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Outcomes of Intraoperative OCT–Assisted Epiretinal Membrane Surgery from the PIONEER Study

Justis P. Ehlers, MD, Mehnaz Khan, MD, Daniel Petkovsek, MD, Laura Stiegel, Peter K. Kaiser, MD, Rishi P. Singh, MD, Jamie L. Reese, BSN, Sunil K. Srivastava, MD

Purpose: To assess the retinal architecture changes that occur during epiretinal membrane (ERM) surgery, utilizing intraoperative OCT (*i*OCT).

Design: Prospective multisurgeon single-center study.

Subjects: Subjects from the PIONEER *i*OCT study who underwent surgical intervention for management of ERM.

Methods: All subjects underwent vitrectomy with ERM peeling with optional internal limiting membrane (ILM) peeling. Preoperative, intraoperative, and postoperative quantitative and qualitative OCT assessments were performed. Clinical characteristics including visual acuity outcomes, central subfield thickness, and complications, including ERM recurrence and need for reoperation, were assessed at 3, 6, and 12 months after surgery for membrane peeling, as available.

Main Outcome Measures: Visual acuity outcomes, anatomic outcomes, and complications, including ERM recurrence; microarchitectural alterations (i.e., retinal layer changes) after membrane peeling visualized with iOCT.

Results: Seventy-six subjects were identified and included in this analysis of clinical outcomes and quantitative OCT assessment. Twenty-four eyes were excluded due to insufficient intraoperative OCT quality for quantitative assessment. The mean preoperative visual acuity measured 20/63. The mean postoperative visual acuity at 3 months was 20/41 ($P < 0.0001$), at 6 months measured 20/36 ($P < 0.0001$), and at 12 months measured 20/33 ($P < 0.0001$). Preoperative mean central subfield thickness (CST) was 426 μm. At 3 months, the mean CST improved to 377 μm ($P < 0.0001$). The 6-month postoperative CST was 367 μm ($P < 0.0001$) and the 12-month postoperative CST measured 359 μm ($P < 0.0001$). Immediately after membrane peeling, the distance between the retinal pigment epithelium and the ellipsoid zone as well as the distance between the retinal pigment epithelium and the cone outer segment tips/interdigitation zone significantly increased ($P < 0.001$). *i*OCT identified occult residual membranes in 12% of cases and confirmed complete membrane peeling contrary to surgeon impression in 9% of cases. Reoperation was required for recurrent ERM in 1% of eyes.

Conclusions: *i*OCT-assisted ERM peeling resulted in significant improvement in visual acuity, reduction in macular thickness, and low recurrence rate. Additional research is needed with randomized clinical trials to better define the comparative success rates of image-guided ERM surgery to standard surgical visualization techniques. *Ophthalmology Retina 2018;2:263-267.*

Formulation of a Peribulbar Block for Prolonged Postoperative Pain Management in Vitreoretinal Surgery: A Randomized Clinical Trial

Sonia Mehta, MD, Philip Laird, MD, Matthew Debiec, MD, Cindy Hwang, MD, Rui Zhang, MD, Jiong Yan, MD, Andrew Hendrick, MD, G. Baker Hubbard III, MD, Chris S. Bergstrom, MD, Steven Yeh, MD, Alcides Fernandes, MD, Timothy W. Olsen, MD

Purpose: To evaluate postoperative pain level using a supplemental peribulbar injection at the conclusion of retinal surgery.

Design: Prospective, parallel-assigned, single-masked, randomized clinical trial.

Participants: Fifty-eight patients undergoing scleral buckle, vitrectomy, or combined surgery.

Methods: In a single academic institutional practice, 58 patients undergoing scleral buckle, vitrectomy, or combined surgery were enrolled. Exclusion criteria included those with a risk for glaucoma, a pre-existing chronic pain disorder, among others. Patients were assigned randomly to receive a postoperative peribulbar formulation of either bupivacaine, triamcinolone acetonide, and cefazolin (group A) or bupivacaine, balanced salt solution, and cefazolin (group B). The postoperative pain score and ocular motility were assessed by a masked observer on the first postoperative day.

Main Outcome Measures: The primary outcome measure was the postoperative pain score. Secondary outcome measures included oral analgesic use, ocular motility, and intraocular pressure (IOP).

Results: The mean pain scores were 2.8±2.9 for group A and 3.8±2.6 for group B ($P = 0.095$). Pain was absent in 28% of group A patients versus 14% of group B patients ($P = 0.11$). Group A required less narcotic pain medication (hydroxycodone: group A, 0.7±3 mg vs. group B, 3±6 mg; $P = 0.05$; oxycodone: group A, 7±7 mg vs. 9±13 mg; $P = 0.2$) than group B. Motility was full in group B and limited in group A ($P \leq 0.001$), with no differences in mean IOP measurements at any point after surgery.

Conclusions: We did not demonstrate a statistically significant reduction in mean postoperative pain scores. However, patients in group A required less hydroxycodone use and had greater akinesia, suggesting prolonged neural blockade. *Ophthalmology Retina 2018;2:268-275.*

Adapted Surgical Procedure for Argus II Retinal Implantation: Feasibility, Safety, Efficiency, and Postoperative Anatomic Findings

Marie-Noëlle Delyfer, MD, PhD, David Gaucher, MD, PhD, Marc Govare, MD, Audrey Cougnard-Grégoire, PhD, Jean-François Korobelnik, MD, Soufiane Ajana, MSc, Saddek Mohand-Saïd, MD, PhD, Sarah Ayello-Scheer, MD, Fouzia Rezaiguia-Studer, BSc, Hélène Dollfus, MD, PhD, José-Alain Sahel, MD, Pierre-Olivier Barale, MD

Purpose: To evaluate the feasibility, safety, and efficiency of an adapted surgical procedure used for postmarket Argus II implantations, so as to lower risks of postoperative hypotony or conjunctivoscleral erosion, and to describe the observed anatomic characteristics of the positioning of the implanted array.

