

Quality in Cataract Surgery: A Personal View

We all subscribe to quality, but what does it mean for cataract surgery?

BY DAVID SPALTON, FRCS, FRCP, FRCOPHTH

Quality in cataract surgery is something every surgeon subscribes to—no one aims to offer poor quality surgery—but it is worth pausing to reflect what we are trying to achieve. This article discusses the multiple aspects of cataract surgery and what I consider the essential elements in providing patients with quality care.

Much is made of quality care, but we must put aside company marketing and promotional material and look at what quality means from the patient's perspective. In other words: What do patients want? I think patients want a safe operation that is reasonably quick and pain-free, and, above all else, one in which surgical risk is minimized. They want to have excellent vision after surgery with refractive correction personalized to their needs. We shall discuss what this means in more detail.

Additionally, patients want, and have the right, to be treated with punctuality and courtesy. Having recently been hospitalized, I realize how important this is and how reassuring it is to be treated by courteous and knowledgeable staff in a clean clinical and professional environment. In the United Kingdom, surgeons are under increasing pressure from hospital management to meet government targets on numbers of patients seen, waiting times, and cost control. Such parameters depersonalize care: At its extreme, the system becomes a sausage machine, processing patients to meet management targets. Wasting resources is unquestionably wrong; however, we must remember that one can have efficiency with kindness and without loss of personal interest and care.

THE OPERATION

I can imagine my anxiety level if I were having surgery and how much more anxious I would be if it were my only seeing eye. Reassurance from the staff and confidence in the surgeon are essential.

Quality of care starts with the welcome; the reception staff should be pleasant, and the environment in the waiting room and preassessment area should be cool, clean, and spacious. A competent, well-trained nursing staff inspires confidence in patients.

Our patients come into the operating theater with a gown over their ordinary clothes. Most UK surgeons take a much less aggressive approach to preoperative antibiotic prophylaxis than US surgeons, often giving either no topical antibiotic prior to surgery or a single drop of chloramphenicol, ciprofloxacin, or levofloxacin along with the preoperative mydriatics. Everyone, however, uses povidone iodine lid preparation, and most transitioned to the use of intracameral cefuroxime after publication of the endophthalmitis prophylaxis study sponsored by the European Society of Cataract and Refractive Surgeons (ESCRS).¹⁻³

My belief is that the important prophylactic factors include administering povidone iodine, which I always ensure is instilled into the conjunctival sac; draping the eyelashes out of the field; and administering intracameral antibiotic, which has positively influenced our endophthalmitis rates.

Quality surgery is about attention to detail. I am a firm believer that topical anesthesia leads to high quality surgery because it forces the surgeon to handle tissue gently

and to be reasonably speedy, cutting out unnecessary fiddling, time wasting, and chatter. There is nothing like recording your own surgery to recognize how much more efficient and controlled each movement and manipulation can be.

My anesthetist used to say that slow surgery is always bad, but fast surgery is not necessarily always good. Really great surgeons plan each procedure carefully and operate with total economy of effort. A Saturday afternoon spent watching your own surgical videos can be a worthwhile (although disconcerting) experience. I am a firm believer, too, in a stereotyped surgical approach: Practice makes perfect, and I try to use the same basic technique and instruments for each case, with as little variation as possible. This tactic stands the surgeon in good stead; when you were up all night caring for sick children with flu symptoms or had an accident driving into work, you know you have a technique you can rely on.

Over the past 200 years, the history of cataract surgery is one of decreasing incision size. In my 30-year surgical career, I have gone from creating 9- to 10-mm incisions for intracapsular cataract extraction to my current 2.4- to 2.2-mm incisions, which seem to offer all I need without overly complicating my technique.

As an aside, I wonder how much further we need to go? Will the patient benefit by shaving another 200 μm off the incision size? Smaller incision sizes are macho and make good meeting material, but does the patient benefit? Patients clamored to be referred to surgeons who had changed from extracapsular cataract extraction to phaco; however, I do not notice a queue of patients looking for a sub-2-mm surgeon.

I think a lot of the interest in microincision cataract surgery is driven by industry rather than by patient benefit. I was, however, impressed by a presentation at the ESCRS symposium 2 years ago by I. Howard Fine, MD, of Eugene, Oregon, who showed that separating fluid inflow from aspiration was technically useful in dealing with complex cases. He concluded that infusion could be out of the bag while phaco was in the bag, and vice versa. I think this approach merits more exploration.

On looking back over the past 2 years, one thing that has really made a difference in my surgery and become something that I use routinely is torsional phaco. For routine cases, this modality provides much greater followability and control, less (or absent) lens fragment chatter, and shorter phaco times. However, I still find that with very dense cataracts I tend to get clogging and blockage at the tip, at which point I resort to conventional phaco. My colleagues tell me I should optimize my settings for these cases, and I am working through this.

