Evaluation of the Intra-operative Efficiency of a Novel Hypersonic Vitrector in Typical Clinical Settings

- Victor Hugo Gonzalez, MD
- Walter I Rivera, MD
- AGUSTIN LORIA, MD

OBJECTIVE To evaluate intra-operative efficiency of a novel hypersonic vitrector compared to a guillotine style vitreous cutter of the same gauge

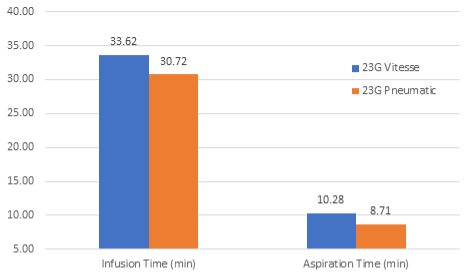
PURPOSE Vitrectomy has traditionally been performed with a guillotine cutter. The trend has been going toward smaller gauge and higher cutting speeds, which are limited by mechanical constraints. Hypersonic vitrectomy could potentially address them. This report compares intra-operative parameters of cases using hypersonic and guillotine style cutters attached to the same vacuum-based vitrectomy system

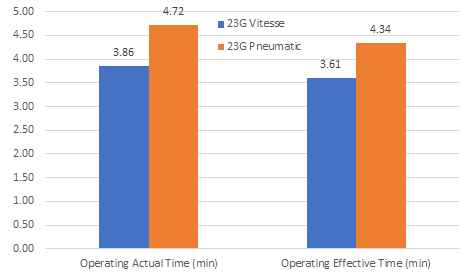
METHODS Retrospective, single surgeon, non-consecutive series of cases performed using 23 gauge, teardrop port hypersonic vitrector (HV) - 25 eyes and 23 gauge guillotine style vitrector (GV) - 27 eyes utilizing venturi-bases vitreo-retinal system. Intra-operative parameters captured using cloud-based database included: Fluid Usage (FU), Infusion Time (IT), Infusion Average Pressure (IAP), Aspiration Time (AT), Aspiration Average Vacuum (AAV), Aspiration Effective Time (AET), Operating Actual Time (OAT), Operating Effective Time (OET), Average Stroke (HV only) and Average Cut Rate (GV only)

RESULTS With Average Stroke (distance vitrector's needle travels) for HV group at 54.32±6.40 µm and Average Cut Rate for GV group at 6664±670 cpm, HV group has shown not statistically significant lower FU (HV-67.88 vs GV-86.30 ml, $p=0.24$), similar IT, which represent majority of the procedure duration (HV-33.62 vs GV-30.72 min, $p=0.60$) and IAP (HV-73.72 vs GV-73.15 mmHg , $p=0.57$). Although AAV was over two-fold higher for the GV group (HV-142.96 vs GV-363.93 mmHg, $p<0.05$), AT difference was not significant (HV-10.28 vs GV-8.71 min, $p=0.30$), but AET, value representing the efficiency of the vitreous removal, was statistically significantly lower for the HV group (HV-2.01 vs GV-5.06 min, $p<0.05$). Both OAT (HV-3.86 vs GV-4.72 min, $p=0.35$) and OET (HV-3.61 vs GV-4.34 min, $p=0.42$) were lower for the HV group, but the difference was not statistically significant

CONCLUSION In this small number case study Hypersonic Vitrector has shown moderate intra-operative efficiency superiority compared to the "Gold Standard" of the modern vitreo-retinal surgery the pneumatic guillotine style cutter. Larger sample size and evolved hypersonic vitrectomy settings and technique could lead to the future advancements of this promising technology

HUMAN RESEARCH Yes: Approved by institutional review board


40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
33.62
30.72
10.28
8.71
23G Vitesse
23G Pneumatic
Infusion Time (min)
Aspiration Time (min)


5.00
4.50
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
3.86
4.72
3.61
4.34
23G Vitesse
23G Pneumatic
Operating Actual Time (min)
Operating Effective Time (min)

Post Hoc Analysis of Clinical Suprachoroidal Injection Experience for Non-infectious Uveitis

- Shree K. Kurup, MD
- Barry Kapik, MS
- Cherry Wan, MS

OBJECTIVE To analyze procedural characteristics of suprachoroidal injection with the SCS Microinjector for two uveitis trials.

