Spectacle independence is a central aim in modern cataract surgery. Although bilateral monofocal IOL implantation, aiming for 0.00 to -0.50 D, leads to high levels of patient satisfaction, spectacle dependence for reading and other near vision tasks is the usual result.

Most surgeons faced with a patient with bilateral cataract would leave him either emmetropic or with low levels of postoperative myopia in both eyes. This leaves most patients dependent on spectacles for near visual tasks. Many surgeons have used multifocal IOLs to enable some of their patients to achieve good near and distance UCVA. Newer models or a mix of different multifocal lens types offer some intermediate UCVA as well.

Along with reports about good near UCVA have come reports of problems encountered with using multifocal lenses. The frequency of patient complaints about glare and photic phenomena with such IOLs is higher than with monofocal lenses. Furthermore, it is crucial to get the biometry right and to control astigmatism.

At the moment, multifocal lenses cannot be implanted in every patient. Patient selection and counseling takes time. Patients usually have to pay more for multifocal lenses, leading to heightened expectations. The cost of multifocal IOLs means that they are not usually available under private insurance or government funded health care, although top-up payments are sometimes acceptable.

EVALUATING MONOVISION IOLS

Reviewing the early clinical trials evaluating multifocal IOLs, one could be led to believe that the only alternative to multifocality is the use of monofocal IOLs targeted for emmetropia. Absent is any mention of an alternative in the form of monovision.

Monovision is a strategy widely used by contact lens practitioners and laser refractive surgeons. Some of my colleagues and I have achieved good results with monovision after LASIK and cataract surgery. We knew that there was some literature about monovision after LASIK, but little evidence about it after cataract surgery. We hypothesized that monovision might offer an alternative to multifocal IOL implantation—an alternative available without the additional cost of multifocal IOLs or postoperative problems with glare.

We therefore set up a randomized controlled clinical trial to compare multifocal IOL implantation with monovision after cataract surgery. The study is funded by equal unrestricted grants from Bausch & Lomb (Rochester, New York) and Abbott Medical Optics Inc. (Santa Ana, California).

In the study, patients with cataract, no comorbidity, and low astigmatism are randomly assigned to receive...
either bilateral Tecnis Multifocal ZM900 (Abbott Medical Optics Inc.) implants or monovision using the Akreos AO monofocal IOL (Bausch & Lomb) to achieve emmetropia in one eye and low myopia (-1.25 D) in the other.

We realized that relatively low myopia might not produce high levels of spectacle independence for reading, but we felt that if patients were unhappy with the monovision strategy it could easily be corrected with spectacles, without troublesome anisometropia.

No contact lens trial is used to determine dominance preoperatively. Instead, we ask the patients which eye they think is dominant, which eye they would hold a camera up to, or we ask the patient to view a distant target through a circle made by thumb and forefinger.

The trial has been set up as a randomized controlled trial that aims to produce high-quality evidence. Because both monovision and multifocal strategies intend to reduce spectacle use, we chose spectacle independence as the primary outcome of the trial. Our calculation of statistical power suggested that 212 patients were needed to detect a difference in spectacle use, and we are close to recruiting this number.

Secondary outcomes include levels of glare disability and visual quality of life, which are documented using the VF-14 questionnaire. We also objectively measure reading speed, contrast sensitivity, glare, and higher-order aberrations.

Eight consultant surgeons are taking part at five National Health Service hospitals in the United Kingdom, meaning that this comparison of two technologies is taking place in a public health care environment. We expect that the results will have relevance to cataract patients in general, rather than those who attend a cataract department with a specialist refractive interest. The large size of the trial will also reveal some of the moderately frequent adverse events (such as IOL exchange) that are not detected by small trials involving 20 to 30 patients.

RESULTS TO COME

The trial has not finished, and no interim results can be revealed. However, it is already clear that both strategies are well tolerated and appreciated by the patients. Indeed, if this were not so, we would not be able to continue the study.

When the results are published, we will have more evidence about spectacle independence with multifocal IOLs. We still do not have a consistent picture about what is achievable; recent trials have produced a wide range of results, with between 27.3% and 87.5% spectacle independence reported. Variations are due to IOL design, patient selection, and the timing of patient testing postoperatively.

We will also have data from only the second study to evaluate monovision after cataract surgery. We will not have information about the extra time spent counseling patients undergoing either of these strategies. In a trial environment the researcher spends more time with the patient regardless of the intervention.

Also needed in future studies will be a better questionnaire instrument that deals with presbyopia. We know from using the VF-14 instrument that patient scores are already high after standard cataract surgery. We are still waiting for something to help us quantify how dissatisfied patients are with presbyopia or how pleased they are when it is treated, whether with multifocals or an alternative strategy such as monovision.

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