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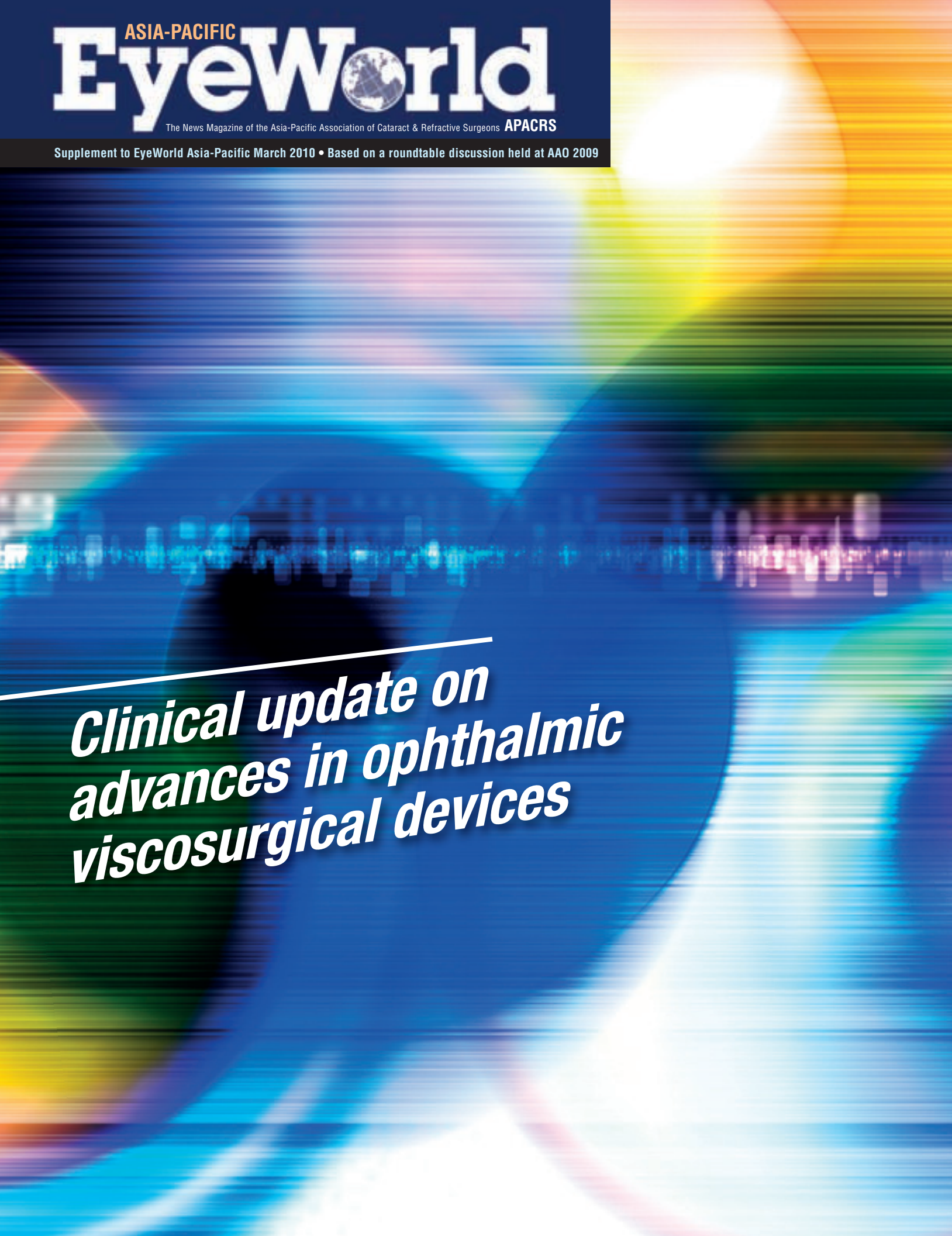

Clinical update on advances in ophthalmic viscosurgical devices

Participants

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The State of OVDs

Based on a roundtable discussion held at the 2009 American Academy of Ophthalmology meeting in San Francisco, CA, USA

by Samuel Masket, MD

When I consider how far we've come in cataract surgery today, in all candor, I think more important than foldable IOLs—perhaps even more important than phaco—is the advent of the OVD.

When I started implanting lenses, we did not have OVDs at all. We could not implant successfully in a number of patients without actually extracting vitreous. We would take a 22-gauge needle, pierce it through the pars plana, and aspirate vitreous in order to make room to implant a lens. As a result, the complication rates were a concern, and very few surgeons could accomplish lens implantation in a significant percentage of their patients.

Once OVDs came onto the market, surgeons of all levels could achieve good outcomes in a variety of case situations. It leveled the playing field to where we don't have to be super-skilled surgeons. I think the fact that globally we're doing roughly 12 million cataract surgeries a year is because of OVDs, not because of phaco or foldable IOLs.

We have to pay respect to these OVD products and what they do. As we move further along in our technology and the outcomes that we are expected to provide, that's where the viscoelastic agents need to be more and more specific to the task. What we're discussing is a comparison, so to speak, of the chondroitin-based agents and hydroxypropyl methylcellulose [HPMC], which is still being used in a variety of markets around the world.

Issue 1: Critical characteristics of OVDs

Dr. Masket: What attributes are important to you as a surgeon when you consider what agents to use in your patients?

Dr. Fonseka: The most important criteria for me is the protection of endothelium as well as the rest of the tissue afforded by the chondroitin-based OVDs. That exceeds all the other attributes of OVDs.

Dr. Masket: Surveys over the last two years demonstrate that 95% of surgeons believe that endothelial protection is their key factor. But there are a number of other attributes with viscoelastics that are also important. I think it was Dr. Bob Osher [MD] who said that the most significant criterion in evaluating the quality of surgery is the visual acuity in the early postoperative period and that translates to corneal clarity. What other attributes make corneal clarity happen for you?

Dr. Vasavada: We cannot say enough about how important it is to protect the endothelium, but having recognized that, the other component is the inflammation. In spite of the clear cornea, if we use certain other viscoelastics [other than chondroitin-based ones], we can end up with a moderate to heavy degree of flare and cells, which can not only lead to anterior segment problems but can also be a risk factor for cystoid macular edema.

