too many uncontrollable variables to consider (eg, even minor variations between the staff that sampled over 500 patients). Furthermore, the concentration of moxifloxacin 0.5% administered topically exceeds 100-fold the minimum inhibitory concentration (MIC) of the bacteria isolated from the conjunctival sac; ie, 300 µg moxifloxacin per 1 drop (a volume of about 0.06 mL) of solution. The MIC of gram-positive microorganisms is approximately 0.5 µg/mL (600 times the MIC), so measuring the efficacy of moxifloxacin in achieving sterilization of the conjunctival sac proportionate to the number of the bacteria isolated loses relevance.\textsuperscript{1} We believe this is also true for povidone–iodine alone.

The hypothesis that Balzli et al. refer to (“Therefore, the actual number of total bacteria in the moxifloxacin-treated group could have been significantly lower than in the group treated with povidone–iodine alone.”) could also work the other way around. There was no detectable factor that could have biased the data unidirectionally.

The last point raised by Balzli et al.—that moxifloxacin has proven penetration of ocular tissues as opposed to povidone–iodine—is not relevant to this study. We did not suggest or check the rate of endophthalmitis, only the rate of bacterial growth in the conjunctival sac. Moreover, it has been proven that injecting the antibiotic solution into the anterior chamber, as routinely done with cefuroxime, is more effective in reducing the rate of endophthalmitis than applying the solution to the conjunctival sac.\textsuperscript{2}—Orly Halachmi, MD, Yaron Lang, MD, Yoram Keness, PhD, Dan Miron, MD

REFERENCES


Phacoemulsification of hard nucleus cataracts

We would like to share several comments about the article by Kim.\textsuperscript{1} The author mentions that excessive ultrasound energy might be used in phacoemulsification of hard nucleus cataracts phacoemulsification. We have a small trick to reduce the ultrasound energy used and avoid “wasted” energy. Once the nucleus fragment is captured by the phaco tip and is ready for phacoemulsification, we compress the nucleus fragment toward the phaco tip to make it crack into smaller fragments. The nucleus material is not absolutely incompressible; once a piece of nucleus is captured by the phaco tip and compressed by the chopper, it usually cracks and turns into smaller fragments, even powder. (This is similar to compressing a piece of cracker and turning it into powder with 2 fingers.) We then use ultrasound energy to remove the mixture of small nucleus fragments and nucleus powder. This reduces the ultrasound energy because some of the nucleus has been “emulsified” by the compression.

Second, we have 2 methods to deal with the posterior bridging strands that connect nucleus fragments. The first is to capture a single nucleus fragment and pull it to the central anterior chamber. After it is pulled into the central anterior chamber, there will be a gap between the pulled nucleus fragment and the adjacent nucleus fragment. The chopper is then moved into the gap to cut the bridging strands beneath the pulled fragment, moving from near the posterior capsule to the central anterior chamber. This method usually separates one nucleus fragment from the others. If the first method does not work, we try the second one: We try to remove all of the hard nucleus and leave a shell of thin epinucleus consisting of pieces of thin nucleus attached to each other by the bridging strands. Ophthalmic viscosurgical device (OVD) is injected into the space between the posterior capsule and the shell. The OVD pushes the posterior capsule away while elevating the shell to the iris plane. This enables the phaco tip to enter the anterior chamber without irrigation. The chopper is used to “feed” the center of the shell, which is the junction of bridging strands and the phaco tip. Phacoemulsification is then started. The center of the shell will obstruct the phaco tip because of the vacuum. Phacoemulsification of the shell can be completed with minor ultrasound energy. Because the phaco tip is obstructed by the shell, a small amount of OVD is aspirated, making the procedure relatively safe to the posterior chamber.

