;68(7):1328-1338. doi:10.4103/ijo.110_1784_20

11. Kalra G, Williams AM, Commiskey PW, et al. Incorporating video visits into ophthalmology practice: a retrospective analysis and patient survey to assess initial experiences and patient acceptability at an academic eye center. *Ophthalmol Ther*. 2020;9(3):549-562. doi:10.1007/s40123-020-00269-3

12. American Academy of Ophthalmology. Recommendations for urgent and nonurgent patient care. March 18, 2020. Accessed June 18, 2021. <https://www.aao.org/headline/new-recommendations-urgent-nonurgent-patient-care>

13. American Society of Retina Specialists. COVID-19: updates and resources. May 6, 2020. Accessed June 18, 2021. <https://www.asrs.org/practice/asrs-member-alert-regarding-covid-19-pandemic>

14. Eyewire NEWS. Analysis: ophthalmology lost more patient volume due to COVID-19 than any other specialty. May 11, 2020. Accessed June 18, 2021. <https://eyewire.news/articles/analysis-55-percent-fewer-americans-sought-hospital-care-in-march-april-due-to-covid-19/>

15. Jain A, Aggarwal S. Commentary: COVID-19 created a surgical backlog that's only going to get worse. *Chicago Tribune*. June 24, 2020. Accessed June 18, 2021. <https://www.chicagotribune.com/opinion/>

commentary/ct-opinion-coronavirus-surgery-hospitals-20200624-njaho2mhnforb6zia4yxp33u-story.html

16. Fingeret M, Dickerson JE Jr. The role of minimally invasive glaucoma surgery devices in the management of glaucoma. *Optom Vis Sci*. 2018;95(2):155-162. doi:10.1097/OPX.0000000000001173

17. American Psychological Association. Stress in America. One year later, a new wave of pandemic health concerns. March 2021. Accessed June 18, 2021. <https://www.apa.org/news/press/releases/stress/2021/sia-pandemic-report.pdf>

18. Nijm LM. Communication, reassurance are keys to returning patients to your practice. *Cataract & Refractive Surgery Today (CRST)*. 2020. Accessed June 18, 2021. <https://crstoday.com/articles/2020-june/what-we-do-now-can-ease-the-transition-back-to-normal/>

19. American Association of Retired Persons. When can older Americans expect to get a COVID-19 vaccine? June 9, 2021. Accessed June 18, 2021. <https://www.aarp.org/health/conditions-treatments/info-2020/coronavirus-vaccine-distribution.html>

20. American Academy of Ophthalmology. Important coronavirus updates for ophthalmologists. March 23, 2020. Updated May 14, 2021. Accessed June 18, 2021. <https://www.aao.org/headline/alert-important-coronavirus-context>

21. American Academy of Ophthalmology. AAO surveys reveal severe effect COVID-19 is having on ophthalmology practices. May 4, 2020. Accessed June 19, 2021. <https://eyewire.news/articles/american-academy-of-ophthalmology-releases-covid-19-survey/>

22. Kaiser Family Foundation (KFF) and Washington Post Frontline Health Care Workers Survey. March 2021. Accessed June 19, 2021. <https://context.cdn.washingtonpost.com/notes/prod/default/documents/4d8d1ddf-c192-40f9-9e3a-7a3fefa0d928/note/91e5f1ac-2cc5-41bb-b164-ecb4d77ed0b5.#page=1>

23. O'Reilly KB. American Medical Association. Are physicians obliged to get vaccinated against COVID-19? November 16, 2020. Accessed June 20, 2021. <https://www.ama-assn.org/delivering-care/public-health/are-physicians-obliged-get-vaccinated-against-covid-19>

24. Smith TM. American Medical Association. Dealing with COVID-19 vaccine hesitancy among health care workers. March 4, 2021. Accessed June 22, 2021. <https://www.ama-assn.org/delivering-care/public-health/dealing-covid-19-vaccine-hesitancy-among-health-care-workers>

25. Safadi K, Kruger JM, Chowers I, et al. Ophthalmology practice during the COVID-19 pandemic. *BMJ Open Ophthalmol*. 2020;5(1):e000487. doi:10.1136/bmjophth-2020-000487

26. Stuart A. Vitreoretinal surgery for COVID-19 positive patients. *EyeNet*. July 2020:27-29. Accessed June 21, 2021. <https://www.aao.org/eyenet/article/vitreoretinal-surgery-covid-19-positive-patients?july-2020>

27. Dockery DM, Rowe SG, Murphy MA, Krzystolik MG. The ocular manifestations and transmission of COVID-19: recommendations for prevention [published online ahead of print; 2020 May 8]. *J Emerg Med*. 2020;59(1):137-140. doi:10.1016/j.jemermed.2020.04.060

28. Zhang X, Chen X, Chen L, et al. The infection evidence of SARS-CoV-2 in ocular surface: a single-center cross-sectional study. *medRxiv*. 2020:2020.02.26.20027938. doi:10.1101/2020.02.26.20027938

29. Lawrenson JG, Buckley RJ. COVID-19 and the eye. *Ophthalmic Physiol Opt*. 2020;40(4):383-388. doi:10.1111/opo.12708

30. Ma D, Chen C-B, Jhanji V, et al. Expression of SARS-CoV-2 receptor ACE2 and TMPRSS2 in human primary conjunctival and pterygium cell lines and in mouse cornea. *Eye (Lond)*. 2020;34(7):1212-1219. doi:10.1038/s41433-020-0939-4

31. Sommerstein R, Fux CA, Vuichard-Gysin D, et al. Risk of SARS-CoV-2 transmission by aerosols, the rational use of masks, and protection of healthcare workers from COVID-19. *Antimicrob Resist Infect Control*. 2020;9(1):100. doi:10.1186/s13756-020-00763-0

