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Long-Term Safety and Efficacy of Limited Vitrectomy for Vision Degrading Vitreopathy Resulting from Vitreous Floaters

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Purpose: Vitreous floaters can lower visual acuity (VA) and degrade contrast sensitivity function (CSF). Limited vitrectomy improves VA and normalizes CSF, but long-term results in a large series with objective quantitative outcome measures are lacking.

Design: Case series.

Participants: One hundred ninety-five eyes of 145 patients (87 men, age = 57.6±4.3 years; 58 women, age = 61.5±12.0 years) reporting bothersome vitreous floaters were compared to 70 age-matched controls. Posterior vitreous detachment (PVD) alone was the cause in 96/195 (49.2%), myopic vitreopathy alone was the cause in 30/195 (15.4%), PVD with myopic vitreopathy was the cause in 56/195 (28.7%), and asteroid hyalosis was the cause in 13/195 eyes (6.7%).

Methods: Limited vitrectomy with 25-gauge instruments was performed without surgical PVD induction, preserving 3 to 4 mm of retrolental vitreous in phakic eyes. Follow-up averaged 32.6±23.5 months (range, 3-115 months), with 2 years or more in 144 eyes, 3 years or more in 69 eyes, 4 years or more in 51 eyes, and 5 years or more in 24 eyes.

Main Outcome Measures: Visual acuity, 39-item National Eye Institute Visual Function Questionnaire (VFQ) results, CSF (Weber index), and quantitative ultrasonography results.

Results: After surgery, vitreous echodensity decreased by 94.1% ($P < 0.0001$) and VFQ results improved by 19.3% ($P < 0.0001$). Preoperative VA was 0.68±0.21, improving to 0.77±0.19 after surgery ($P < 0.0001$). Preoperative CSF was degraded by 91.3% compared with controls ($P < 0.0001$), normalizing at 1, 3, 6, 12, 24, 36, and 48 months after surgery ($P < 0.00005$ for each). There were no cases of endophthalmitis. There were 3 retinal tears and 3 retinal detachments that underwent successful repair. Clinically significant vitreous hemorrhage developed in 2 patients, clearing spontaneously. Two macular puckers and 4 recurrent floaters from new PVD were cured by re-operation. Cataract surgery occurred in 21 of 124 patients (16.9%; mean age, 64±7 years; none younger than 53 years), an average of 13.1±6.8 months after vitrectomy.

Conclusions: Limited vitrectomy for Vision Degrading Vitreopathy decreases vitreous echodensity, improves patient well-being, improves VA, and normalizes CSF. The long-term efficacy and safety profiles suggest this may be a safe and effective treatment for clinically significant vitreous floaters, warranting a prospective randomized trial.

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Influence of Surgical Procedures and Instruments on the Incidence of Suprachoroidal Hemorrhage during 25-gauge Pars Plana Vitrectomy

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Purpose: To evaluate the influence of surgical procedures and instruments that are associated with intraocular pressure (IOP) fluctuations on the incidence of suprachoroidal hemorrhage (SCH) during 25-gauge pars plana vitrectomy (25G-PPV), and to investigate the clinical features of SCH during 25G-PPV.

Design: Retrospective, comparative case series.

Participants: A total of 3034 cases that underwent initial 25G-PPV at a single surgical center.

Methods: Univariate analysis was performed to evaluate the relationships between the incidence of SCH during 25G-PPV and the surgical procedures and instruments that were associated with IOP fluctuations. The participants were divided into 4 groups that underwent the following procedures: neither fluid-air exchange nor vitreous shaving under scleral depression (group 1, n = 1144); fluid-air exchange alone (group 2, n = 463); vitreous shaving under scleral depression alone (group 3, n = 639); and both procedures (group 4, n = 788). The incidence of SCH in each group was compared. The clinical features and surgical outcomes of SCH during 25G-PPV were also investigated.

Main Outcome Measures: The incidence of SCH during 25G-PPV and the clinical features and surgical outcomes of SCH during 25G-PPV.

Results: The incidence of SCH was significantly higher in cases that underwent fluid-air exchange ($P = 0.0047$) or vitreous shaving under scleral depression ($P = 0.0157$). There were no significant relationships between the incidence of SCH and the use of surgical instruments. The incidence of SCH in group 4 (8/788, 1.02%) was significantly higher than that in groups 1 (1/1144, 0.09%), 2 (0/463, 0%), and 3 (0/639, 0%) ($P = 0.01$). Almost all SCH cases were localized, and there were no cases of SCH involving the posterior pole. Of all the SCH cases, only one case required reoperation for retinal redetachment. No cases required secondary surgical management for SCH.

Conclusions: There remains a slight risk of SCH during 25G-PPV in cases that require both fluid-air exchange and vitreous shaving under scleral depression. Even if SCH occurs during

25G-PPV, the surgical outcomes after SCH may not be substantially worse.