Dr. Masket: Can you expand on that a bit? Is there a particular product type where you'll see the inflammatory reaction?

Dr. Vasavada: All of us know very well that hydroxypropyl methylcellulose [HPMC] is the one that is the culprit most of the time. The reality is that many surgeons internationally are still using methylcellulose, and they either don't resort to any other viscoelastic, or only in a very rare situation they use a cohesive or Viscoat [sodium chondroitin sulfate, sodium hyaluronate, Alcon, Fort Worth, TX, USA]. I transitioned from methylcellulose to these products more than 10 years ago, and there was a dramatic improvement in my cases in terms of inflammation.

Dr. Masket: Dr. Arshinoff, you are the rheologist among us, so tell me what you think the big issue is in terms of endothelial protection and OVDs.

Dr. Arshinoff: When we choose OVDs, we want to choose something that will make our surgery as easy as we possibly can make it for the patient, and then we want to have clear corneas and nice outcomes the first day. It is obviously most pleasant for us to walk in on the first post-op visit and the patient sees 20/20, the cornea is clear, and we have no headaches. We want to achieve clear corneas, which we all agree—and everyone has agreed for years—that chondroitin sulfate is the best content of a device to preserve good, healthy, clean corneas on day one. But in many places we want to save money. That's the issue.

Dr. Masket: Dr. RojanaPongpun, my best sense is that trends on the international stage are almost identical to trends now in the major markets where patients have certain expectations. Are you seeing patient-expected outcomes and [very good] early outcomes as being significant factors in what you're going to use, particularly with regard to OVDs?

Dr. RojanaPongpun: Patient expectations are being raised very high, and with the introduction of the premium lenses, patients are asking for more. In considering OVDs, one must look at the ease of surgery. The second factor is corneal clarity, and I think cost is the third factor. In some countries, surgeons can only use one viscoelastic—the most cost-effective one.

Dr. Masket: When we take a look at the global cost to the cataract patient, it's not just about how much the product itself costs. It's about what we have to do to take care of that patient through the perioperative period, the number of visits to the office, perhaps the number of eye drops necessary to quiet the inflamed eye. The global cost of surgery in the entire perioperative period is the key determinant that needs to be considered versus the initial cost of just the product at the time of the procedure.

> *"The most important criteria for me is the protection of endothelium as well as the rest of the tissue afforded by the chondroitin-based OVDs"*
>
> Charith Fonseka, MD

Dr. Fonseka: There are two different scenarios. I'll address the patient pay one because that is a high percentage of situations in many markets now that phacoemulsification is expanding. Patients don't understand the effects of a good versus poor OVD on their long-term care. This can be terribly significant if the cornea were to be damaged when such a simple change can help prevent that issue. A small cost upgrade would save them over time.

Dr. Arshinoff: I'll comment on the hospital/multi-payer system like we have in Canada. The facility focuses on what it pays initially for the product because it isn't involved in what happens to the patients who come back for additional treatments, up to and including a corneal transplant. Ultimately, the one that suffers is the patient, and as doctors, we are greatly concerned about the potential ongoing care. We have to educate both the patients and the facility managers on the value of good OVDs in order to best care for our patients.

Issue 2: Where did HPMC come from?

> *"[HPMC] doesn't remain in the eye as well or protect the cornea as well as chondroitin sulfate or hyaluronic acid"*
>
> Steve Arshinoff, MD

Dr. Masket: There's a group of OVDs in the same price range and then there's HPMC. Is there anyone here who understands the history of the use of HPMC and dealing with it?

Dr. Vasavada: I used it for many years. The way it has been manufactured is one issue. The combination with the varied pH and osmolality of the fluid when they combine is a second issue. Then you throw in posterior capsular rupture and if the methylcellulose is there, it produces vitritis. When methylcellulose is combined with bad fluidics or compromised eyes, it's a bad combination.

Dr. Arshinoff: I think if we're going to look at methylcellulose, HPMC, we have to look at it historically to figure out why we use it, which is a really poor OVD. In 1976 there were no real OVDs. We tried to use everything we could find that would maintain space. One physician in Germany [Fechner] came up with the idea of using HPMC and made it himself. Then after him, Moorfields Eye Hospital [London, England, UK] began to make it.

HPMC had all kinds of impurities and it caused a problem with inflammation. The first company to make commercial HPMC was in India. They needed something better than air or ringers, yet still inexpensive. This was actually an improvement for a physician who didn't have the funds to pay for Healon [sodium hyaluronate, Abbott Medical Optics, AMO, Santa Ana, CA, USA], which was the first OVD released in the world in 1980.

