REFRACTIVE SURGERY
Refractive procedures carry some risk of glaucoma misdiagnosis
by Roibeard O’hEineachain in Vienna

Virtually every type of refractive surgery can have effects on glaucomatous pathology and/or its diagnosis, said Stephan Kaminski MD, Medical University of Vienna, Vienna, Austria.

“Close collaboration between refractive and glaucoma surgeons should be considered in patients who are at risk for the disease,” Dr Kaminski told attendees at a session of the special Glaucoma Day portion of the XXIX Congress of the ESCR.

He noted that most patients undergoing refractive surgery range in age from their mid-20s to around 50 years of age. Therefore, most will have undergone their procedures at an earlier age than patients usually develop glaucoma. The prevalence of glaucoma increases with age, from two per cent in those over 40 years of age to more than 10 per cent in those over 75 years of age. Refractive surgeons have no way of knowing whether their patients will develop the disease in the future, he said.

It therefore makes good sense to closely examine a refractive surgery candidate’s ocular parameters related to glaucoma, such as optic nerve head and IOP. Patients who are at a higher risk of the disease may warrant closer scrutiny. This includes patients with a family history of the disease, those of African descent, high myopes, those with a central cornea thickness less than 500 µm, and those with cardiovascular disorders. Their examinations should include visual field testing, nerve fiber imaging and optic disc photographs, he noted.

“Most highly myopic patients have an abnormal disc and it’s really hard to detect if they have glaucomatous pathology or if it’s just due to the myopia,” Dr Kaminski said.

Refractive surgery can raise the risk

The different forms of refractive surgery have the potential to damage ocular structures in ways that have an effect on parameters important in glaucoma. For example, the suction produced by a microkeratome or femtosecond laser head during LASIK can temporarily raise IOP to 80 mmHg, which might be enough to induce some vision loss in a patient with an already compromised optic nerve.

“LASEK might be a better option in eyes with suspicious nerve heads,” Dr Kaminski said.

Meanwhile, both iris-fixated and angle-supported phakic IOLs can cause synechiae and pigment dispersion, Dr Kaminski said. Angle-supported IOLs can also compromise the trabecular meshwork. Posterior chamber IOLs also carry some glaucomatous risk, as they can compromise aqueous flow and induce pigment dispersion.

With clear lens extraction the main glaucoma-related risk comes from the postoperative elevated pressure caused due to retained viscoelastic. On the other hand, such procedures may actually be beneficial in eyes with pigment dispersion glaucoma.

The IOP challenge

The main problem with corneal refractive techniques in relation to glaucoma is that they can skew the findings of Goldmann applanation tonometry, which remains the gold standard, Dr Kaminski noted. LASIK in particular makes the cornea softer and flatter. Corneal inlays may also alter cornea’s biomechanics, although there is currently little data as to how it affects Goldmann applanation.

“Previous corneal refractive surgery makes it difficult to set a target IOP. Target pressure must be individualised and based on the level of IOP at which glaucomatous change occurred. Preoperative IOP may be a guide to correct for corneal changes,” Dr Kaminski said.

The use of steroids in all refractive surgical procedures, especially corneal surface ablation procedures, carries with it a risk of IOP increase. Elevated IOP can cause fluid accumulation in the LASIK flap interface, which can be misinterpreted as diffuse lamellar keratitis, potentially leading to the prescription of further steroids, Dr Kaminski said.

Dr Kaminski cited a study of 13 eyes with suspected diffuse lamellar keratitis that received steroids to treat the condition. Subsequent tonometry showed that the mean central IOP was 19.1 mmHg but the mean peripheral IOP was 39.5 mmHg. Closer examination showed interface oedema with interface fluid pockets. Fortunately, cessation of steroid use and initiation of anti-glaucomatous therapy resulted in clear corneas and normal vision by the end of follow-up (Galal et al, J Refr Surg 2006; 22: 441-447).

However, another report showed a less favourable outcome in six eyes of four patients with diffuse lamellar keratitis treated with steroids. All eyes developed interface fluid pockets and IOP was low to normal centrally in all eyes. However, IOP was not measured in the periphery until several months after the initiation of steroid medication. By that time, three eyes of two patients had severe optic neuropathy (Hamilton et al, Ophthalmol 2002; 109:659-665).

In summarising, Dr Kaminski said that the detection of high IOP after corneal refractive procedures could be difficult. Patients should therefore have a medical record card with preoperative data like IOP, central corneal thickness, anterior chamber depth, he suggested. Patients should undergo several IOP measurements preoperatively. General ophthalmologists and glaucoma specialists also need to be aware of any refractive surgery a patient has undergone.

“Patients should inform every ophthalmologist that refractive surgery has been performed, patients are often forgetting,” Dr Kaminski concluded.