Design: Single-arm prospective multicenter clinical trial.

Participants: Eighteen consecutive patients with end-stage retinitis pigmentosa.

Methods: To protect the site of insertion of the cable of the device, a scleral flap was systematically added to the standardized implantation procedure. It was associated with temporalis fascia autograft, so as to cover the episcleral-fixed electronics case. Intraoperative and postoperative data at day 1, weeks 1 and 2, and months 1, 3, and 6 were collected. Postoperative distance between electrode-array and retina was measured on spectral domain OCT images. Position of the array was evaluated on fundus images between months 1 and 6.

Main Outcome Measures: Feasibility of the modified surgical technique (time constraints, intraoperative complications), variations of intraocular pressure over time, postoperative ocular findings and adverse events, postoperative distance between the array and the retina, and rotation of the array between months 1 and 6 after implantation.

Results: The adapted surgical technique was performed easily without associated specific complications. No cases of chronic hypotony or conjunctivoscleral erosion were reported. One serious device/procedure-related adverse event was recorded (sterile posterior uveitis), which resolved after vitrectomy. Postoperative distance between array and retina was variable: full apposition was achieved in 4 patients (22.22%), partial apposition observed in 9 patients (50.00%), and absence of strict apposition noted in 5 patients (27.78%, 4 of whom had posterior staphyloma). A statistically significant slight rotation of the array was observed between months 1 and 6 ($P < 0.0001$), occurring downwardly in 68.75% of cases.

Conclusions: The combined use of scleral flap and temporalis fascia autograft was easily achieved and effective in preventing hypotony and conjunctival erosion in our study. Postoperative distance between semi-rigid array and retinal surface was variable, and increased in the case of preoperative staphyloma. A slight rotation of the device occurred over time. Further studies based on larger samples are needed to confirm our findings and determine their functional consequences. *Ophthalmology Retina 2018;2:276-287.*

The Impact of the Vitreomacular Interface in Neovascular Age-Related Macular Degeneration in a Treat-and-Extend Regimen with Exit Strategy

Marion R. Munk, MD, PhD, Petra Arendt, MD, Siqing Yu, MD, Lala Ceklic, MD, Wolfgang Huf, MD, Andreas Ebneter, MD, PhD, Sebastian Wolf, MD, PhD, Martin S. Zinkernagel, MD, PhD

Purpose: To evaluate the impact of the vitreomacular interface (VMI) in a treat-and-extend (TREX) regimen with exit strategy in patients with neovascular age-related macular degeneration (nAMD).

Design: Retrospective cohort study.

Participants: Five hundred ninety-three eyes of 498 patients with nAMD.

Methods: Eyes were treated according to a TREX regimen with an exit criterion, which was defined as no signs of disease activity during 3 consecutive 16-week injection visits. The impact of the VMI and the presence of an epiretinal membrane (ERM) assessed by spectral-domain OCT were evaluated based on the parameters mentioned below.

Main Outcome Measures: Effect of vitreomacular adhesion (VMA) and ERM on mean treatment interval, number of injections, likelihood of fulfilling the exit criterion, choroidal neovascularization recurrences, CRT decrease, and BCVA improvement.

Results: During the TREX period, posterior vitreous detachment (PVD) eyes needed significantly fewer injections (mean, 10.6±5.9) than VMA eyes (mean, 12.6±6.7; $P = 0.0008$), and the mean injection interval was shorter in VMA eyes (8.3±3.1 weeks) than in PVD eyes (9.5±3.5 weeks; $P = 0.0008$). Eyes with PVD at baseline and without an ERM were 9.2 and 11.4 times more likely to fulfill the exit criterion than eyes with VMA and ERM, respectively ($P = 0.006$ and $P = 0.004$, respectively, corrected). Although CRT decrease ($P = 0.16$) and BCVA improvement ($P = 0.32$) did not differ with respect to the VMI configuration, ERM had a significant impact on CRT decrease (ERM present, +11±198 μm vs. ERM absent, −92±136 μm; $P = 0.041$). Vitreomacular adhesion at treatment cessation was associated significantly with disease recurrence (likelihood ratio, 7.8; $P = 0.013$, corrected), whereas the presence of an ERM was not associated with choroidal neovascularization recurrence ($P = 0.18$).

Conclusions: The configuration of the VMI and the presence of an ERM have a significant impact on the treatment frequency, the chance to meet the exit criterion in this TREX regimen, and the recurrence risk after treatment cessation. This indicates that eyes with VMA should be monitored carefully for new disease activity after treatment cessation. *Ophthalmology Retina 2018;2:288-294.*

Pachychoroid Geographic Atrophy: Clinical and Genetic Characteristics

Ayako Takahashi, MD, Sotaro Ooto, MD, Kenji Yamashiro, MD, Hiroshi Tamura, MD, Akio Oishi, MD, Manabu Miyata, MD, Masayuki Hata, MD, Munemitsu Yoshikawa, MD, Nagahisa Yoshimura, MD, Akitaka Tsujikawa, MD