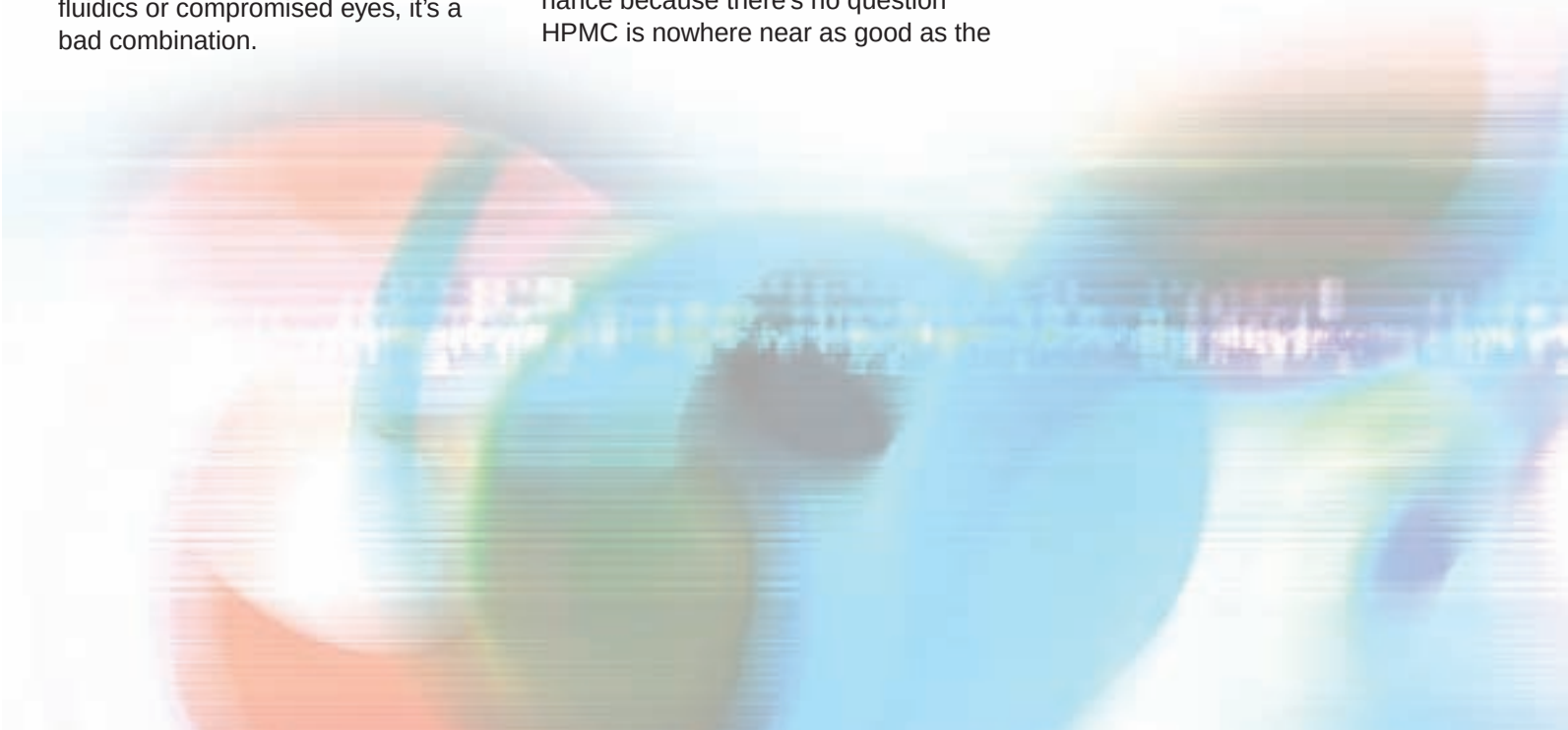
I think if we look at the way it came along, HPMC was a good product for the time it was designed for. But where we are now, as we get more complex surgery and we want to achieve more, it doesn't facilitate our surgery as well. That's the real problem. It really is not a good OVD and has many issues as noted. But it is cheap, and that's what we're arguing about. We're not arguing about corneal clarity or space maintenance because there's no question HPMC is nowhere near as good as the newer, more expensive OVDs we have on the markets today.

Dr. Masket: Is it not as good because of the purity issues or is it about the rheology?

Dr. Arshinoff: It doesn't maintain space very well. It doesn't remain in the eye as well or protect the cornea as well as chondroitin sulfate or hyaluronic acid [HA]. It's just not as good an OVD.

Dr. Masket: Dr. Arshinoff, since you are the rheologist among us, why don't you expand on all of these rheological properties?

Dr. Arshinoff: When we measure OVDs, we measure how well they're retained in the eye. HPMC just doesn't come out as well. Its viscosity doesn't change much with shear rate. It's relatively flat, so unlike either the Healon group of products or Viscoat and DisCoVisc [sodium chondroitin sulfate, sodium hyaluronate, Alcon], there is not a significant drop in the viscosity of HPMC as we go from low shear to higher shear. This helps us understand rheologically why it often comes with a bigger syringe and cannula; it is hard to inject into the eye.



Issue 3: The challenges of HPMC use

Dr. Masket: One of the other considerations with regard to inflammatory reaction is the ability to remove HPMC at the end of surgery. If it incites reaction at all, then it's nice to be able to get it outside of the eye. But it's almost impossible with HPMC, is it not?

Dr. Vasavada: It's very difficult, and even if I go behind the IOL, 99.9% of the time I'll detect methylcellulose even the next day. It is impossible to remove that.

Dr. Masket: What about elevation of IOP as a result of it?

Dr. Arshinoff: IOP rise is one of the most interesting, misunderstood problems in OVDs. The problem is the IOP rise is maximal from eight to 12 hours post-op. No one measures pressure eight or 12 hours post-op. No one is going to bring patients back at 4:00 am or midnight to measure their pressure. If left in the eye, all the OVDs will cause intraocular pressure spikes, and the pressure spike is proportional to how much is left in. But the pressure spike isn't so high on the first day post-op because we missed it at 12 hours post-op.

Dr. Fonseka: Intraocular pressure in eyes that we see on post-op day one is directly related to the amount of inflammation. If we get an inflamed eye, the intraocular pressure can be very high. The other point is that we spend a lot of time trying to remove HPMC, and when we do that, we are going to use much more infusion fluid, which is also damaging to the intraocular structures.

Dr. Masket: That's another good point, the fact that we've got to wash a lot of fluid in, and not just the volume of fluid but the potential impurities that come with it.

Dr. Arshinoff: The nice thing about chondroitin sulfate is we can leave some of it in the eye.

Dr. Masket: In your countries, have you experienced problems over the years with manufacturing of agents that didn't come up to specifications, so to speak? What problems have you had?

Dr. Vasavada: Unpredictability is an issue. HPMC can produce serious inflammation. We also had fungus detected in some of the locally manufactured bottles. Inflammation and contaminants are the major issues.

Dr. Masket: Dr. RojanaPongpun, what about in Southeast Asia? Any products that were particularly problematic that needed to be removed from the market?

Dr. RojanaPongpun: I'm glad that in most parts of Southeast Asia, HPMC is no longer accepted, even for the third-party payers like government agencies.

Dr. Masket: What about in Sri Lanka? Were there any products that were problematic and had to be withdrawn that you recall?

Dr. Fonseka: We had an outbreak recently and that was related to a particular batch of HPMC. These are in pre-filled cylinders and still we can get very bad attacks. We have patients who eventually lost their eyes. It raises a lot of issues regarding litigation.

Dr. Masket: So there seems to be a repeating theme of manufacturing inconsistencies. Is it possible that this is related to HPMC being plant-based? Do all of our problems go away when we eliminate methylcellulose?