IOL CONSIDERATIONS

Two major challenges currently associated with cataract surgery are avoiding posterior capsular opacification (PCO) and achieving spectacle independence for our patients.

PCO. A clear capsule is required for a good quality outcome, especially with premium lenses. The rate of PCO is down but not out. Square-edged IOLs have reduced the incidence of Nd:YAG capsulotomy from 50% at 2 years to approximately 5% now.⁴ A Nd:YAG rate higher than this should lead a surgeon to question his technique and IOL choice.

All lenses are marketed as having square edges; however, although square-edged hydrophilic acrylic IOLs are better than round-edged IOLs of the same materials, they still seem to have higher PCO rates than hydrophobic acrylic lenses.⁵ A recent study in our department explains the reason why: We found that the quality of the square edge varies considerably among IOL models. Generally, hydrophobic materials have high-quality edge profiles, whereas this is not necessarily true for hydrophilic IOLs. The reason for this is that manufacturers machine their hydrophilic IOLs from a dehydrated block, and the edge profile is somewhat lost with rehydration. The material places limitations on the engineering. It appears that high-quality edges can be put on hydrophilic materials, but manufacturers must be convinced that the investment necessary to achieve this is worthwhile.

The other major PCO problem is through-haptic PCO—the Achilles' heel effect—in which lens epithelial cells invade the posterior capsule at the optic-haptic junction, where the 360° barrier is lost. This is a common finding with these types of IOLs. One might ask why manufacturers do not prevent through-haptic PCO by making a 360° barrier on the IOL. The answer is that this requires increasing the thickness of the IOL, and therefore would require a larger incision size to accommodate it.

Spectacle independence. In my mind, achieving spectacle independence starts with astigmatism management. However, although zero astigmatism looks good in the patient's notes, we have to remember that 0.75 D of against-the-rule astigmatism is associated with better depth of focus for reading vision. Perhaps more insight is required for what we want to achieve in our distance monofocal eyes.

I like to incorporate astigmatic management into all eyes with more than 1.00 D of preoperative corneal cylinder. All my surgery is stereotyped with a temporal clear corneal incision, thus I have to use methods other than wound manipulation to manage astigmatism. Patients with 1.00 to 2.00 D of cylinder undergo ALK with the Nichamin nomogram—a simple procedure that works

well using a 600- μ m diamond blade. The site of the incision is crucial. I place it just inside the vascular arcade because more peripheral placement decreases the efficacy and, I believe, accounts for some of the variable results one sees with ALK.

I don't like astigmatic incisions of more than 4 to 4.5 mm, as I think they weaken the eye too much. For cases that require greater astigmatic correction, I use a toric IOL such as the AcrySof toric (Alcon Laboratories, Inc., Fort Worth, Texas) or the T-flex (Rayner Intraocular Lenses, Ltd., East Sussex, United Kingdom). Both give good results, but I tend to favor the T-flex because of its slightly stiffer haptics, which I find easier to align to the corneal marks.

If using conjunctival vessels as landmarks, use substantial vessels that will not disappear with blanching.

Alignment accuracy is paramount, and I have tried most methods of marking the corneal axis but have come back to using conjunctival vessels as landmarks. However, a word of caution is needed: Use substantial vessels that will not disappear with blanching from preoperative mydriatics. I like to mark the corneal axis at the start of surgery, having been once placed in the unpleasant situation of experiencing subconjunctival inflation with balanced saline solution from a corneal incision that was too peripheral, so that I lost all landmarks.

I find the results of astigmatic control add another dimension of surgical satisfaction and a rewarding patient outcome, surprisingly even in partially amblyopic eyes.

IOL CHOICE

Aspheric IOLs. There is a tremendous marketing drive behind aspheric lenses, and I feel guilty for my skepticism regarding them. The physics are undoubtedly correct; however, we found an underwhelming patient response to aspheric IOLs in a study we conducted some time ago. Each patient had an aspheric IOL in one eye and a traditional spherical IOL in the fellow eye. Mesopic contrast sensitivity testing showed the expected benefit of the aspheric IOL, but our patients could not tell which eye had the aspheric IOL, even on direct questioning. A recent Cochrane study has confirmed this.⁶ The reasons are clear and not surprising. Spherical aberration is dependent on pupil diameter. Most spherical aberration measurements are performed with dilated pupils (5–6

mm), but many elderly patients have relatively miotic pupils that do not dilate to more than approximately 4 mm. The benefits of asphericity will not be appreciated by these eyes.

