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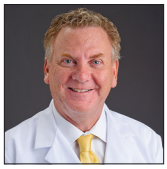
Guest Editorial *Cataract*

Cataract surgery 2020 and beyond: Pearls from my career

John S. Jarstad[1]

[1]Department of Clinical Ophthalmology, University of South Florida Morsani School of Medicine, Florida, United States.



***Corresponding author:**
John S. Jarstad,
Department of Clinical Ophthalmology, University of South Florida Morsani School of Medicine, Tampa, Florida, United States.

jarstadj@usf.edu

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INTRODUCTION

From my very first solo cataract procedure as a 1st-year ophthalmology resident at Mayo Clinic in the late 1980s, which took 1 h and 45 min, to today's micro-incision or femto laser procedure which has taken <5 min in many routine cases, it is surprising that many pearls of the cataract operation have not changed significantly and are still useful in today's competitive eye surgery environment. Hopefully, the ideas provided in this treatise will assist the resident surgeon as you embark on this most rewarding of all medical fields in mastering the most common and frequent surgical procedure performed each year worldwide.

PRE-OPERATIVE ASSESSMENT

In addition to systemic conditions, those patient health issues which are really important are as follows:

1. Whether your cataract patient has had a stroke or a myocardial infarction within the past 6 months?
2. Is there uncontrolled hypertension?
3. Is there a new arrhythmia not previously documented, such as atrial fibrillation?
4. Is the eye pressure greater than 35 mmHg from uncontrolled glaucoma?

During the slit-lamp examination, is there significant blepharitis, cornea dystrophy (Fuchs or basement membrane dystrophy), any pseudoexfoliation, or is the nucleus dense, white, black, or Morgagnian? Is the angle shallow or pupil poor to dilate? Can the retina be adequately visualized? If not, a B-scan ultrasound or optical coherence tomography (OCT) of the Macula is quite useful, especially when a premium intraocular lens (IOL) is anticipated.

CLINIC EXAMINATION

Slit-lamp biomicroscopic examination and dilated retina examination are essential in the proper workup of all patients. Once the basics are performed, an IOL Master or Immersion A-scan is used to determine the correct power of the artificial lens to be implanted. For patients desiring a premium IOL, corneal topography is helpful to confirm the axis of astigmatism, especially for astigmatism-correcting IOLs.

ARTIFICIAL LENS OPTIONS

In addition to standard high definition or aspheric artificial lenses, newer multifocal and accommodating IOLs are now available which can correct distance, near, and computer vision.

One should also keep in mind that not every patient desires uncorrected distance vision, and in fact, artists or watchmakers, fine detail painters, or those who have fine detail handiwork as a hobby or profession may actually prefer to have a near vision-optimized corrective artificial lens implant. Over 90% of patients, including those who have been myopic their entire life, still prefer a distance-focused IOL. Premium lens options include multifocal IOLs (similar to a "no line trifocal") that create a bull's eye focus on the macula, toric/astigmatism correcting distance lenses, accommodating IOLs that adjust like the natural lens by the contraction and relaxation of the ciliary body muscle and require up to a month of eye exercises postoperatively to achieve maximum effect for reading and computer work and the light adjustable IOL which can be fine-tuned after it is already in the eye. A brief discussion with the patient asked, "How important would it be for you to go without glasses after your cataract is removed?" and "Would you be willing to pay extra for a premium lens that could provide that for you?"

Day of surgery

Like an experienced pilot, as a surgeon, it is important to survey the operating theater and proceed through a mental checklist (or even write one down) to go through the equipment. Examine the operating microscope making sure the light intensity is acceptable (clean water or salt residue from the lens if noted with lens paper). Check that the usual instruments along with instruments for each type of surgery planned along with the correct power and brand of intraocular lens implants for each patient are available and write this information on the whiteboard in the operating theater along with a map of astigmatism to be corrected. Verify that extrapotential emergency equipment is available such as Malyugin pupil expansion rings, capsular tension rings, viscoelastic for each case, 10-0 and 6-0 nylon suture, iris retractor hooks, and capsule retractor hooks, Miochol or Miostat, eye pads, and protective metal or clear shields.

Cataract operation – pearls

In the operating room, a prep with 5% povidone-iodine with a drop into the eye is proven to prevent infection.

A sterile 3M 1060 or similar plastic eye drape to capture the eyelashes is also helpful in preventing infection.

Test the phaco tip outside the eye to make sure the ultrasonic tip is functioning correctly and safely, and examine it under the microscope before inserting it into the eye.