Dr. Arshinoff: The issue is simply that its performance isn't as good in surgery, giving a higher complication rate. Let's say you are a great surgeon and you have a 0.2% complication rate and you use this and you get a 3% complication rate. That's a big difference. There will be a lot of people coming back for other procedures, problems, and follow-up, and you really haven't saved yourself any money. You may have saved the hospital money because it isn't paying for the complications, but you haven't saved the patient or you anything.

> ***"...in most parts of Southeast Asia, HPMC is no longer accepted, even for the third-party payers like government agencies"***
>
> **Prin RojanaPongpun, MD**

Surgeons are limited in how they perform by their complication rate. If you have a high complication rate as a consequence of using inferior devices, you're really destroying your own practice. ***Your time is being spent managing complications rather than doing new cases.***

Dr. Fonseka: In our part of the world, most of the surgeons have a high proportion of complex cases compared to many western countries.

Dr. Arshinoff: Surgeons want to use good OVDs to make their cases easier because it makes everything much better. It lowers their complication rate.

Dr. Vasavada: I think that's very important—the global aspect—and we need to counsel the patient more and push the quality.

Dr. Fonseka: We upgrade our microscopes but we don't push for viscoelastics like that. I think one of the reasons is that people don't understand viscoelastics very well.

Issue 4: Understanding the importance of better OVDs

> *"We can use antiquated machinery and get the job done, but we cannot use antiquated rheologic protection and get the job done"*
>
> Samuel Masket, MD

Dr. Masket: I think the overwhelming factor in the success of cataract and implant surgery is the OVD and not any of the other advances. But I don't think that's recognized by the surgeon and the third-party payers.

Dr. Arshinoff: Which would be more problematic: If you used an eight-year-old phaco machine or if you didn't use an OVD in your case? You would have a disaster with the fanciest machine without OVDs, whereas with an older machine, you just push the buttons differently. With a good OVD, it still comes out OK, even if it takes longer to get a clear cornea.

Dr. Masket: That's a good point you raise. We can use antiquated machinery and get the job done, but we cannot use antiquated rheologic protection and get the job done.

Dr. Arshinoff: Right. You can't use serum or air.

Dr. Masket: We could even use 20-year-old IOLs and get a good result.

Dr. Arshinoff: The patient could still see. But I can tell you, without good OVDs, I would never do bilateral cataract surgery, which I do 90% of.

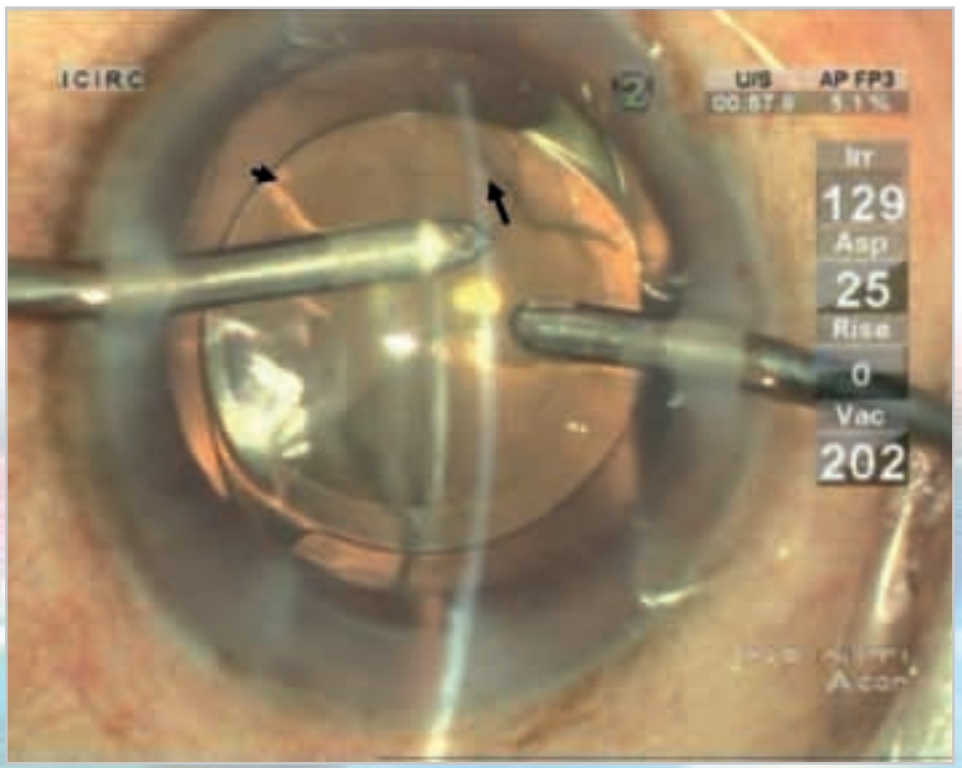
Dr. Masket: A slick new phaco machine with all these different energy parameters is very exciting to the surgeon. I think that the OVD doesn't carry that same interest or attractiveness to the surgeon, and somehow that message needs to be gotten out. Let's talk about what agents we have today, particularly the chondroitin-based agents, and how they afford us the protection that we think our patients need and demand.

Dr. Arshinoff: It's interesting about OVDs because we started off with Healon, then we got Viscoat, and then we got the idea of using them both together. One company tried to make a device that could demonstrate all the properties under different flow conditions and they came up with Healon 5 [AMO], which changes properties when you change the flow rates. Then Alcon came out with DisCoVisc to try to cover all the properties with one device by making it both viscous and dispersive because before, all viscous devices were cohesive and all lower viscosity devices were dispersive.

Dr. Masket: I use DisCoVisc and Viscoat when I do guttata patients, which are people with very compromised corneas. I've done a number of cases—cells in the 400 to 500 range—and maintained clear corneas.

I use Viscoat against the endothelium and DisCoVisc for all of its characteristics, particularly its clarity. I use that in patients with endothelial disease to save them from corneal transplants, and by and large they do very well with it.

Dr. Arshinoff: But none of us uses HPMCs in any complicated case. That's not really a consideration.



DisCoVisc is retained in the anterior chamber even after IOL implantation

Source: Abhay Vasavada, MD

Issue 5: Protecting against free radicals

Dr. Masket: Does anyone have any interest in the free radical discussion?

