Round Table: Approaches for handling astigmatism at cataract surgery

I. Howard Fine, MD, Moderator

I. Howard Fine, MD: The question of what to do about pre-existing astigmatism at the time of cataract surgery is an important one. Jim Salz really touched on the issue as did Jack Holladay. Whether we like it or not, patients judge the quality of our surgery on refractive results. One little error in the things that Jack Holladay talked about and the best of flawless phaco technique is meaningless to the patient. They do not know they have had flawless surgery. They know that they have had the surgery and they cannot see a darn thing. And you are telling them that they can put glasses on, which is not what they had in mind. So we are increasingly looking at options for correcting astigmatism that existed prior to surgery, at the time of surgery. There are really very few alternatives, and these depend on excellent studies by the surgeon and his people and excellent lens power calculation. Then you have got to do astigmatically neutral surgery. You have to know what you are creating at the time of surgery, and then you have some options. You can do your incision on the steep axis, although that is still under evaluation in my mind. There is a great infatuation with this concept in America today, but at the European Society for Cataract and Refractive Surgery in Lisbon last fall, Jochen Kammann from Dortmund, Germany and Thomas Kohnen from Giessen, Germany both presented papers showing that oblique axis incisions had what looked like astigmatism neutrality for about a year, and then they had considerable against-the-rule drift. Another new option, which Jim may be touching on later, is going to be toric IOLs. Certainly the implant itself can address pre-existing astigmatism. But many of us are left with astigmatic keratotomy at the time of cataract surgery.

I hate to talk about economic factors of cataract surgery, but I will share this with you. We have increasing managed care in Oregon, and last month I recognized that for the first time in the history of my career the inmates are running the asylum. We have just turned the corner, and the art and science of ophthalmology are no longer directing the practice – the front office is. Economic considerations are important, and so I am looking for a fast cure, not a long cure, not something that takes a lot of time or a lot of expensive equipment. I am going to emphasize that.

I use the Maloney system, which is based on no pachymetry, because he did studies back in 1984 that showed he was using the same setting in 90% of the cases, which was 600 microns. He operated with incision pairs at 7 and 8 mm optical zones, and they were 3 mm cuts, which he later refined to include half incisions, 1.5 mm cuts. And I basically use these two optical zones and I do one, two, three, maybe – I have not done four, but I may get around to doing four incisions with the Feaster knife, which is Fred Feaster's innovation. This is a diamond blade that is 3 mm wide and does not have a point on the bottom. It is very sharp, but has a straight edge. This allows you to stamp the cornea with an incision very rapidly.

Anterior Segment and Strabismus Surgery, pp. 77–80
edited by D.A. Long
organized by the New Orleans Academy of Ophthalmology
New Orleans, LA, USA, February 9–12, 1995

You are not dragging the blade through tissue, so when you are done making your incision, it is gone. You cannot see it, and it does not interfere with your subsequent procedure. My concept was that they ultimately were going to change it so the actual mounting of the blade was going to be the blade glide. They have not done that yet, but I think it may lead to more precise cuts and increased safety. We did have some problems early on. The corneal tissue was so compliant that we initially were getting no cut in the center. We had to learn to extend the knife more. I finally did cut through some corneas, and we recognized that we needed to cut in a heel-to-toe method. This gave us an ability to incise Bowman's a point at a time, but still to stamp the knife into the tissue. I like to do my astigmatic cuts before I do the phaco, because I can blow the eye up with viscoelastic and the same viscoelastic can be used for making the capsulorhexis and then performing phacoemulsification. I use a reticule in the microscope sometimes, so I do not actually need to put my incision guides on it. I actually could place the incisions in the same way that I place the marker. We put the heel in first and then step down on the cornea. This knife is wonderful, because once we make the incision, take the knife off and irrigate the eye, the incision basically is gone. We do not have any interference with our visualization of intraocular structures, because we have not dragged the blade across the cornea, and we have not roughed up the corneal epithelium. The stroma, also, is amazingly clear and free of changes. It is a great instrument. It has worked well. My data is at John Retzlaff's to be analyzed, so we can calculate exactly what I am getting per incision, but it is approximately what Bill was getting for his incisions. So, I think that increasingly we are addressing pre-existing astigmatism, but there are certain pitfalls and certain problems, and the timing is one for me. I cannot afford to take a patient back and do a procedure with no renumeration: Medicare does not pay for this procedure as a second separate surgical procedure. I have tried to help patients understand what it is I am going to do, just for the sake of informed consent, and they do not really understand it. They do agree they want to see better without glasses, but there is no way to explain to a senior citizen what an astigmatic cut is or does. The timing is important, and what is going on in a fellow eye is important. You do not want to disrupt symmetrical astigmatism. There are considerations for the cataract-aged population that are different from refractive surgery populations. For me this has worked well as a value-added aspect of my surgery. Jim, can you give us some guidelines on management of pre-existing astigmatism in the cataract-age population?

