

Abstracts

Edited by Dr. Tahir Mahmood

Wearing swimming goggles can elevate intraocular pressure

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Br J Ophthalmol 2008; 92: 1218-21

Swimming is a popular form of exercise with many swimmers wearing goggles to improve underwater visibility. Tension from the goggle headband keeps the goggles in place. This force acting on the goggles may compress orbital vasculature and other structures to cause an elevation in intraocular pressure (IOP). Continuously elevated IOP is a significant risk factor for glaucoma development and progression.

There is no previous information regarding the effects of swimming goggles upon IOP. There are case reports of migraine, supraorbital neuralgia, eyelid swelling, skin irritation and diplopia associated with wearing goggles. One study found that the air pressure between a swimming goggle and the eye decreased as one subject placed his goggle on and off. The authors wanted to determine if goggle wear resulted in immediate changes to IOP and if these changes were sustained for the duration of goggle wear. They were also interested in determining the goggle characteristics that were associated with any IOP changes. They performed a pilot study to test the immediate effect of wearing goggles upon IOP and used measurements of the subjects orbits and swimming goggles to generate a predictive model of IOP change. A subsequent Validation study involving more subjects and using a greater range of goggles tested the validity of this predictive model. The Validation study also added to the data from the Pilot study and allowed them to clarify if IOP changes upon goggle application were sustained or varied while wearing goggles for an extended period of time.

The purpose of the study was to examine the acute effects of wearing swimming goggles upon intraocular pressure (IOP).

This research consisted of a pilot study and a Validation study. Holes were drilled into the faces of

13 different goggles to allow IOP measurement by applanation tonometry. IOP was measured before goggle wear, 2 min after goggle application, 20 min after goggle application and after goggle removal. The pilot study (n=15) was initially performed to investigate changes in IOP while wearing five different types of swimming goggles. Anatomical and goggle design parameters from the pilot study were then used to generate a predictive model and design a Validation study (n=20). The Validation study tested the predictive model, examined IOP changes using another eight goggles and clarified whether IOP changes were sustained for the duration of goggle wear.

IOP increased while wearing goggles by a mean pressure of 4.5 mm Hg (SD 3.7, $p < 0.001$) with this pressure rise being sustained for the duration of goggle wear. A smaller goggle face area ($p=0.13$), was consistently associated with greater IOP elevation.

Authors concluded with the remarks that these measurements were not taken while swimming, but they suggest that some swimming goggles can elevate IOP.

Efficacy and Safety of Capsular Bending Ring Implantation to Prevent Posterior Capsule Opacification

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J. Cataract Refract Surg. 2008; 34: 1318-28

Adding a sharp posterior edge to intraocular lenses (IOLs) has significantly reduced the formation of regeneratory after cataract on the posterior capsule behind the optic and the subsequent need for neodymium: YAG (Nd:YAG) laser capsulotomy. However, the barrier effect of sharp edged IOLs occasionally fails and generally wears off over time. This is caused by 2 weakness of the concept. The first is that the persistence of the barrier effect of the posterior optic edge is dependent on the formation of

a permanent circumferential capsular bend at the posterior optic edge, which results from capsular bag closure. Capsular fusion and subsequent bend formation are counteracted by broad haptic junctions (junction phenomenon) or by overly long and rigid loops that ovally distort the capsular bag and are sometimes incomplete (primary barrier failure) for unknown reasons. In the long run, fusion and bending may secondarily be reversed by the proliferative pressure of delayed soemmering ring formation if collagenous sealing of the capsular leaves at the optic rim is not firm enough to resist redivision (secondary barrier failure).

Second, a prerequisite to bend formation is circumferential overlap of the optic by the anterior capsule leaf, which is not always achieved. Incomplete overlap results in early retro-optical lens epithelial cell (LEC) ingrowth. Capsulorhexis-optic overlap that is too small may give way to anterior capsule retraction with consequent anterior optic buttonholing and fibrosis of the retro-optical posterior capsule, while overlap that is too large unnecessarily reduces the free optic zone, especially when fibrotic capsulorhexis contraction ensues. This explains the 10 year cumulative Nd:YAG laser capsulotomy rate of more than 40% found with the most widely used hydrophobic acrylic IOL.

The purpose of the study was to determine whether a capsular bending ring (CBR) with a rectangular cross-section and sharp edges moves the barrier to the very equator and avoids contact between the capsulorhexis and optic to prevent posterior capsule opacification (PCO) and anterior capsule fibrosis.

A 0.7 mm high, open poly (methyl methacrylate) CBR was implanted in 60 eyes (patients) in a prospective randomized intraindividual trial. The impact of additional CBR implantation on PCO and anterior capsule fibrosis was compared to that of intraocular lens (IOL) implantation alone using objective scoring.

No CBR-related surgical complications occurred. The objective PCO score and area were statistically significantly reduced in the CBR group. In patients with complete follow-up, the mean PCO score (scale 1 to 10) at 1, 2 and 3 years was 0.8, 1.7 and 2.1 respectively, in the CBR group and 2.6, 3.9, and 4.6 respectively, in the no CBR group. The number of quadrants affected by PCO was 0.9, 1.5, and 1.8 versus 3.2, 3.8, and 3.8. Barrier failures with the CBR were

caused by the inherent slight edge blunting and occasional eyelet gaping. Laser capsulotomies were performed in the no-CBR group only. Capsule stress folds and fibrotic anterior capsule opacification were also greatly reduced. The best corrected visual acuity was better in the CBR group.

Authors concluded with the remarks that capsular bending ring implantation was an effective and safe adjunct to in the bag IOL fixation. With improvements in technology and design securing exquisitely sharp edges and circumferential capsular bending independent of the capsular bag diameter, this concept has the potential to prevent PCO and anterior capsule fibrosis.