Third, one problem with hard nucleus cataracts is phaco burn to the clear corneal incision (CCI), possibly due to the heat produced by the ultrasound energy. Although the flow can decrease the heat, it is sometimes not enough. We notice that phaco burn is more common at the anterior lip of the CCI. This may be because the phaco handpiece is vertical instead of fully horizontal during phacoemulsification, making the rubber tube at the phaco tip firmly attach to the anterior lip of the CCI. This may reduce the flow through this area and thus not decrease heat at the anterior lip. During phacoemulsification, we usually ask the assistant to drop balanced salt solution onto the CCI at 10- to 15-second intervals. This can decrease the heat and “cool” the CCI. Although most assistants pay attention to
the transparency of the central cornea and drop balanced salt solution on this area, it may not protect the CCI from a phaco burn. This is because the anterior lip of the CCI is usually elevated by the phaco tip during phacoemulsification, making it higher than the plane where the balanced salt solution spreads. Besides, the balanced salt solution dropped on the central cornea usually fails to reach the posterior lip of the CCI, which is beneath the phaco tip. Dropping the BSS directly onto the CCI can decrease the heat conducted to this area, protecting the area above and under the phaco tip.

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REFERENCE

REPLY: Hou and Hu comment about effective phacoemulsification in very hard nucleus cataract cases. I am convinced the 3 methods they describe will be helpful. However, I wanted to present a novel principle in phacoemulsification rather than a technique. Many variations of the phacoemulsification technique have been described. All have unique advantages, but they have a common principle that enables one to achieve successful phacoemulsification: The techniques are focused on lens fragmentation along the anatomical suture line. Thus, we have called the techniques “nucleofractis.” My technique is totally different anatomically: It is based on separating or peeling the lamellated nuclear structure rather than vertical or horizontal fragmentation of the nucleus. The separation is performed along the loosely adhesive lamellated zone.

Initially, I coincidentally devised the decrease and conquer technique,1 the experience of incomplete fragmentation during the course of the vertical chopping method. At that time, I could not divide the nucleus completely because of its leathery character at the posterior pole. I therefore peeled the epinucleus from the hard nucleus core and isolated the dense yellow core. I successfully finished the case with a separation technique, not with fragmentation. Although I reported the principle for the first time, many surgeons have experienced a similar situation. In the case of incomplete fragmentation in the course of the phaco-chop technique, the remnants can be removed by separating the core and remaining epinucleus. I propose that all the procedures that manually separate the endonucleus along the lamellated zone and decrease nucleus volume by conquering the remnants be called decrease and conquer.—Hong Kyun Kim, MD, PhD

REFERENCE

Decreased anterior chamber depth after myopic LASIK

We would like to make several comments about the article by Nishimura et al.1 Forward movements of the cornea measured by slit scan or similar devices after myopic laser in situ keratomileusis (LASIK) or photorefractive keratectomy have been reported by many authors. This phenomenon can be explained by the steepening of the posterior cornea caused by postoperative changes in the magnification ratio.2 Postoperative differences in the corneal thickness measurement by ultrasound and by slit scan or similar devices can be explained by the same hypothesis.3

Nishimura et al. show that in younger and older groups, postoperative curvature of the posterior cornea is slightly steeper than the preoperative state, as described above. If the authors attribute the deepening of the anterior chamber depth to possible backward movements of the cornea, the posterior cornea should become flatter postoperatively.

From the standpoint of magnification, performing myopic LASIK is like adding a minus lens on the cornea. Internal structures observed through the postoperative cornea change their apparent sizes, depending on the amount of correction and the distance from the cornea.

Assuming that the plane of the anterior surface of the lens is located \( L \) (mm) posterior to the anterior surface of the cornea, the refractive power of the cornea is \( K \) (D), and the refractive index of the anterior chamber is \( n \), the distance (expressed as minus value by geometrical optics) from the anterior surface of the cornea to the apparent image of the anterior lens surface (\( L' \)) is expressed as

\[
1/L' = (n/L) + K
\]

The magnification ratio of the anterior lens surface \( M \) compared with the real anterior lens surface is expressed as

\[
M = n \frac{L'}{L}
\]

After myopic LASIK, the magnification ratio of the internal structures becomes smaller. Calculation using