PURPOSE The SCS Microinjector reliably delivers drug to the suprachoroidal space (SCS), a new administration route for chorio-retinal diseases. Injections are first attempted with a 900µm length needle and switched to 1100µm length as required. Correlations between needle length and baseline patient characteristics and physician experience survey with the device are presented.

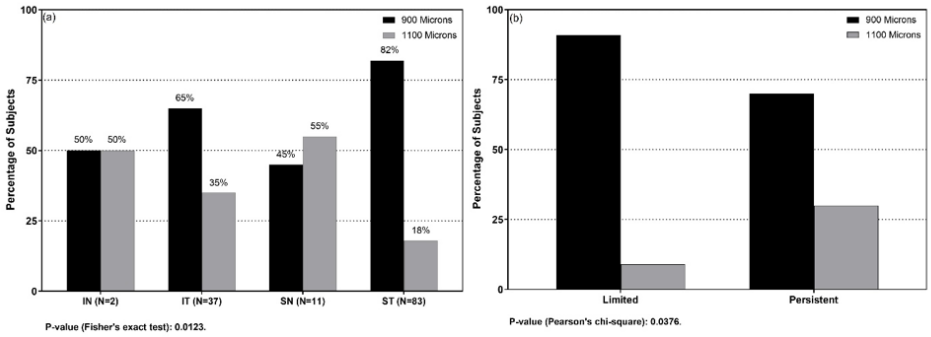
METHODS Post hoc analyses were performed to assess the relationship between needle length for baseline injection and patient characteristics. Univariate analysis was conducted with Pearson chi-square analysis for categorial variables and the biserial correlation for continuous variables. Multivariate logistical regression was run to confirm univariate findings. Furthermore, a user experience survey was completed to evaluate the injection experience in one trial.

RESULTS 74% of 133 total baseline injections were completed with the 900µm needle; the remaining with the 1100µm needle. Univariate analysis revealed no relationship between needle length and gender, lens status, uveitis location, disease course or onset. Disease duration was statistically correlated with needle length: 91% of injections were completed with the 900µm needle for Limited (≤ 3 months) and 70% for Persistent (> 3 months). Age was moderately inversely correlated with needle length. Injection quadrant was statistically related: 77% of injections administered temporally were completed with the 900 µm needle compared to 46% of injections administered nasally. Multivariate logistical regression

verified univariate analysis demonstrating the potential impact of age, disease duration and injection quadrant on needle length. In the user experience survey, over 80% of the physicians responded that SC injections presented no new challenges compared to other types of injections.

CONCLUSION While these analyses are retrospective with small sample size, few patient characteristics correlated with needle length, indicating SC injection can be completed for the majority with a 900µm needle and the remainer with the 1100µm needle. This suggests SC injections with the SCS Microinjector has potential to reliably and repeatably deliver drugs for chorio-retinal diseases in an office setting.

HUMAN RESEARCH Yes: Approved by institutional review board



Frequency Distributions of Needle Length by (a) Injection Quadrant and (b) Uveitis Disease Duration

Sutureless Intrascleral Fixation of Intraocular Lenses: Clinical Outcomes and Comparative Effectiveness of Haptic Flanging in a Series of 488 Eyes

- Ashkan M. Abbey, MD
- Ava Emily Yazdani, BS

OBJECTIVE To assess the clinical outcomes, complications, and effectiveness of haptic flanging in transconjunctival sutureless intrascleral (SIS) fixation of intraocular lenses (IOLs) in a series of 488 eyes.