32. Centers for Disease Control and Prevention. Hand hygiene recommendations: guidance for healthcare providers about hand hygiene and COVID-19. Updated May 17, 2020. Accessed June 21, 2021. <https://www.cdc.gov/coronavirus/2019-ncov/hcp/hand-hygiene.html>

33. Shorstein NH, Myers WG. Drop-free approaches for cataract surgery. *Curr Opin Ophthalmol*. 2020;31(1):67-73. doi:10.1097/ICU.0000000000000625

34. Kessel L, Tendal B, Jørgensen KJ, et al. Post-cataract prevention of inflammation and macular edema by steroid and nonsteroidal anti-inflammatory eye drops: a systematic review. *Ophthalmology*. 2014;121(10):1915-1924. doi:10.1016/j.ophtha.2014.04.035

35. Wu P, Duan F, Luo C, et al. Characteristics of ocular findings of patients with coronavirus disease 2019 (COVID-19) in Hubei Province, China. *JAMA Ophthalmol*. 2020;138(5):575-578. doi:10.1001/jamaophthalmol.2020.1291

36. Lindstrom RL, Galloway MS, Grzybowski A, Liegner JT. Dropless cataract surgery: an overview. *Curr Pharm Des*. 2017;23(4):558-564. doi:10.2174/13816128226661129150628

37. Abbvie News Center. Allergan [press release]. Allergan receives FDA approval for DURYSTA™ (bimatoprost implant) the first and only intracameral biodegradable sustained-release implant to lower intraocular pressure in open-angle glaucoma or ocular hypertension patients. March 5, 2020. Accessed June 21, 2021. <https://news.abbvie.com>

CORE CONCEPTS

- **Procedures that should be followed as clinics and physicians' offices reopen** include minimizing the use of waiting areas, deciding on the appropriate use of severe acute respiratory syndrome SARS-CoV-2 testing, and optimizing the use of personal protective equipment.
- **Practices should also be attentive to vaccine hesitancy among eye care professionals and staff**, with education on how to overcome this barrier and achieve safe patient care as an important consideration.
- **A careful screening process is an essential component of all practices.** Patients should have their temperature taken upon entering the physician's office or the clinic and should fill out a questionnaire about their health status.
- **A significant issue encountered by ophthalmology practices that manage patients with glaucoma and those who require cataract surgery is that many of these individuals are elderly** and thus at increased risk for adverse outcomes following SARS-CoV-2 infection.
- **Addressing patients' fears regarding SARS-CoV-2 is critical in resuming practice** because SARS-CoV-2 can be a barrier to individuals coming to the office or the clinic to receive care.
- **At present, little or no evidence has shown that the eyes are a major reservoir or significant source of transmission** of SARS-CoV-2 infection.
- **To minimize an individual's risk for infection following cataract surgery, simplifying patient management is essential.** The postsurgical regimen can be streamlined by switching from the use of postoperative eyedrops to a sustained-release intracameral corticosteroid injection.

com/news/allergan-press-releases/allergan-receives-fda-approval-for-durysta-bimatoprost-implant-first-and-only-intracamerall-biodegradable-sustained-release-implant-to-lower-intraocular-pressure-in-open-angle-glaucoma-or-ocular-hypertension-patients.htm

38. Durysta [package insert]. Madison, NJ: Allergan USA, Inc; 2020. Accessed June 21, 2021. https://media.allergan.com/products/durysta_pi.pdf

39. Dexycu [package insert]. Watertown, MA: EyePoint Pharmaceuticals US, Inc; 2020. Accessed June 21, 2021. https://dexycu.com/downloads/DEXYCU%20Prescribing%20Information_6-11-20.pdf

40. Donnenfeld E, Holland E. Dexamethasone intracameral drug-delivery suspension for inflammation associated with cataract surgery: a randomized, placebo-controlled, phase III trial. *Ophthalmology*. 2018;125(6):799-806. doi:10.1016/j.ophtha.2017.12.029

41. Donnenfeld ED, Solomon KD, Matossian C. Safety of IBI-10090 for inflammation associated with cataract surgery: phase 3 multicenter study. *J Cataract Refract Surg*. 2018;44(10):1236-1246. doi:10.1016/j.jcrs.2018.07.015

42. Inveltys [package insert]. Waltham, MA: Kala Pharmaceuticals, Inc; 2018. Accessed June 21, 2021. https://www.accessdata.fda.gov/drugsatfda_docs/label/2018/210565s000lbl.pdf

43. Schopf L, Enlow E, Popov A, Bourassa J, Chen H. Ocular pharmacokinetics of a novel loteprednol etabonate 0.4% ophthalmic formulation. *Ophthalmol Ther*. 2014;3(1-2):63-72. doi:10.1007/s40123-014-0021-z

44. Lotemax SM [package insert]. Bridgewater, NJ: Bausch + Lomb, Inc; 2020. Accessed June 22, 2021. <https://www.bausch.com/Portals/69/-/m/BL/United%20States/USFiles/Package%20Inserts/Pharma/lotemax-sm-package-insert.pdf>

45. Fong R, Silverstein BE, Peace JH, Williams JI, Vittitow JL. Submicron loteprednol etabonate ophthalmic gel 0.38% for the treatment of inflammation and pain after cataract surgery. *J Cataract Refract Surg*. 2018;44(10):1220-1229. doi:10.1016/j.jcrs.2018.06.056

46. Dextenza [package insert]. Bedford, MA: Ocular Therapeutix, Inc; 2019. Accessed June 22, 2021. https://www.accessdata.fda.gov/drugsatfda_docs/label/2019/208742s001lbl.pdf