Dr. Vasavada: I think the free radical protection is very important, especially in compromised eyes. We did a study with Alcon that showed that if we use chondroitin sulfate versus pure Healon, or ProVisc, or sodium hyaluronate, the free radical protection is much better with the chondroitin sulfate OVD. I think that needs to be kept in mind in all cases but particularly in compromised eyes.

Dr. RojanaPongpun: We have to make clinicians understand and see these benefits.

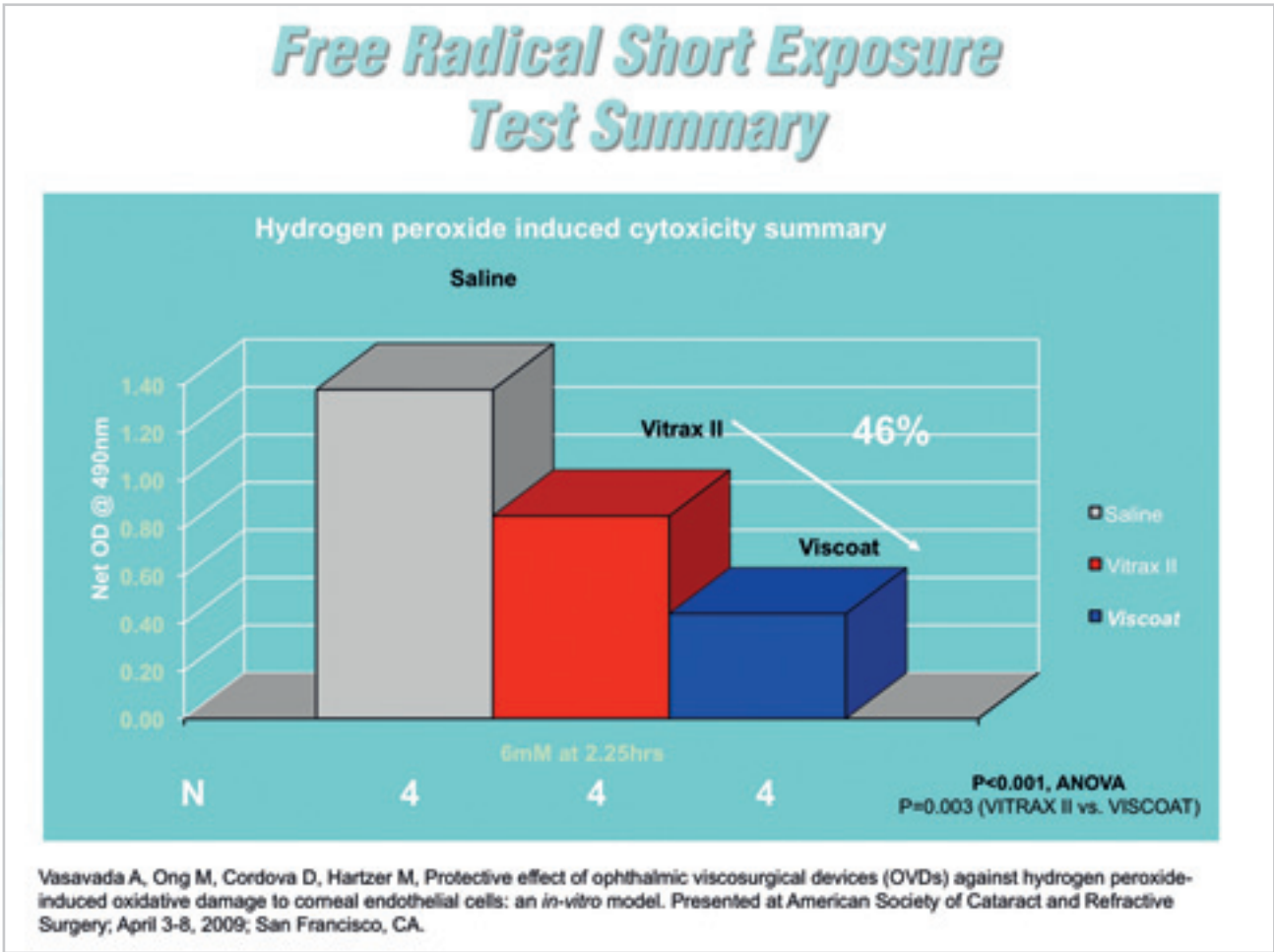
Dr. Vasavada: The clinician may not be able to see this immediately as it has more of a long-term impact. However, it is possible to measure using established laboratory methods, and that is what we did.

Dr. Masket: Where does the OVD come into play in terms of the free radicals?

Dr. Vasavada: The free radicals are generated for various reasons, physical and chemical. Any device that coats and remains put will obviously help protect. While HA alone has been shown to reduce free radicals, it is the addition of chondroitin sulfate that compounds the effect. It acts as a buffer against turbulence, and it has an alternate reactant impact that mitigates the free radical molecules.

Dr. Arshinoff: Viscoat is retained well, so I would use it if that's your concern. If your major concern is free radicals, then you ought to use a thick layer of Viscoat because it will stay there.

> ***"The free radicals are generated for various reasons, physical and chemical. Any device that coats and remains put will obviously help protect"***
>
> Abhay Vasavada, MD



Vasavada A, Ong M, Cordova D, Hartzer M, Protective effect of ophthalmic viscosurgical devices (OVDs) against hydrogen peroxide-induced oxidative damage to corneal endothelial cells: an *in-vitro* model. Presented at American Society of Cataract and Refractive Surgery; April 3-8, 2009; San Francisco, CA.

Issue 6: Techniques and OVD impacts

Dr. Masket: I'm curious what you use as your OVD in a routine case. In the garden variety of cataracts that you deal with, what is your preferred agent and how do you use it?

Dr. RojanaPongpun: I mainly use the soft shell technique.

Dr. Masket: Some people use DuoVisc as two separate agents. They'll use the Viscoat at the beginning of the surgery, allowing it to protect the cornea during the phaco process. Because of its easy removability, they'll use the ProVisc [sodium hyaluronate, Alcon] for the implanting of the lens.

Another point is if you work under Healon 5 and you don't create a fluid space, you almost can't do a capsulorhexis, the cornerstone of cataract surgery. It's like moving in cement.