Intraocular pressure on the first postoperative day as a prognostic indicator in phacoemulsification combined with deep sclerectomy

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J. Cataract Refract Surg. 2008; 34: 1374-8

The incidence of open-angle glaucoma increases with patient age, and cataract and glaucoma frequently develop in the same patient. In addition, there is an increased risk for cataract in patients with glaucoma, and glaucoma surgery significantly increases the risk for development of cataracts. For these reasons, there has been an increasing trend toward performing a combined procedure for both diseases. Nevertheless, the decision to do sequential or combined cataract and glaucoma surgery depends on several individual patient factors including the degree of visual impairment, target intraocular pressure (IOP), stage of glaucoma, and patient age and life expectancy.

Deep sclerectomy and viscocanalostomy are nonpenetrating filtration procedures to surgically treat glaucoma. Isolated or combined with phacoemulsification, both procedures may offer good success rates, minimizing the risk for postoperative complications associated with trabeculectomy or phacotrabeculectomy. Regarding the efficacy of these nonpenetrating filtration procedures, the results are controversial. The purpose of the current study was to evaluate whether the IOP value 24 hours after combined phacoemulsification-nonpenetrating deep sclerectomy can also be considered a prognostic indicator.

The purpose of the study was to study the intraocular pressure (IOP) as a prognostic indicator on

the first day after combined phacoemulsification and nonpenetrating deep sclerectomy.

This retrospective study included 70 eyes of 70 patients who had combined phacoemulsification-nonpenetrating deep sclerectomy with a reticulated hyaluronic acid implant. Visual acuity, IOP, and slitlamp examinations were performed preoperatively and 1 and 7 days and 1, 3, 6, 12, and 24 months postoperatively. A split point of 9.0 mm Hg on the first postoperative day was used. The need for medication and postoperative neodymium: YAG goniopuncture was also recorded.

The mean preoperative IOP was 22.5 mmHg \pm 5.2 (SD). The mean postoperative IOP was 11.6 \pm 8.1 mmHg, 16.4 \pm 4.7 mmHg, and 17.0 \pm 5.3 SD mmHg at 1 day, 12 months, and 24 months, respectively. A greater success rate was observed in terms of survival ($P = .006$, log rank test) in patients with an IOP of 9 mmHg or less on the first postoperative day; these patients also had a significantly reduced need for glaucoma treatment ($P = 0.15$) and goniopuncture ($P = .009$).

Authors concluded with the remarks that an IOP of 9mm Hg or less on the first postoperative day might serve as a positive prognostic indicator in combined phacoemulsification with deep sclerectomy.

Vision-related quality of life in patients with pituitary adenoma

Okamoto Y, Okamoto F, Hiraoka T, Yamada S and Oshika T
Am J Ophthalmol 2008; 146: 318-22.

Pituitary adenoma, which account for 17.4% of all brain tumors, is the third most frequently diagnosed brain tumor, following intracranial meningioma and glioma. The development of pituitary tumors may compress surrounding structures such as optic nerve and cranial nerves III, IV, and VI, leading to visual field (VF) defects including bitemporal hemianopia, visual disturbance, and ocular motility abnormalities. The frequency of VF defects associated with pituitary adenoma varies, ranging from 9% to 32% as reported in the literature. Visual disturbance is reported to be present in 4% to 16% of patients with pituitary adenoma and ocular motility abnormalities in 1% to 6% of patients.

In addition to traditional objective assessments of patients such as clinical examinations and laboratory data collection, subjective assessment of the daily activities and well being of patients has become increasingly important in recent medical practice. The tool for quantitative evaluation of the vision related quality of life (VR-QOL), the 25 item National Eye Institute Visual Function Questionnaire (VFQ-25), has been used to track the outcome of many ocular diseases such as cataract, glaucoma, age related macular degeneration (AMD), epiretinal membrane, diabetic retinopathy, keratoconus, and macular hole. As for patients with pituitary adenoma, the existing studies have assessed the quality of life and well being of patients with pituitary adenoma, the well being of patients by using general health related quality of life measures.

The purpose of the study was to evaluate the vision related quality of life (VR-QOL) in patients with pituitary adenoma.

A VR-QOL questionnaire was distributed to 154 patients with pituitary adenoma and 81 normal controls. These were presurgical patients. VR-QOL was measured using the 25-item National Eye Institute Visual Function Questionnaire (VFQ-25). The influence of various factors on VFQ-25 score was assessed, including age, logarithm of the minimum angle of resolution best corrected visual acuity (logMAR BCVA), critical flicker fusion frequency, Humphrey static perimetry scores, and the duration of ocular symptoms.

The VFQ-25 composite score was significantly lower in patients with pituitary adenoma than in the normal controls ($P < .001$), with significant differences in all subscales except for color vision. The VFQ-25 composite score in patients with pituitary adenoma was significantly correlated with logMAR BCVA, mean deviation (MD) and corrected pattern standard deviation (CPSD) of Humphrey perimetry, critical flicker fusion frequency, and the duration of ocular symptoms. Stepwise multiple regression analysis revealed that MD score in the better seeing-eye ($r = 0.69$; $P < .001$) and the duration of ocular symptoms associated with pituitary adenoma ($r = -0.36$; $P < .001$) were significantly related to the VFQ-25 composite score.

Authors concluded with the remarks that the VR-QOL is significantly deteriorated in patients with pituitary adenoma. The degree of visual field defect in better seeing-eye and duration of ocular symptoms

were found to be significantly related to the decline of VR-QOL in these patients.