47. Walters T, Bafna S, Vold S, et al. Efficacy and safety of sustained release dexamethasone for the treatment of ocular pain and inflammation after cataract surgery: results from two Phase 3 studies. *J Clin Exp Ophthalmol*. 2016;7(4):1-11. doi:10.4172/2155-9570.1000572

Developing and Executing a Reopening Protocol in Response to COVID-19: FUTURE PRACTICE AND PREPARING FOR THE NEXT PANDEMIC

Robert J. Weinstock, MD Although health authorities and professional societies provided clear guidance about pausing elective surgical procedures at the “height” of the COVID-19 pandemic, reopening and undertaking such procedures is more dependent on local and regional issues (eg, resurgence of SARS-CoV2 infections) and factors specific to individual ophthalmology practices, such as patient demographics. This brief review summarizes lessons learned during the COVID-19 pandemic and suggestions regarding how these experiences might be applied in the future.

DEVELOPING AN ACTION PLAN FOR REOPENING

The government and multiple medical societies have provided action plans for reopening medical practices, and the American Academy of Ophthalmology (AAO) has provided guidance for its members.¹ Although the AAO guidance is valuable, decisions regarding reopening and resuming elective surgeries, including cataract surgery, will vary both regionally and locally.^{2,3} National plans provide a framework that must be adapted to individual practices. Furthermore, it is the responsibility of each health care provider to consider these recommendations as a minimum acceptable standard and to provide the maximum possible protection for their patients.

Timelines for Reopening

In our practice, we strictly followed guidance to postpone elective surgeries during the specified moratorium.⁴ Nevertheless, procedures occasionally needed to be performed—mostly in patients with glaucoma or retinal diseases. We did not begin scheduling elective ophthalmic procedures until the federal and state health care authorities indicated that it was safe to do so.

OFFICE WORKFLOW AND REORGANIZATION

Managing Patient Flow

Patient protection requires working differently and seeing fewer patients per day in ophthalmology practices.^{5,6} In our office, we proactively decreased the number of patients scheduled each day. Use of the waiting room was eliminated by having patients wait outside or in their cars until we called them on their mobile phones and told them to come into the office.⁷ Also, the use of examination rooms has been

staggered. Initially, we used every other examination room to maximize social distancing, which substantially decreased the number of patients that we could manage in a day. In addition, we reduced the number of patients in each surgical bay by 50%. Although these steps dramatically slowed the surgical flow, we believed that they were necessary in order to protect our patients and our staff.

Use of Telemedicine

The increased use of telemedicine was important for enhancing our efficiency and minimizing the time that patients spent in the office. This approach has been shown to be valuable in many practices worldwide.^{8,10} Patients’ medical histories are taken over the telephone, and charts are filled out as far in advance as possible before patients arrive in the office. All of the physicians in the practice also used telemedicine to the maximum extent possible. We used an app called doxy.me⁹, which worked well for telemedicine consults. Although it was not possible to check patients’ vision, measure their intraocular pressure (IOP), or perform other tests remotely, many simple problems could be handled in this manner. Most importantly, it is usually possible to determine whether a patient needs to be seen in the office.⁸

Surgical Follow-up

Another important change in ophthalmology practices resulting from the COVID-19 pandemic is the approach to follow-up visits after procedures such as cataract surgery. We are now conducting these visits selectively and not routinely bringing patients back for their day 1 postoperative visit. Prior to the COVID-19 pandemic, we saw each patient on the day after cataract surgery, but this is impossible now. As a result, for all routine cataract surgeries in which the patient has no underlying conditions and no complications are noted during or immediately following the procedure, the patient is examined and their IOP is measured prior to discharge. A

telemedicine examination is conducted on postoperative day¹. If the patient is comfortable and is seeing well, an in-person postoperative examination is not conducted. Not only is this approach more convenient and safer for patients, it also improves the overall workflow in the office. If the patient has any issues at all, the physician will discuss the concerns with him or her, and an office visit will be scheduled if necessary.

This approach is possible because cataract surgery has become remarkably safe. Our experience has taught us that the vast majority of patients who undergo cataract surgery report no problems at all at their day 1 follow-up visit. When postoperative complications do occur, such as infection, they typically appear 5 to 7 days after surgery. We educate patients about potential postsurgical adverse events and check in with them frequently via telephone. Elimination of the day 1 follow-up after cataract surgery is supported by literature from 1994 to 2017, which indicated that such visits were not necessary and could be replaced with a questionnaire administered by a nurse over the telephone.¹¹ Importantly, though, if patients do want to have an in-person follow-up visit on the day after surgery, we will accommodate them.

Optimizing Information Technology to Minimize the Number of Staff in the Office

We have used information technology (IT) extensively to minimize the number of staff who are required to be present in the office. Everyone who can work from home does so. All billing, accounting, and routine telephone interactions are carried out remotely. Our IT department created remote work capabilities for all of these functions. Extensive staff training on new protocols was required, and this approach allowed many of our staff to stay home, decrease their risk

for infection, and take care of their children without disrupting our overall workflow. The AAO has provided useful tips and resources for “teleworking” in ophthalmology practices.¹²

PROTECTING STAFF AND PATIENTS FROM INFECTION

The procedures we established for patient and staff protection included all of those recommended by the Centers for Disease Control and Prevention and the AAO.^{13,14} They include the use of personal protective equipment and frequent handwashing. We also have patients fill out a questionnaire that includes inquiries about possible contacts that might have increased their risk for infection and the presence of any symptoms that might be related to COVID-19. Their temperature is taken when they enter the office, and any patient who is suspected of having COVID-19 is moved directly to an examination room.