PURPOSE This study reviews the largest consecutive cohort of SIS fixation cases performed by a single surgeon (AMA) with long-term follow-up. This review of 488 eyes aims to evaluate clinical outcomes, complications, and successful modifications to the technique. Specifically, we will demonstrate the comparative effectiveness of haptic flanging and intraoperative peripheral iridotomy (PI) in these cases.

METHODS This retrospective chart review was comprised of 488 eyes that received SIS fixation of a 3-piece IOL with concurrent pars plana vitrectomy between September 2015 and September 2019. All surgeries were performed by a single surgeon (AMA) using transconjunctival fixation through 25- or 27-gauge trocar cannulas. The preoperative and postoperative best-corrected visual acuities (BCVA) and complications were evaluated. The comparative effectiveness of haptic flanging in reducing the incidence of postoperative IOL dislocation was assessed. Finally, the comparative effectiveness of intraoperative PI to prevent reverse pupillary block (RPB) was evaluated.

RESULTS Mean follow-up was 444 days (Range: 87 – 1389 days). Mean preoperative BCVA was 20/355, and postoperative mean BCVA was 20/39 (P=1.11 x 10-16, T-test). 67 (13.7%) IOLs dislocated in the postoperative period. The mean number of postoperative days prior to IOL dislocation was 85.2 days (Range 1 – 296 days). 35 of 67 (52.2%)

dislocations occurred after repositioning of a previously dislocated IOL. 13 of 196 (6.6%) flanged IOLs dislocated, whereas 54 of 292 (18.5%) unflanged IOLs dislocated ($p < 0.001$, T-test). Reverse pupillary block (RPB) occurred in 7 of 231 eyes (3.0%) without intraoperative peripheral iridotomy (PI), whereas RPB occurred in 1 of 257 eyes (0.4%) with intraoperative PI ($p < 0.05$, T-test). 5 eyes (1.0%) developed a postoperative retinal detachment. Haptic exposure occurred in 6 eyes (1.2%). 2 eyes (0.4%) were treated for postoperative endophthalmitis secondary to haptic exposure.

CONCLUSION This is the largest reported series of SIS fixation of IOLs using trocar cannulas. The technique is an effective surgical option in eyes with insufficient capsular support and results in significant visual improvement with minimal postoperative complications. IOL dislocation is most likely to occur after IOL repositioning, and its incidence can be significantly reduced by haptic flanging.

HUMAN RESEARCH Yes: Approved by institutional review board

Visual Outcomes and Postoperative Complications of Pars Plana Vitrectomy for Dropped Nuclear Fragments: A Multicenter Database Study

- Ahmed Sallam, MD PhD FRCOphth
- Sami H. Uwaydat, MD
- Mohamed K Soliman, MD, MSc

OBJECTIVE This large-scale study defines and quantifies the visual outcome and the postoperative complications of pars plana vitrectomy for dropped nuclear fragments following cataract surgery

PURPOSE The purpose of this study was to investigate the visual outcome and the rate of postoperative complications in eyes with pars plana vitrectomy (PPV) for retained nuclear fragments after cataract surgery over a period of 15 years in a real-world clinical setting.

METHODS Retrospective, non-randomized, multicenter comparative study of 217,107 eyes that had phacoemulsification cataract surgery at 8 United Kingdom sites between January 2000 and May 2015. Of those eyes, we analyzed 2 groups: eyes with posterior capsule rupture and dropped nuclear fragments in the vitreous cavity (DNF group) and eyes with posterior capsule rupture and no retained nuclear fragments (PCR group). Main outcome measures included the logarithm of the minimum angle of resolution (logMAR) VA at 4-12 weeks postoperatively, and the rate of cystoid macular edema (CME) and retinal detachment between eyes with dropped nucleus and eyes with PCR and no dropped nucleus

