The refractive outcome after cataract surgery is important for both patients and the surgeon who wants happy patients. With refinements of the surgical procedure and the increasing awareness our patients have, refractive outcome has become even more important.

Sometimes, the refractive outcome of cataract surgery is a surprise. In routine cataract surgery, 75% to 90% of patients end up with a final refraction within ±1.00 D of the target refraction. It has previously been reported that risk factors for deviating from the desired postoperative refraction include older age and use of a clear corneal incision.

We were interested to find out what factors are related to the refractive outcome after cataract surgery. In a recent study, we analyzed follow-up data from the Swedish National Cataract Register (NCR). The objective of the study was to examine what factors were related to deviation from the desired postoperative refraction.

**METHODS**

The study included data from the NCR during 6 years (2000–2005). The Swedish NCR covers 98.5% of all cataract surgeries performed in Sweden. Every March, many ophthalmology departments voluntarily participate in a more thorough investigation, reporting data on every cataract extraction during that month. Data are collected at the preoperative examination, during surgery, and at postoperative follow-up.

Approximately 4,000 cataract surgeries every year are reported in this way to the NCR. During the 6-year block included in our study, 49 of 55 ophthalmology departments performing cataract surgery in Sweden participated in the data collection. A total of 23,244 patients were eligible for the study.

The study’s main outcome measure was the mean absolute prediction error, which we defined as the difference between the planned and the achieved postoperative refraction. The achieved refraction was calculated as the spherical equivalent of the spherical and astigmatic correction at the final postoperative follow-up. The mean absolute prediction error was the response variable in our statistical analyses.

The variables we examined as possible predictors in the analyses were age; sex; preoperative visual acuity; whether the patient had previously undergone cataract surgery in the fellow eye; and the presence of any sight-threatening eye disease, which was divided into glaucoma, macular degeneration, diabetic retinopathy, and other eye disease. We also studied whether there were differences between high-volume ophthalmology departments regarding how close they got to achieving the target refraction and whether there were any differences during the 6 years we observed.

**TAKE-HOME MESSAGE**

- The Swedish National Cataract Register includes data on almost all cataract surgeries performed in Sweden.
- Women’s mean refractive outcome was further from the predicted outcome than men’s; a possible explanation for the difference is that women have on average shorter axial lengths than men.
- The mean absolute prediction error became smaller as the surgeries became more recent, possibly due to improvements in techniques and equipment.
RESULTS

The absolute prediction error for all patients was 0.59 ±0.66 D (mean ±standard deviation). In the study, 58.4% of patients were within ±0.50 D difference between planned and final postoperative refraction, and 83.8% of patients were within ±1.00 D. As in earlier studies, more women (n=15,214) had cataract surgery than men (n=8,030).

Women had a greater mean absolute prediction error than men (P<.001). Other factors that affected the mean absolute prediction error were preoperative visual acuity (P <.0001), glaucoma (P =.015), and other eye disease (P<.0001). Patients with second eye surgery did not have a smaller mean absolute prediction error (P=.49). No effect on outcomes was seen regarding macular degeneration (P=.36), age (P =.39), or diabetes (P=.43).

There was a significant difference in mean absolute prediction error among the years studied (P<.0001), with a smaller degree of error in the more recent years. There was also a significant difference in mean absolute prediction error among the different high-volume ophthalmology departments included in the study (P<.0001).

DISCUSSION

This study reports some new and interesting findings. Register studies do not provide explanations, but they do generate hypotheses that can become the impetus for new studies.

We found that women end up farther from the planned refractive outcome than men. We have not seen previous studies showing this, although some studies have shown that women have worse visual outcomes than men after cataract surgery.9,10 A possible explanation for the poorer refractive outcome in women may be that they have shorter axial lengths compared with men.11,12

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We also found that second eye surgery did not affect refractive outcome. We thought this was surprising because the surgeon must account for the refractive outcome of the fellow eye when planning the refraction of the second eye. Another recent study had similar findings.13

Age was not related to refractive outcome. If preoperative visual acuity was excluded from the analyses, age was a significant predictor; however, when visual acuity was included, age disappeared as a risk factor.

The mean absolute prediction error became smaller the more recently the surgery was performed. This difference may be due to the introduction of better techniques and equipment. For example, use of the IOLMaster (Carl Zeiss Meditec, Jena, Germany) for biometry has probably increased during the years studied, and its method of partial coherence interferometry has been shown to be more reliable than conventional ultrasound for biometry.5

We found a significant difference in refractive outcome among the high-volume ophthalmology departments. This accords with the results of the 1998 European Cataract Outcome Study.1

In summary, several factors seem to be related to refractive outcomes after cataract surgery. It is important to study these factors to continuously improve the results of this procedure, the most common surgical procedure in the world.

Maria Kugelberg, MD, PhD, practices at St. Erik’s Eye Hospital, Karolinska Institutet, Stockholm, Sweden. Dr. Kugelberg states that she has no financial interest in the products or companies mentioned. She may be reached at tel: +46 8 672 30 00; fax: +46 8 651 07 85; e-mail: maria.kugelberg@sankterik.se.

Mats Lundström, MD, PhD, practices with EyeNet Sweden, Blekinge Hospital, Karlskrona, Sweden. Dr. Lundström states that he has no financial interest in the products or companies mentioned.