Stringent cleaning protocols have also been established. Each examination room is fully cleaned between patients, as would be done after examining an individual with conjunctivitis or any other contagious disease. Our protocol calls for wiping down and sterilizing the examination room and all testing equipment.¹⁵ Immediately after reopening our office, our protocol also required all physicians and staff to arrive at the office in street clothes and then change into scrubs. As we have all learned more about how SARS-CoV-2 is transmitted (ie, spread through coughing, sneezing, and by normal breathing),¹⁶ our protocols have evolved. We now request that physicians and staff put on a clean pair of scrubs every day and wash them at home every night.

ELECTIVE SURGERY: THE PATIENT WITH CATARACTS

During the moratorium, no elective cataract surgeries were performed, and there were only rare emergencies in which patients had to receive immediate treatment because of angle-closure glaucoma or another anatomical change that required a rapid cataract extraction. With the reopening of our office, we have made ourselves available to perform elective procedures, including cataract surgery. We have found that patients are quite receptive to undergoing surgery as well as the associated preoperative and postoperative evaluations. Upon reopening, we contacted all of our surgical patients; about 60% to 70% wanted to come in and resume the process. All patients who had completed presurgical assessments had to be reevaluated because of the 90-day gap in our contact with them.

At this point, we have rescheduled and begun to perform surgeries in most of the patients who had planned them prior to the pandemic. About 25% to 30% of patients who had scheduled cataract surgery have decided to defer treatment, and our advice to them has been to contact us when they feel comfortable coming into the office. Our anecdotal findings on the attitudes of patients regarding cataract surgery appear similar to those from a recent survey conducted in the United Kingdom, which included responses from 207 candidates for cataract surgery. Results of the study showed that 64.8% of patients agreed or strongly agreed that their eyesight was reducing their quality of life (QOL); 70% were prepared to undergo cataract surgery within 1 month; and 27.6% preferred to wait until there were no more cases of COVID-19 or a vaccine was developed, even if took longer than 6 months. In addition, 47.3% and 37.2% of individuals were concerned about contagion while in the hospital or traveling to and from the hospital, respectively.¹⁷

Overall, we have left the decision regarding the need for cataract surgery largely to our patients, and we are doing everything possible to protect them from exposure to SARS-CoV-2. Although impairment and vision-related QOL are related to best-corrected visual acuity in patients with cataracts,¹⁸ we also realize that different individuals have very

different reactions to a given degree of cataract-associated visual impairment. For one patient with cataracts, 20/70 vision might be completely acceptable, whereas another patient might have 20/30 vision and believe that this is a significant impairment. The degree of impairment associated with cataracts is a function of how much it affects a patient's life. The goal of our practice is to meet patients' needs. When we reopened, elective cataract surgery was made available to all who were in need of the intervention. The message to patients was that our processes are safe, and we are willing to perform their cataract surgery if they feel comfortable. Importantly, this advice to patients is evidence-based. Available data clearly support the fact that appropriately accomplished cataract surgery is associated with almost no risk for infection.¹⁹

Flow for the Patient Undergoing Cataract Surgery

With the reopening of our office, we have learned to be much more efficient with our surgical patients. Individuals with cataracts are dilated almost immediately upon arrival at the office. As a result, they are fully dilated by the time they reach the surgical center. Intravenous access is obtained, the patient's history is collected, a brief physical examination is conducted, and the patient is moved rapidly to the operating room. We have assembled multiple cross-trained teams to ensure that this process can be carried out in parallel for several patients. The existence of multiple independent teams for patient preparation also protects the practice from one team member becoming infected with SARS-CoV-2 (and the subsequent requirement to quarantine everyone involved in surgery). Cross-training has been identified by others as an important approach to expanding the use of professional services, as needed, and ensuring continuity of care during the COVID-19 pandemic.²⁰

Specific Procedures

In March 2021, the AAO provided updated guidance on decreasing the risk for SARS-CoV2 transmission in ophthalmology practices. This advice reflects the availability of vaccines as well as rapid point-of-care and at-home testing for infection.¹⁴ Nevertheless, many precautions recommended in 2020 remain in effect, with best practices for their rapid implementation continuing to be important in the future.

The Cataract Examination

During a patient's cataract examination, there is minimal risk for exposure to ocular secretions. Typically, no need exists to touch the eye, but we are extremely careful when it becomes necessary. For example, in patients who are wearing contact lenses, we are cautious about having them remove their lenses, providing them with hand sanitizer after they do so, and cleaning the lens case after it has been used. In addition, we use a tonometer rather than a Tono-Pen® (Reichert, Inc; Depew, NY) for the measurement of IOP. We believe that the tonometer is slightly safer because it can be wiped down more thoroughly and completely and has a separate disposable cover that can be used for each patient. (Note, a tip cover is also available for the Tono-Pen.)

Surgery

Although a degree of risk for virus exposure during surgery does exist, the risk is not high when appropriate measures for the patient's protection are taken. Both the patient and the physician must wear masks. The surgeon will also be wearing either 3D glasses or a face shield during a procedure and will be separated somewhat from the patient because of the fact that he or she is sitting back and viewing a 3D screen. Although the technician will be even farther away from the patient, he or she may also elect to wear clear glasses to protect against the aerosolization of tears or the spreading of viral particles that may be associated with phacoemulsification. This part of the procedure probably has

the greatest potential risk for aerosolization of viral particles. The risk for exposure of the physician or other operating room personnel is extremely small, but there is a greater risk for transmission associated with coughing, sneezing, talking, and intubation.²¹

Appropriate patient screening also decreases the risk for exposure during cataract surgery. We may inadvertently operate on asymptomatic patients who may have just contracted COVID-19 and thus may not be shedding large numbers of viral particles. Nevertheless, it has been shown that asymptomatic individuals can have detectable viral shedding,²² which remains a concern. It is also important to remember that since SARS-CoV-2 has characteristics that resemble those of other viruses, our past experience with these pathogens can help guide our development of protocols for operating room procedures and overall patient management.