Jim Salz, MD: I do not have any problem doing what you are doing because you know that your surgery is astigmatically neutral. Since I have switched to silicone lenses in the last year and a half, I would not be unwilling to do what you are doing at the time of surgery. I have not done it yet. I still like doing arcuate incisions. I still like to base them on the topography. And I tend to do them after the cataract surgery, although your method is certainly faster. And I think at the 7 and 8 mm zone you are using, you are unlikely to overcorrect these patients if they have a significant amount. I would caution you that these older patients can at times respond significantly more than the nomograms will show you, especially arcuate cuts at a 6 mm treatment zone, which is what I tend to do. And you have to be very cautious. Instead of a pair, I will do one and see what effect that gets, unless the astigmatism is exactly symmetrical, and then I will make them quite short. The key is to have astigmatically neutral cataract technique. It will be interesting to see what the results of this Feaster knife are, because at least you are getting exactly the same incision every time.

Dr. Fine: Bruce, I do not think you would recommend this as a good admixture with mitomycin, would you?

Bruce Shields, MD: The only thing I know about astigmatism is how to make it, and I seem to be very good at that. There is one problem I might mention, more as a question to the two of you to see if you have any thoughts on this. The majority of the cataracts I do, which is a very small amount compared to your experience, involves the combined procedures. And these can be a real problem with astigmatism. I do not know how to get around it because you often are dealing with an eye that is much softer than it was preoperatively, and it is hard to predict how something is going to be. Sometimes you do not know if it is the low pressure that is resulting in your astigmatism and if that is going to change in a few months. Also, when you have these combined procedures and you put one or two sutures in your tunnel incision, cutting a suture to relieve astigmatism will make the hypotony worse and maybe make the astigmatism worse. I do not know if there is any answer to that. If you have one, I would be glad to hear it.

Dr. Fine: I think that one of Henry Hirschman's many insights is a phenomenon that he described over ten years ago. He said that to avoid astigmatism, you should make your cataract incisions as though you were making a triangular trabeculectomy flap. He made them that way, and he sutured them so that he had arms that were perpendicular to the two arms of the incision and one at the apex. He indeed had considerably less surgically induced astigmatism by that method than by traditional cataract methods. I really enjoyed your tape and your surgery. It is elegant and looks beautiful. From my perspective as a cataract surgeon, I think glaucoma surgeons have nothing to apologize for. They have become so sophisticated in cataract surgery, I leave my troublesome glaucoma patients to glaucoma specialists. I have not used mitomycin, because we do not know as much about it as we need to, and they have the bulk of the experience. But one thing that could be done is to convert from this type of an incision to an actual scleral flap incision, which is triangular. You can get away with just one suture at the apex and get very, very little astigmatism and use your limbus-based flap as you like. You would not have to change very much, and because you are elevating a flap, you have direct access to your incision to use the same punch. I think it would be significantly less astigmatogenic. Do you have any feelings about that, Jim?

Dr. Salz: I agree.

Dr. Shields: The problem right now is that with the mitomycin we are trying to get a very tight closure to avoid the hypotony. On the other hand, we are trying to avoid a tight closure to avoid the astigmatism. So you have the two working against each other, and we have not quite reached the balance.

Dr. Fine: I do not know what the answer is. Can we answer any questions about pre-existing astigmatism? Jim, is there any thought about the possibility of using a laser as a free-standing modality combined with cataract surgery in a patient who has responded predictably to astigmatically neutral cataract surgery? Does that look feasible?

Dr. Salz: You mean before the cataract surgery, for just the astigmatism?

Dr. Fine: Or after, yes.

Dr. Salz: In order to use a laser to help you, you have to have a myopic spherical equivalent. So you would deliberately have to make them myopic with your IOL to make that feasible. It certainly would be feasible.

Dr. Fine: You know there is some new work going on now with the yttrium lithium fluoride (YLF) laser in pre-softening of cataracts. You could sit a patient down and zap the lens with the YLF laser and zap the cornea with an excimer laser, and the next day take him to the OR and fix up the cataract. That would be a high-tech procedure. Anything else? Any questions?