Dr. RojanaPongpun: I could not agree more because to me, capsulorhexis size and position is so important to ensure lens implantation. Even for those who fail or have a rupture of the posterior capsule, if I can maintain a good anterior capsulorhexis, then I can always ensure that the implantation can occur.

Dr. Masket: From the standpoint of surgical preference, the ability to perform the capsulorhexis is related to the OVD.

I prefer the use of a forceps to create it. I've always felt that I have better control of the leading edge of the capsule. But therefore, I need an OVD that's going to maintain the space for me. DisCoVisc has become my preferred agent because of the space maintenance during the capsulorhexis, which I consider the most important part of the surgery. The OVD is key in the capsulorhexis. Dr. Arshinoff, what about you? In a routine surgery, what is your standard method and why?

Dr. Arshinoff: I tend to have a lot of OVDs in my OR. I don't have one OVD like some places. I have about six or eight so I can choose from among them. I think the advantage of using DisCoVisc over Viscoat, for example, is it's much more stable at zero shear. As you say, it makes it easier for your capsulorhexis. Anything from DisCoVisc up in terms of zero-shear viscosity I like to do the capsulorhexis.

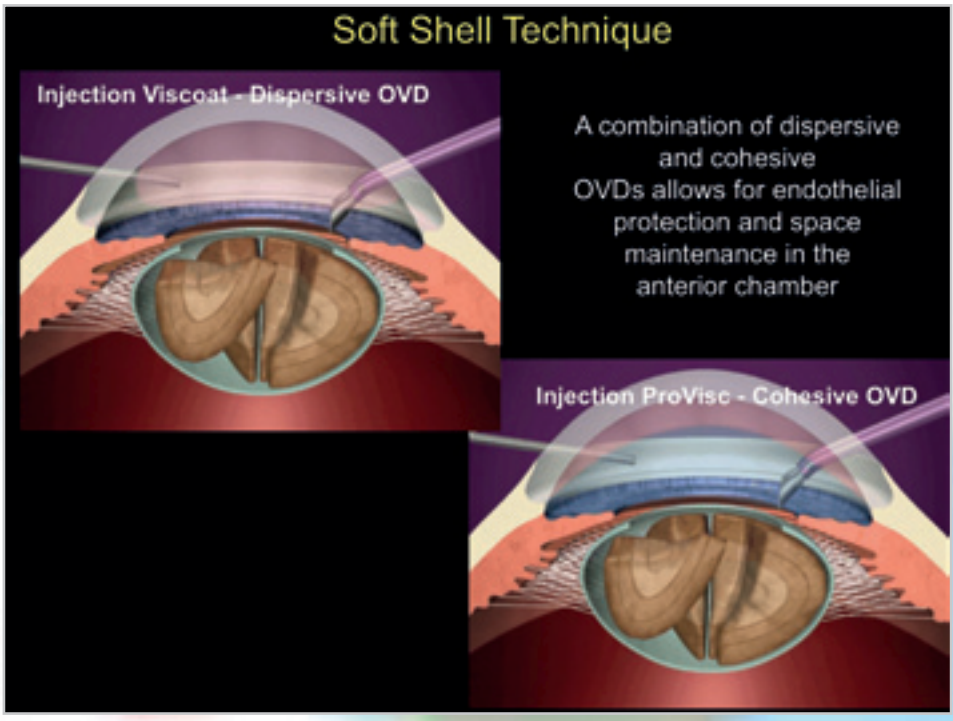
Dr. Vasavada: We found that clarity is outstanding with DisCoVisc, and I can perform the capsulorhexis with a needle in a very controlled way without any problems. I think DisCoVisc is a great agent for the capsulorhexis in compromised situations.

Dr. Masket: Particularly the white cataracts. In your everyday routine cases, which agents do you use?

Dr. Vasavada: Today I use the soft shell technique—Viscoat and ProVisc—because we just got DisCoVisc in the market last month in India. I'm going to shift to DisCoVisc. But in 10 to 15% of cases I would defer to the soft shell, and I would rather use separate Viscoat. Now I'll be using DisCoVisc at all phases of the capsulorhexis, before removal of the fragment and before I/A of the cortex. It will be easier for me because it will give me additional space maintenance as well. So I can use a lower bottle height for the initial procedure of my cortex removal, and so on.

Dr. Masket: Dr. Fonseka, I know you take care of a large number of very advanced cataracts. What are you using as your routine?

Dr. Fonseka: Soft shell or I use Viscoat alone. I like the feeling of having a little dispersive on the iris as well as protecting the endothelium.



The soft shell technique

Source: Abhay Vasavada, MD

Surgeon shares his OVD preferences and techniques

Steve Arshinoff, MD, clinical instructor of ophthalmology, University of Toronto, Toronto, ON, Canada, uses a lot of ophthalmic viscosurgical devices (OVDs)—just not any with hydroxypropyl methylcellulose (HPMC). "The reason I don't is simply because they're not very viscous and not very elastic," said Dr. Arshinoff. "In terms of what you expect an OVD to do, they are generally the poorest. Some newer modified HPMCs have better viscoelastic properties, but the main reason to use HPMCs is because they are less expensive."

Dr. Arshinoff believes surgeons will have their OVD preferences, and he shared some of his. Surgeons should keep in mind that there are benefits and drawbacks to any OVD and method of use, and Dr. Arshinoff is direct about all of this.

To begin with, he said DisCoVisc (sodium chondroitin sulfate, sodium hyaluronate, Alcon, Fort Worth, TX, USA) can be used successfully for all steps of phacoemulsification. DisCoVisc is the first OVD to combine higher viscosity and dispersion.

"It works for all phaco steps," Dr. Arshinoff said. "But you can never achieve as much with any single OVD as with a combination of different OVDs. DisCoVisc has middle-of-the-road properties and not extreme properties with respect to viscosity and cohesion-dispersion."

In difficult cases or complications, however, Dr. Arshinoff prefers other OVDs with specific techniques. "We all see 80-year-old patients who have pseudoexfoliation and lenticular instability," Dr. Arshinoff said. "In those patients and other expected complicated cases, I perform a soft shell—or ultimate soft shell—technique."