Postsurgical Management of Patients

As described above, we have used telemedicine to streamline our processes and decrease patient contact during the immediate postsurgical follow-up period. We have also incorporated other measures to simplify this process and potentially decrease patients' risk for infection. First, we are minimizing the use of postsurgical eyedrops. Independent of the COVID-19 pandemic, it has become more apparent each year that the need to use postsurgical eyedrops creates difficulties for patients, physicians, and office staff. Problems are reported with respect to patient adherence, callbacks to the office, patient confusion over which drop to use and how to instill the drops, and corneal issues associated with the use of topical eyedrops.²³

The COVID 19 pandemic just adds to the list of reasons to avoid the use of postoperative eyedrops if this can be accomplished safely and effectively. One step toward achieving this goal is to use a single formulation that combines an antibiotic, a corticosteroid, and a nonsteroidal anti-inflammatory drug. This simplifies patient instructions, decreases the risk for contamination, and also has the potential to improve adherence. The single bottle can be shipped directly to the patient. It is also possible to completely eliminate postoperative eyedrops with the use of a single-dose, sustained-release intracameral corticosteroid that can be used to manage postoperative inflammation. We have used this medication effectively in our practice as well.

One novel corticosteroid that has been used effectively in dropless cataract surgery is dexamethasone intraocular suspension 9% (DEXYCU®; EyePoint Pharmaceuticals, Watertown, MA), which is a sustained-release formulation designed to be administered via injection into the inferior portion of the posterior segment at the conclusion of ocular surgery—most often cataract extraction and IOL implantation.²⁴ More recently, dexamethasone intraocular suspension has been successfully administered directly into the capsular bag adjacent to the IOL. Dexamethasone intraocular suspension has been shown to be safe and effective for treatment of the inflammation that occurs following cataract surgery and may be an alternative to corticosteroid drop instillation in this patient population.^{25,26} It also has the potential to decrease the risk for infection that may be associated with the use of contaminated eyedrops as well as to reduce patient visits and associated complications, such as time spent in the waiting room and management of any individuals who may accompany patients to the clinic.

Other anti-inflammatory treatments that may circumvent the limitations of conventional topical anti-inflammatories have been recently approved by the US Food and Drug Administration (FDA) for use in patients undergoing cataract surgery. Two topical formulations of loteprednol etabonate are now available: loteprednol etabonate ophthalmic suspension 1% (INVELTYS™; Kala Pharmaceuticals, Waltham, MA).²⁷

which offers improved bioavailability via proprietary mucus-penetrating particle technology,²⁸ and loteprednol etabonate ophthalmic gel 0.38% (LOTEMAX[®] SM; Bausch + Lomb, Bridgewater, NJ), which delivers a submicron particle size for faster drug dissolution in tears and greater penetration to the aqueous humor.²⁹ In addition, cataract surgeons now have the option of using the dexamethasone ophthalmic insert 0.4 mg (DEXTENZA[®]; Ocular Therapeutix, Bedford, MA)³⁰—a dexamethasone-eluting punctal plug that provides tapered drug delivery to the ocular surface over a 30-day period, after which it dissolves and clears via the nasolacrimal system.^{30,31}

Recently, the FDA approved DURYSTA[™] (bimatoprost 10 mcg intracameral implant; Allergan Pharmaceuticals, Madison, NJ) for the treatment of glaucoma or ocular hypertension.^{32,33} Placement of this implant can allow patients with glaucoma to go 4 to 6 months without applying eyedrops or visiting the pharmacy, which has helped keep my patients treated and at home during the pandemic.

COMMUNICATION

A key aspect of reopening ophthalmology practices and adjusting protocols as the severity of the pandemic waxes and wanes is communication with staff and patients. For staff, it is essential to repeatedly stress the importance of following protocols that have been established for the office. It is equally important to remind them of their responsibilities when they are not at work (eg, use and cleaning of face masks, appropriate social distancing, frequent handwashing, and use of hand sanitizers). The behavior of the staff, as well as that of the physicians and other health care professionals involved in the practice, is an important determinant of infection risk for both patients and colleagues. For patients, it is our responsibility to communicate with them frequently and to help them understand the risks associated with undergoing cataract surgery.

LESSONS TO CARRY FORWARD

IT and Telemedicine

The COVID-19 pandemic greatly increased our use of IT and telemedicine, which was the case for many other practices as well.³⁴⁻³⁷ For example, telephone triage was shown to be highly effective in reducing the need for in-person consultation, decreasing in-office management of minor conditions, and shortening patient waiting time. Importantly, this approach resulted in only 0.3% of triage decisions being considered inappropriate.³⁸ The responses of patients and staff to this approach were highly positive, with everyone recognizing the benefits of immediate access to advice, reduced waiting time, prioritization of true emergencies, and the resultant low risk for COVID-19 in this setting.³⁸ Continued improvement of IT and telemedicine can benefit ophthalmology practice at all times. Building infrastructure and increasing training in ophthalmology practices can help us now and in the case of another pandemic in the future.

Even when in-person evaluation is necessary (eg, testing IOP in patients with glaucoma), the use of telemedicine to collect needed information prior to patient visits, together with implementation of a program in which evaluations and procedures are carried out on the same day (described as a “see-and-do” approach), can significantly decrease patient visits and the time required for these encounters.³⁹

Being Proactive in Maintaining the Health and Performance of Physicians and Staff

Multiple studies have provided evidence of impairment among physicians and staff in ophthalmology practices during the COVID-19 pandemic, which has the potential to adversely affect patients’ outcomes.⁴⁰ It has become clear that many health care professionals have required

psychological support during the COVID-19 pandemic^{41,42} and that creating an appropriate infrastructure to address these issues should be undertaken.^{42,43} This critical need should be addressed within individual practices as well as in national and international initiatives.