More than 95% of the wavefront aberration of the human eye is due to lower-order sphere and cylinder aberration.⁷ It has been calculated that, at a pupillary diameter of 4 mm, the amount of spherical aberration is equivalent to approximately 0.25 D. Therefore, unless the biometry is perfect, the benefits of spherical aberration correction will be lost in the lower-order noise. There is the dilemma, too, of how much spherical aberration should be corrected, with options varying from neutral to complete correction of corneal asphericity. For example, Bausch & Lomb's (Rochester, New York) aspheric IOLs have neutral correction, whereas the AcrySof IQ has 0.17 μ m and the Tecnis (Abbott Medical Optics Inc., Santa Ana, California) has 0.27 μ m of spherical aberration. We await studies that show whether customizing the IOL correction to the corneal asphericity has advantages for the patient whether complete or partial correction of spherical aberration is best.

The effect of decentration is well recognized, but with good surgery this does not seem particularly relevant. Spherical aberration provides increased depth of focus, and some studies show that spherical IOLs provide better depth of focus and reading ability.⁸ However, the effect is small and may not be clinically relevant, especially with pupillary miosis with near vision.

I use aspheric IOLs but without any great conviction that I am making much difference to the patient's quality of vision, with the exception of young patients with larger pupils or after previous corneal refractive surgery with increased spherical aberration.

Blue-blocking IOLs. I have used blue-light-blocking lenses for many years because I thought they provided some macular protection. Having sat through a number of presentations by Martin A. Mainster, PhD, MD,

TAKE-HOME MESSAGE

- Think of quality cataract surgery in terms of what the patient wants.
- Great surgeons plan each procedure carefully and operate with total economy of effort.
- Posterior capsular opacification and achieving spectacle independence for patients remain two challenges in cataract surgery.
- Discuss the potential of postoperative spectacle correction with each patient before surgery.

FRCOphth, of Kansas City, Kansas, I have recently become more skeptical about their macular protection benefit. With that said, however, my patients do not seem to suffer any of the dire consequences he predicts from changes in circadian rhythm. My present conclusion is that the advantages and disadvantages of these IOLs owe more to the marketing strategies of the companies concerned than to clinical results.

Some years ago, I gave expert advice on a case in which the patient sued the surgeon because she was not told she would have to wear spectacles postoperatively for correction of her astigmatism and to read. She received a minimal out-of-court settlement. Ever since then, I am careful to discuss the potential need for postoperative spectacle correction with each patient before surgery to make sure our expectations are the same. Some prefer to keep their myopia and use spectacles for distance. As a low(ish) myope, this is a concept I have sympathy with and would probably opt for myself (with correction of my 2.00 D of astigmatism). Monovision is a strategy I am wary of and offer only to patients who have used it with a previous contact lens trial.

Presbyopia-correcting lenses. These IOLs are a relatively small part of my practice. Perhaps 10% of patients are suitable candidates, but only 5% opt for these technologies. Oftentimes, this choice is because of the additional financial implications not reimbursed by health insurance companies, especially in the current economic climate. Patient awareness in my practice is low, and usually I find that I offer multifocal IOLs to the patient rather than being asked about them directly. I do not regard myself as having to be a salesman for personal financial gain, and I am extremely careful about patient selection. I have a central London practice with a lot of demanding, type-A personalities, most of whom want and expect high-quality, uncomplicated vision from their surgery. Such patients are emotionally unsuitable candidates for the compromises of visual quality inherent with multifocal IOLs. The following comment from a wealthy and high-powered hedge fund trader is one I remember well: Me: "Do you use a computer much?"

Patient: "It's all I ever do, Doctor. I'm there when the market opens and trade all day."

The patient was clearly not a candidate for these lenses, and he went on to have emmetropic distance IOLs and reading glasses, with which he was extremely pleased.

I initially used the AcrySof IQ Restor +4.0 D (Alcon Laboratories, Inc.), and some patients complained about loss of contrast, too near of a reading focus, and halos at night. I changed to the Acri.LISA (Carl Zeiss Meditec, Jena, Germany) with better results, and I now hear of

good results with the AcrySof IQ Restor +3.0 D aspheric and shall try this lens.

The typical patient I know will be happy with a multifocal is an elderly, hyperopic woman with minimal corneal astigmatism and low reading and near vision requirements who wants to be spectacle independent. For example (without being patronizing), someone who reads tabloid-style daily newspapers, spends time looking after her grandchildren, and rarely drives at night is a good candidate. The Crystalens (Bausch & Lomb), just coming into the UK market, appears to offer better depth of field without the disadvantage of the dysphopic symptoms; this is something I actively look forward to using.

CONCLUSION

Patients' surgical expectations have never been higher. There is no one as bitter as a patient who feels the operation has not met his expectations and has a less-than-satisfactory outcome, for whatever reason. When this happens, as it must inevitably, it is important to give these patients ample chair time and positive help. It is extremely important to discuss any unusual surgical risk factors with patients prior to surgery so they can give proper informed consent. Patients must know that limitations such as concomitant disease can influence their visual outcome. The challenge of meeting patients' refractive requirements becomes more onerous as the options for refractive correction increase. All of this makes the challenge more interesting and satisfying for the surgeon. ■

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