Dr. Arshinoff explained that the soft shell technique can be employed successfully using Viscoat (sodium chondroitin sulfate, sodium hyaluronate, Alcon), a dispersive OVD, and ProVisc (sodium hyaluronate, Alcon), a cohesive OVD. The two are marketed by Alcon in one disposable package called DuoVisc.

Another technique is to utilize what is known as the ultimate soft shell technique, which Dr. Arshinoff has described as using viscoadaptive OVDs, such as Healon 5 (Abbott Medical Optics, AMO, Santa Ana, CA, USA.), to blockade space rather than fill it. He described this technique in the September 2002 issue of the *Journal of Cataract & Refractive Surgery*.

"The ultimate soft shell technique compartmentalizes the anterior chamber using the ultimate low-viscosity fluid—water," Dr. Arshinoff wrote. "The use of this technique facilitates cataract surgery with viscoadaptive OVDs and viscoadaptive removal at the end of the procedure."

Dr. Arshinoff discussed the importance of chondroitin sulfate. "It has a longer residence time in the eye adjacent to corneal endothelial cells. Chondroitin sulfate, when used alone, is a low viscosity Newtonian fluid that is very dispersive," Dr. Arshinoff said. "It is therefore protective for the cornea. It sits up against endothelial cells and resists being washed away by irrigation.

"Chondroitin sulfate is particularly helpful in variants of the soft shell technique when there is a hole in the posterior capsule or broken zonules, and with Healon 5, in IFIS cases, where the fundamental physical role is to partition spaces, thereby protecting selected spaces from the turbulence of irrigation," he said.

"Generally in surgery, post-op day one corneal edema is minimized by using chondroitin sulfate-containing OVDs like Viscoat."

> ***"I like the properties of DisCoVisc in handling the white lens because it has better space maintenance. It stops the egress of the liquefied cortex and flattens the anterior capsule"***
>
> Samuel Masket, MD

Dr. Masket: Does anyone want to make any comments about alteration of their OVD technique in an eye with comorbidities? Let's talk about how we handle our OVDs with capsule staining for the white cataract.

Dr. RojanaPongpun: I inject Viscoat first to coat the endothelium and put in trypan blue and then quickly rinse it off because we don't need a huge amount of dye on the capsules. We only need to enhance the visualization.

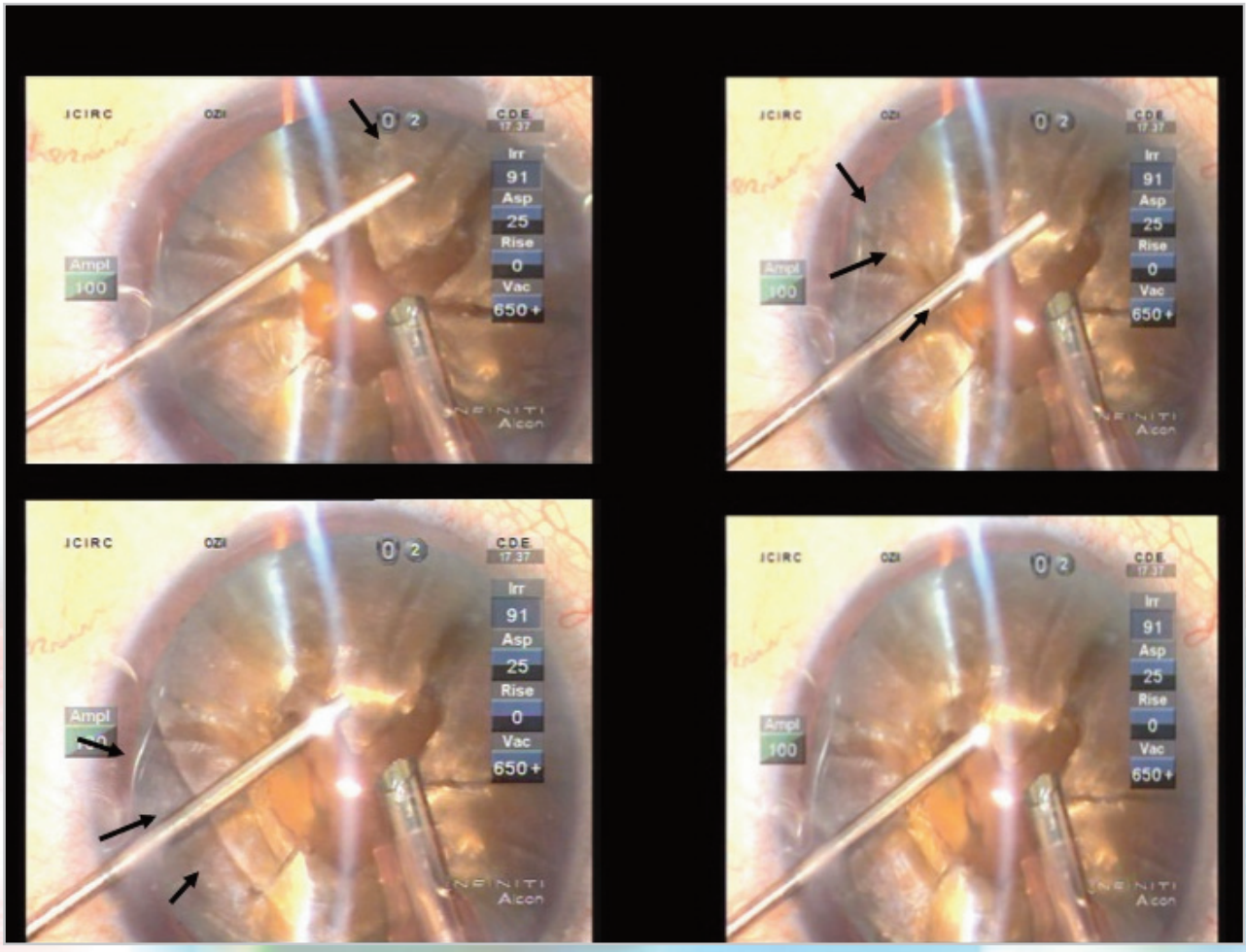
Dr. Masket: With my own method, I actually do it under air. I make a small DisCoVisc patch at the sideport to prevent the egress of the air, and I'll work under an air bubble. You don't have to paint the capsule very much with trypan blue. Then I exchange the air for DisCoVisc. I like the properties of DisCoVisc in handling the white lens because it has better space maintenance. It stops the egress of the liquefied cortex and flattens the anterior capsule, so that's the way I like to do it.