CONCLUSIONS

The phrase “new normal,” which has been used repeatedly to describe the world in which we will live following resolution of the COVID-19 pandemic, has been extended to the practice of ophthalmology.⁴³ This new normal may include many near-term changes in ophthalmology practice that will prove beneficial if we face another pandemic.⁴⁴ Changes in ophthalmology will certainly include increased use of telemedicine and minimization of office visits—both of which eye care professionals and patients have learned to accept. There may also be increased use of immediate sequential bilateral cataract surgery and reduced use of in-person follow-up after cataract surgery.⁴⁵

Ultimately, patients will perform their own risk-benefit analysis with respect to cataract surgery and other procedures in the context of the current pandemic and future health care emergencies. It is the responsibility of health care professionals, however, to provide evidence-based advice and to render office visits and surgery as safe as possible. As conditions continue to change, the need to modify protocols or even further reduce patient visits may arise. We now have a great deal of experience in handling these emergencies in our practices. It is important for us not to wait for governmental guidance, but to act based on our own judgment about the risks and benefits associated with specific interventions for our patients.

REFERENCES

1. American Academy of Ophthalmology (AAO). Special considerations for ophthalmic surgery during the COVID-19 pandemic. May 27, 2020. Updated March 22 2021. Accessed June 23, 2021. <https://www.aao.org/headline/special-considerations-ophthalmic-surgery-during-c>
2. American Society of Cataract and Refractive Surgery (ASCRS). Reopening facilities for non urgent care. April 29, 2020. Accessed June 23, 2021. <https://ascrs.org/covid-19/reopening-facilities-to-provide-non-urgent-care>
3. Ambulatory Surgery Center Association (ASCA). ASCA's COVID-19 Resource Center: the latest information and the ASC response. Accessed June 23, 2021. <https://www.ascassociation.org/resourcecenter/latestnewsresourcecenter/covid-19>

4. American Academy of Ophthalmology (AAO). Recommendations for urgent and nonurgent patient care. March 18, 2020. Updated April 17, 2020. Accessed June 23, 2021. <https://www.aao.org/headline/new-recommendations-urgent-nonurgent-patient-care>
5. Jones A. Ophthalmology in the time of coronavirus. April 16, 2020. Accessed June 23, 2021. <https://theophthalmologist.com/subspecialties/ophthalmology-in-the-time-of-coronavirus>
6. Arshinoff SA. Will COVID-19 change our thinking about the timing of cataract surgery? June 2020. Accessed June 23, 2021. <https://crstoday.com/articles/2020-june/will-covid-19-change-our-thinking-about-the-timing-of-ataract-surgery/>
7. Centers for Disease Control and Prevention (CDC). Get your clinic ready for coronavirus disease 2019 (COVID-19). Updated October 5, 2020. Accessed June 23, 2021. <https://www.cdc.gov/coronavirus/2019-ncov/downloads/clinic.pdf>
8. EuroTimes. European Society of Cataract and Refractive Surgeons (ESCRS). Integrating telehealth into ophthalmic practices. 2020. Accessed June 23, 2021. <https://www.eurotimes.org/integrating-telehealth-ophthalmology/>
9. Sharma M, Jain N, Ranganathan S, et al. Tele-ophthalmology: need of the hour. *Indian J Ophthalmol*. 2020;68(7):1328-1338. doi:10.4103/ijoo.IJO_1784_20
10. Grenda TR, Whang S, Evans NR III. Transitioning a surgery practice to telehealth during COVID-19. *Ann Surg*. 2020;272(2):e168-e169. doi:10.1097/SLA.0000000000004008
11. Grzybowski A, Kanclierz P. Do we need day-1 postoperative follow-up after cataract surgery? *Graefes Arch Clin Exp Ophthalmol*. 2019;257(5):855-861. doi:10.1007/s00417-018-04210-0
12. American Academy of Ophthalmology (AAO). Coronavirus impact: teleworking considerations. March 21, 2020. Accessed June 23, 2021. <https://www.aao.org/practice-management/article/coronavirus-telework-remote-practice-operations>
13. Centers for Disease Control and Prevention (CDC). Interim infection prevention and control recommendations for healthcare personnel during the coronavirus disease 2019 (COVID-19) pandemic. Updated February 23, 2021. Accessed June 23, 2021. <https://www.cdc.gov/coronavirus/2019-ncov/hcp/infection-control-recommendations.html>
14. American Academy of Ophthalmology (AAO). Special considerations for ophthalmic surgery during the COVID-19 pandemic. May 27, 2020. Updated March 22, 2021. Accessed June 24, 2021. <https://www.aao.org/headline/special-considerations-ophthalmic-surgery-during-c>
15. Shabto JM, De Moraes CG, Cioffi GA, Liebmann JM. Review of hygiene and disinfection recommendations for outpatient glaucoma care: a COVID Era Update. *J Glaucoma*. 2020;29(6):409-416. doi:10.1097/JG.0000000000001540
16. Nardelli EA, Nathavitharana R. Airborne spread of SARS-CoV-2 and a potential role for air disinfection. *JAMA*. 2020;324(2):141-142. doi:10.1001/jama.2020.7603
17. Naderi K, Maubon L, Jameel A, et al. Attitudes to cataract surgery during the COVID-19 pandemic: a patient survey. *Eye (Lond)*. 2020;34(12):2161-2162. doi:10.1038/s41433-020-1112-9
18. Zhu M, Yu J, Zhang J, Yan Q, Liu Y. Evaluating vision-related quality of life in preoperative age-related cataract patients and analyzing its influencing factors in China: a cross-sectional study. *BMC Ophthalmol*. 2015;15:160. doi:10.1186/s12886-015-0150-8