Ink the side port incision blade tip with a sterile marking pen to assist in locating the entry site. Have vision blue dye available for dense or white cataracts or for a novice surgeon to assist in visualizing the lens capsule.

Place a layer of OcuCoat or Cellugel on the cornea surface to improve visualization.

If using a bent 25 g cystitome, bend the very tip at a 45° angle sideways (a little "English") to assist in grasping the lens capsule. Have Utrata or similar Capsulorhexis forceps available for difficult cases.

Use OcuCoat or Cellugel to place pressure on the capsule and allow easy use of a needle cystitome; otherwise, you will need capsulorhexis forceps to complete the capsulotomy.

Start your capsulorhexis about 2 mm away peripherally from the center, going toward the center of the capsule with your first motion. Bend the capsular flap over on itself and proceed drawing the capsule around aiming about 2-3 h ahead of where you intend the rhexis to go. If it begins to "tear cut" toward the periphery, utilize the (Brian) Little maneuver to rescue the rhexis by pulling it backward before continuing.

Divide and conquer the dense nucleus using a second instrument to crack the nucleus once the central groove is 75% deep. I like a blunt tip instrument such as a Connor wand or Koch spatula.

The use of a Kratz, Nakahashi, or similar Nuclear Cracker is useful in soft cataracts, breaking it in two and emulsifying the two halves while steadying with a Connor wand or Koch spatula.

Irrigation and aspiration pearls involve reaching under the iris and anterior capsule, and in a circular motion, catching the lens cortex with a low vacuum and then gently pulling it with additional suction at a 45° angle with the I and A tip opening toward the cortex, which adds efficiency and prevents zonular stripping.

While injecting the intraocular lens, two-handed screw-type injectors or the one-handed Jarstad Passport spring-loaded injector can be used. It is important to withdraw the injector once the IOL is ¾ of the way into the eye so that the lens does not strip the lens zonules on the opposite side of the lens if it is injected too far before withdrawing the injector from the eye. Once the IOL is inside the eye, have the lens positioning instrument ready, quickly tuck the trailing haptic under the anterior capsule, and dial the IOL into the center position.

At the conclusion of the case, Moxifloxacin antibiotic is injected into the side wall of the cornea incision using a 27 g cannula with the tip directed slightly upward from the horizontal to saturate the side walls of the incision (both the primary and side port incision). Following this step, the anterior chamber is filled with a balanced salt solution through the side port incision, overfilling until the eye is firm and then using the "Zombie Double Tap" technique to lower the intraocular pressure to a normal (16-21 mmHg) level by ever so quickly tapping the 27 g cannula completely into and out of the eye through the side port incision twice (See Jarstad Zombie Double Tap – YouTube Video).

POST-OPERATIVE INSTRUCTIONS

One popular change that many ophthalmologists began using a decade or two ago was the "no stitch, no patch, no drops" technique. While experience with the no drop (intracameral) technique or sub-tenon's slow-release injection or pellets intraocular variant provided patients with convenience and was successful in replacing the 4 times daily eye drops in approximately 85% of cases, still 15% required rescue steroids or non-steroidal anti-inflammatory drug (NSAID).

Typical post-operative eye drop routine

Non-diabetics

Moxifloxacin: 1 drop in operative eye 4 times daily for 1 week to prevent infection; prednisolone acetate: 1 drop 4 times daily for 1 week, then 1 drop 2 times daily until bottle is empty. Metal or acrylic eye shield taped on only at night for 1 week after surgery.

For diabetics

Ketorolac, 1 drop 2 times daily to the operative eye until the bottle is empty. In a study I conducted from 2018 to 2019 in 908 consecutive patients, we found that routine cataract patients who did not use NSAIDs (ketorolac) had no statistical difference in cystoid macular oedema (CME) versus those who used NSAIDs post-operative. Diabetics, however, who did not use NSAIDs post-operative had an ×8 greater incidence of CME. We concluded that NSAIDs are not necessary in non-diabetic uncomplicated cataract surgeries but essential in all diabetic cases (Read at 2019 American Society of Cataract and Refractive Surgery (ASCRS) Annual Meeting in San Diego, CA).

CONCLUSION

Those of us in the eye restoration field are working in one of the greatest jobs. We are literally restoring sight to the blind on a daily basis. Our work is a job and means to make a living, but also a higher calling to which we unselfishly sacrifice our time and talents for the betterment of mankind and society.

May you each go forward in our noble profession and continue to bring credit to yourselves, your family, your mentors, and the God you worship, who has blessed each of us with the talents to truly make a difference in the lives of our fellow sisters and brothers on this earth.

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