Issue 7: Why good rheology equals good phaco, and vice versa

> *"Phaco really is applied rheology. If we don't have good rheology with our phaco machine or OVDs, we're not going to have good surgeries and the outcomes will be bad"*
>
> Steve Arshinoff, MD

EyeWorld: Dr. Arshinoff, in the *Journal of Cataract & Refractive Surgery* years ago you explained with a diagram the different rheological properties—cohesive, dispersive, viscoadaptive. In framing the OVD issue, is it most important to think about the rheologic properties or to think about the actual chemical makeup of the OVD?

Dr. Arshinoff: It's the chemistry of the OVD that gives it its rheological properties, so that's a hard question to answer. You want to have a chemical that in itself is non-toxic and protective, gets along well with tissues, and is tissue-friendly. But you want to have it in a package that is rheologically and functionally very good for us. We're pickier in correcting our cylinders with toric lenses. We're pickier with our multifocal lenses. Tiny issues start to matter. Everyone expects our surgery is going to be perfect: the capsulorhexis is perfect, the lens is perfect, the edge is totally covered, the capsule is totally clear and polished, and the cornea is OK, and then the patient



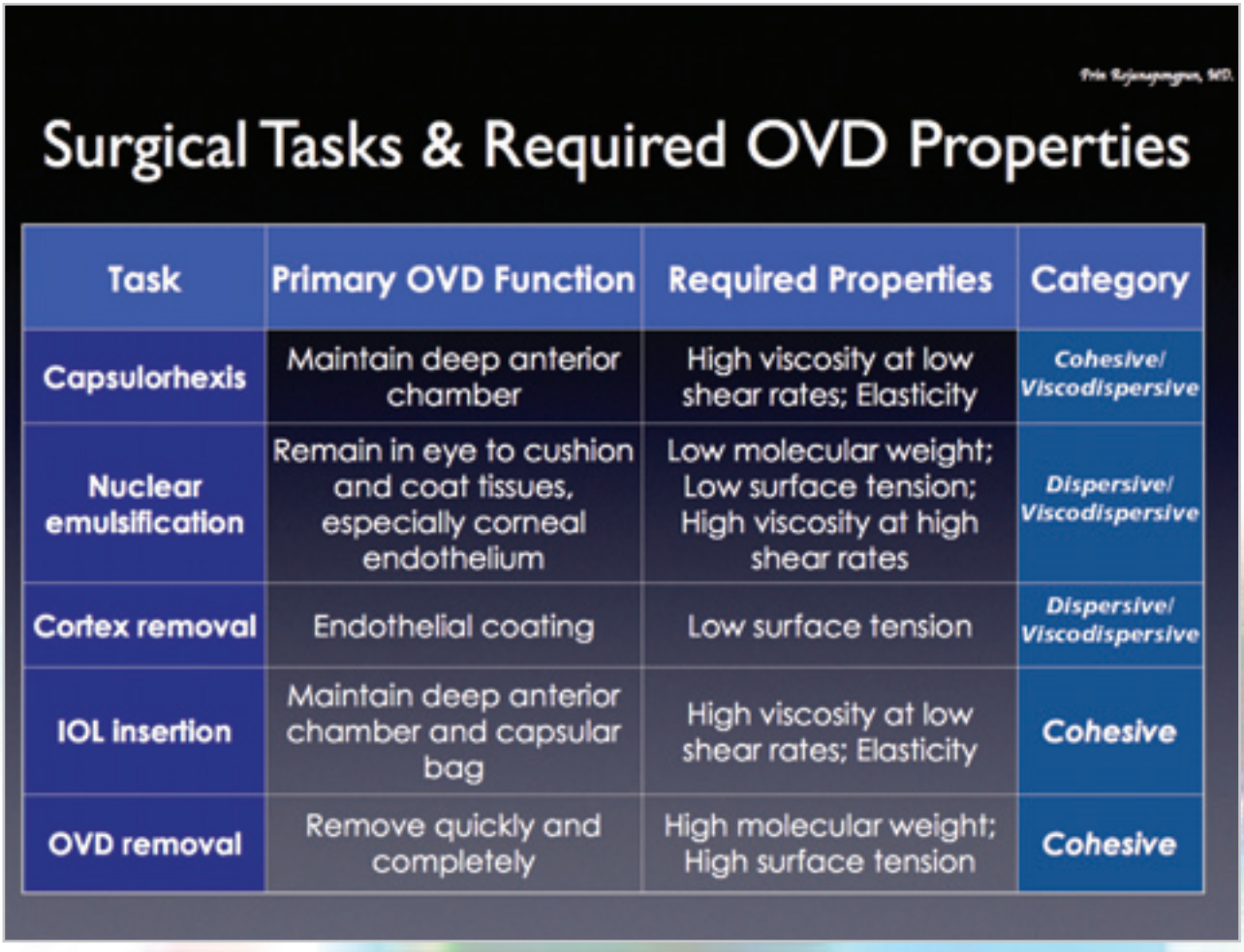
A dispersive OVD is supplemented during fragment removal of a dense cataract for endothelial protection

Source: Abhay Vasavada, MD

can see well with the multifocal lens. It's more important to use good quality OVDs to achieve that because if we don't, it's not going to work. If we have patients with a multifocal lens and they come back in five years having lost some endothelial cells and the cornea starts to swell, their vision is going to be horrible and that's going to be a huge problem.

We're saying, 'The surgeon should be abandoning HPMC,' but at the same time, the community should be more critical of how we're doing our surgery because if we do cause endothelial damage, all those fancy tricks we did are out the window. We just messed up our surgery because of the basic things we didn't do. OVDs are critically important to good surgery. Phaco really is applied rheology. If we don't have good rheology with our phaco machine or OVDs, we're not going to have good surgeries and the outcomes will be bad.

> ***"Everyone expects our surgery to be perfect. It's important to use good OVDs to achieve that because if we don't, the patient's vision is going to be horrible in five years"***
>
> **Steve Arshinoff, MD**



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