CORE CONCEPTS

- **National plans for resuming ophthalmic surgery provide a framework that must be adapted to individual practices.** It is the responsibility of each health care provider to consider these recommendations as a minimum acceptable standard and to go beyond them, providing the maximum possible protection for both their patients and their staff.
- **The increased use of telemedicine is key** to improving efficiency and minimizing the time that patients spend in the office.
- **The coronavirus disease 2019 (COVID-19) pandemic has generated a significant change in follow-up visits after procedures** such as cataract surgery. In-person, day 1 visits are now being conducted selectively, with most being accomplished via telemedicine.
- **Overall, we are generally leaving the decision regarding the need for cataract surgery to our patients,** and we are doing everything necessary to protect them from exposure to SARS-CoV-2.
- **The behavior of physicians and staff outside of the office is an important determinant of the risk for infection** among both patients and our colleagues.
- **Lessons learned as we worked through the current pandemic must be remembered and refined to support more efficient future practice,** along with a more rapid and robust experience-based response to the next pandemic.

19. Du H, Zhang M, Zhang H, Sun X. Practical experience on emergency ophthalmic surgery during the prevalence of COVID-19. *Graefes Arch Clin Exp Ophthalmol*. 2020;258(8):1831-1833. doi:10.1007/s00417-020-04692-x
20. Drake DH, De Bonis M, Covella M, et al. Echocardiography in pandemic: front-line perspective, expanding role of ultrasound, and ethics of resource allocation. *J Am Soc Echocardiogr*. 2020;33(6):683-689. doi:10.1016/j.echo.2020.04.007
21. Koshiy ZR, Dickie D. Aerosol generation from high speed ophthalmic instrumentation and the risk of contamination from SARS COVID19. *Eye (Lond)*. 2020;34(11):1954-1955. doi:10.1038/s41433-020-1000-3
22. Li W, Su Y-Y, Z S-S, et al. Viral shedding dynamics in asymptomatic and mildly symptomatic patients infected with SARS-CoV-2. *Clin Microbiol Infect*. 2020;26(11):1556.e1-1556.e6. doi:10.1016/j.cmi.2020.07.008
23. Shorstein NH, Myers WG. Drop-free approaches for cataract surgery. *Curr Opin Ophthalmol*. 2020;31(1):67-73. doi:10.1097/ICU.0000000000000625
24. Dexycu [package insert]. Watertown, MA: EyePoint Pharmaceuticals US, Inc; 2020. Accessed June 24, 2021. https://dexycu.com/downloads/DEXYCU%20Prescribing%20Information_6-11-20.pdf
25. Donnenfeld E, Holland E. Dexamethasone intracameral drug-delivery suspension for inflammation associated with cataract surgery: a randomized, placebo-controlled, phase III trial. *Ophthalmology*. 2018;125(6):799-806. doi:10.1016/j.ophtha.2017.12.029
26. Donnenfeld ED, Solomon KD, Matossian C. Safety of IBI-10090 for inflammation associated with cataract surgery: phase 3 multicenter study. *J Cataract Refract Surg*. 2018;44(10):1236-1246. doi:10.1016/j.jcrs.2018.07.015
27. Inveltyl [package insert]. Waltham, MA: Kala Pharmaceuticals, Inc; 2018. Accessed June 25, 2021. https://www.accessdata.fda.gov/drugsatfda_docs/label/2018/210565s0001bl.pdf
28. Schopf L, Enlow E, Popov A, Bourassa J, Chen H. Ocular pharmacokinetics of a novel loteprednol etabonate 0.4% ophthalmic formulation. *Ophthalmol Ther*. 2014;3(1-2):63-72. doi:10.1007/s40123-014-0021-z
29. Fong R, Silverstein BE, Peace JH, Williams JI, Vittitow JL. Submicron loteprednol etabonate ophthalmic gel 0.38% for the treatment of inflammation and pain after cataract surgery. *J Cataract Refract Surg*. 2018;44(10):1220-1229. doi:10.1016/j.jcrs.2018.06.056
30. Dextenza [package insert]. Bedford, MA: Ocular Therapeutic, Inc; 2019. Accessed June 25, 2021. https://www.accessdata.fda.gov/drugsatfda_docs/label/2019/208742s001bl.pdf
31. Walters T, Bafna S, Vold S, et al. Efficacy and safety of sustained release dexamethasone for the treatment of ocular pain and inflammation after cataract surgery: results from two Phase 3 studies. *J Clin Exp Ophthalmol*. 2016;7(4):1-11. doi:10.4172/2155-9570.1000572
32. AbbVie News Center. Allergan [press release]. Allergan receives FDA approval for DURYSTA™ (bimatoprost implant) the first and only intracameral biodegradable sustained-release implant to lower intraocular pressure in open-angle glaucoma or ocular hypertension patients. March 5, 2020. Accessed June 25, 2021. <https://news.abbvie.com/news/allergan-press-releases/allergan-receives-fda-approval-for-durysta-bimatoprost-implant-first-and-only-intracameral-biodegradable-sustained-release-implant-to-lower-intraocular-pressure-in-open-angle-glaucoma-or-ocular-hypertension-patients.htm>
33. Durysta [package insert]. Madison, NJ: Allergan USA, Inc; 2020. Accessed June 25, 2021. https://media.allergan.com/products/durysta_pi.pdf
34. Ghazala FR, Hamilton R, Giardini ME, Ferguson A, Poyser OB, Livingstone IA. Live teleophthalmology avoids escalation of referrals to secondary care during COVID-19 lockdown. *Clin Exp Optom*. Published online May 20, 2021. doi:10.1080/08164622.2021.1916383
35. Newman-Casey PA, De Lott L, Cho J, et al. Telehealth-based eye care during the COVID-19 pandemic: utilization, safety and the patient experience. *Am J Ophthalmol*. Published online April 30, 2021. doi:10.1016/j.ajo.2021.04.014
36. Li JO, Thomas AAP, Kilduff CLS, et al. Safety of video-based telemedicine compared to in-person triage in emergency ophthalmology during COVID-19. *EJ Clin Med*. Published online April 2021. doi:10.1016/j.ejclinm.2021.100818
37. Tham Y-C, Husain R, Teo KYC, et al. New digital models of care in ophthalmology, during and beyond the COVID-19 pandemic. *Br J Ophthalmol*. Published online March 22, 2021. doi:10.1136/bjophthalmol-2020-317683. doi:10.1136/bjophthalmol-2020-317683
38. Chen Y, Ismail R, Cheema MR, Ting DSJ, Masri I. Implementation of a new telephone triage system in ophthalmology emergency department during COVID-19 pandemic: clinical effectiveness, safety and patient satisfaction. *Eye (Lond)*. Published online May 25, 2021. doi:10.1038/s41433-021-01528-8
39. McKinney S. Reconciling glaucoma care. *Rev Ophthalmol*. February 12, 2021. <https://www.reviewofophthalmology.com/article/reconciling-glaucoma-care>
40. Erdem B, Gok M, Bostan S. The evolution of the changes in the clinical course: a multicenter survey-related impression of the ophthalmologists at the peak of the COVID-19 pandemic in Turkey. *Int Ophthalmol*. 2021;41(4):1261-1269. doi:10.1007/s10792-020-01681-1
41. Kroll KH, Larsen S, Lamb K, et al. Responding to the psychological needs of health-care workers during the COVID-19 pandemic: case study from the Medical College of Wisconsin. *J Clin Psychol Med Settings*. Published online May 31, 2021. doi:10.1007/s10880-021-09791-3
42. Søvdal LE, Naslund JA, Kousouli AA, et al. Prioritizing the mental health and well-being of healthcare workers: an urgent global public health priority. *Front Public Health*. Published online May 7, 2021. doi:10.3389/fpubh.2021.679397
43. Chandra A, Romano MR, Ting DS, Chao DL. Implementing the new normal in ophthalmology care beyond COVID-19. *Eur J Ophthalmol*. 2021;31(2):321-327. doi:10.1177/1120672120975331
44. Wenham C, Kavanagh M, Torres I, Yamey G. Preparing for the next pandemic. *BMJ*. Published online May 21, 2021. doi:10.1136/bmj.n295