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Outcomes of Anterior Chamber Intraocular Lens Implantation in Patients Undergoing Pars Plana Vitrectomy

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Purpose: To assess outcomes and complication rates in patients undergoing pars plana vitrectomy (PPV) and implantation of an anterior chamber intraocular lens (ACIOL).

Design: Retrospective chart review.

Participants: A total of 50 eyes that underwent secondary ACIOL placement in the setting of concurrent PPV from October 2000 to August 2016 were included.

Methods: A retrospective chart review was conducted.

Main Outcome Measures: The primary outcome measure was the occurrence of postoperative complication including persistently elevated intraocular pressure, persistent or recurrent hyphema, persistent or recurrent vitreous hemorrhage, persistent corneal edema, or persistent uveitis, macular edema, epiretinal membrane, lens dislocation, retinal tear, or retinal detachment. The secondary outcome measure was best-corrected visual acuity (BCVA).

Results: Postoperative complications occurred as follows: persistently elevated intraocular pressure in 4 eyes (8%), persistent corneal edema in 1 eye (2%), persistent postoperative uveitis in 1 eye (2%). Seven eyes (14%) had new macular edema and 2 eyes (4%) had new epiretinal membranes after combined PPV and ACIOL surgery. No patient had persistent postoperative hyphema, vitreous hemorrhage, retinal tear, retinal detachment, or lens dislocation after ACIOL placement. Mean preoperative BCVA was 20/200 (logarithm of the minimum angle of resolution 0.96) and improved to 20/40 (logarithm of the minimum angle of resolution 0.28, $P \leq 0.0001$) at 1 year postoperatively.

Conclusions: Whereas there is a recent emphasis on new intraocular lens placement techniques in the setting of PPV including sutured and scleral-fixated intraocular lenses, ACIOL placement in the setting of concurrent PPV is a safe procedure, with few eyes developing long-term complications if careful case selection.

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First Results of a New Hyperaspheric Add-on Intraocular Lens Approach Implanted in Pseudophakic Patients with Age-Related Macular Degeneration

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Purpose: To determine the visual outcomes of the EyeMax Mono intraocular lens (IOL) technology (London Eye Hospital Pharma, London, UK), which is a foldable and injectable hydrophobic acrylic IOL implanted as an add-on solution in pseudophakic eyes with age-related macular degeneration, in a pilot study.

Design: A prospective, interventional case series.

Participants: A total of 22 pseudophakic eyes (11 patients) with bilateral severe or intermediate dry age-related macular degeneration (AMD) (13 eyes) or stable wet AMD or disciform scarring (9 eyes) meeting the criteria for sulcal IOL implantation.

Methods: Both eyes of participating subjects underwent small-incision ciliary sulcal implantation of a hyperaspheric, soft hydrophobic acrylic intraocular lens designed to improve the quality of the retinal image in all areas of the macula $\leq 10^{\circ}$ from fixation and to generate a moderate hypermetropic correction for magnification.

Main Outcome Measures: The primary outcome was safety as determined by intra- and postoperative complications, raised intraocular pressure requiring medical or surgical intervention, postoperative diplopia, reduction in visual field, and loss of ≥ 2 lines of visual acuity. Secondary outcomes were improvements in subjective and objective visual acuity (logarithm of the minimum angle of resolution).

Results: No intraoperative complication occurred. Elevated intraocular pressure values were measured directly after the operative procedure in 2 eyes (25 mmHg and 27 mmHg) and at the 1-week postoperative visit in 1 eye (22 mmHg) but not later. The mean postoperative spherical equivalent of refraction changed to +2.5 diopters, and all eyes had gained ≥ 2 lines of visual improvement (corrected distance visual acuity) by 6 months after surgery. Corrected near visual acuity as well as corrected distance visual acuity improved over time, suggesting a neuroadaptive component to improved visual function with the device. Devices were implanted bilaterally in all patients, and there were no reported symptoms of dysphotopsia or diplopia.

Conclusions: Safety concerns were not identified in the short-term or medium term. These results indicate the potential of the EyeMax Mono IOL to improve near and distance visual acuity in pseudophakic eyes with intermediate to severe AMD.

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Cost Savings Analysis for a Diabetic Retinopathy Teleretinal Screening Program Using an Activity-Based Costing Approach

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Purpose: To examine the costs and cost savings associated with a large, urban teleretinal screening program for diabetic retinopathy (DR).

Design: Retrospective analysis.

Participants: Eighteen thousand twenty-five patients (36 050 eyes) screened via the Harris Health System (HHS) DR teleretinal screening program between June 2013 and April 2014.

Methods: Activity-based costing applied to the operational screening pathway was implemented to determine the cost of screening. Actual costs were calculated based on retrospective chart review and figures obtained from the HHS and Centers for Medicare and Medicaid Services. Theoretical costs of in-clinic examinations and delayed intervention were compared with actual costs of screening and treatment to determine costs savings.

Main Outcome Measures: Costs and cost savings in United States dollars were estimated.

Results: The per-patient cost of teleretinal screening itself was found to be $27.35, whereas the average total cost (factoring in treatment) per patient was determined to be $43.14. The physical