EXAMINATION QUESTIONS: CATARACT SURGERY: CHALLENGES IN THE WAKE OF THE COVID-19 PANDEMIC

This CME activity is sponsored by the University of Florida College of Medicine and is supported by an unrestricted educational grant from EyePoint. Participants must score at least 80% on this exam in order to receive credit. The University of Florida College of Medicine designates this enduring material for a maximum of 1 AMA PRA Category 1 Credit™. To take this exam and obtain credit, please take the test online at <https://cme.ufl.edu/ataract-surgery-challenges-in-the-wake-of-the-covid-19-pandemic-enduring-pdf/>. Expires: September 30, 2022

- The AAO has noted that deciding on how to manage individuals who have recovered from infection is also complicated by the fact that it is unclear whether the presence of neutralizing antibodies after a natural infection confers sufficient protection against reinfection.
 - True
 - False
- What percentage of individuals who have been fully vaccinated remain fearful of SARS-CoV-2 infection?
 - 13%
 - 29%
 - 48%
 - 64%
- Which of the following statements is true regarding the Day 1 postoperative visit for patients undergoing cataract surgery?
 - It can be safely accomplished by telemedicine for many patients.
 - It should be eliminated for all patients.
 - It greatly increases risk for SARS-CoV-2 infection.
 - It should be continued to for all patients.
- According to Dr. Weinstock, what percentage of patients want to undergo their cataract surgery now that this is again possible?
 - 10%
 - 30%
 - 50%
 - 70%
- Which of the following are recommended by AAO for office visits?
 - Social distancing in waiting rooms.
 - Having patients wait in their cars for appointments.
 - No requirement for masks in vaccinated patients.
 - No requirement for masks in vaccinated ECPS.
- True or False: Asymptomatic patients with SARS-CoV-2 infection do not shed viral particles.
 - True
 - False
- True or False: At present, there is little or no evidence that the eyes are a major reservoir of SARS-CoV-2 or a significant source of infection.
 - True
 - False
- Which of the following statements is true regarding patients' attitudes toward virtual office visits?
 - Patients generally object to them.
 - They have been shown to be confusing for elderly patients.
 - They should be employed only when there is no availability of in-person visits.
 - Patients are generally accepting of this approach.
- According to the survey carried out by the American Academy of Ophthalmology, what percentage of practices will be both smaller and financially unhealthy by the end of 2020?
 - 22%
 - 38%
 - 47%
 - 61%
- What is the current guidance for the management of SARS-CoV-2-positive patients?
 - All treatment should be deferred.
 - Non-urgent treatment should be deferred.
 - Non-urgent treatment can be carried out with appropriate protection.
 - Non-urgent treatment can be carried out, but only by vaccinated providers.
- Results from one study of telephone triage indicated that ___% of decisions made using this approach were inappropriate.
 - 0.3
 - 1.6
 - 3.5
 - 8.9