RESULTS Dropped nuclear fragments were encountered in 617/217,107 eyes (0.28%) of all eyes undergoing cataract surgery and posterior capsule rupture without dropped nucleus in 3515, (1.61%). Preoperatively, mean vision (± SD) was 0.1 LogMAR (1 Snellen line) worse the DNF as compared to the PCR group (1.0 ±0.8 vs. 0.9 ±0.7, $p < 0.001$, t test). Pars plana vitrectomy was performed on the same day of the cataract surgery in 87 eyes (14.1%) with DNF. At 4-12 weeks after surgery, eyes with DNF had an improvement in mean VA of -0.3 ±0.9 logMAR and a substantial gain (≥ 0.30 logMAR units) in 18.8%. This was not substantially different ($p = 0.49$, t test) from the visual outcomes in the PCR only group: mean VA gain -0.3 ±0.7 and a visual gain (≥ 0.30 logMAR units) in 18.0% at 4-12 weeks. Postoperatively, we observed a near similar rates of CME (1.6% vs.1.9%; $p = 0.159$, chi square), ERM (0.5% vs.0.2%; $p = 0.180$), and retinal detachment (2.1% vs.1.4%; $p = 0.159$) in the DNF and PCR group, respectively.

CONCLUSION Although dropped nuclear fragments after cataract surgery require additional PPV surgery, results are satisfactory and the outcomes are not different from eyes that had PCR and no dropped fragments. Our results should aid retina surgeons in counselling patients on the visual outcome and the risk of postoperative complications in the setting of retained nuclear fragments after cataract surgery.

HUMAN RESEARCH Yes: Exempt from approval

Real-World Visual Outcomes After YAG Vitreolysis for Vitreous Opacities (VOYAGE)

- Netan Choudhry, MD, FRCS(C)
- Collier Jiang, BMSc

OBJECTIVE Does Yag-Vitreolysis Work?

PURPOSE To evaluate the impact of yttrium-aluminium garnet (YAG) laser vitreolysis on visual outcomes and vitreous optical coherence tomography (OCT) imaging for the treatment of symptomatic vitreous floaters.

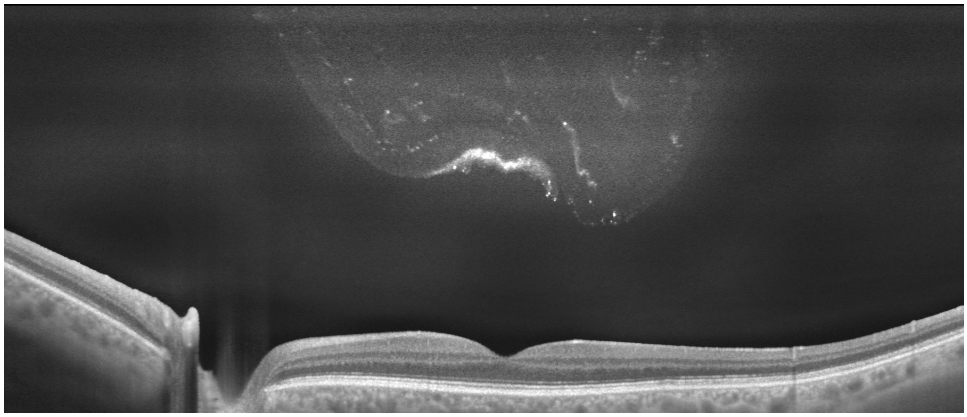
METHODS 40 eyes from 35 patients were treated with YAG laser vitreolysis for symptomatic floaters due to vitreous opacities or posterior vitreous detachment. Best corrected visual acuity (BCVA) was measured during initial consultation 1 week to 1 month before the vitreolysis procedure, as well as an average of 1 month after vitreolysis. Patients were re-treated with YAG laser vitreolysis if the reported ongoing significant vision symptoms during follow-up. 5 patients received bilateral YAG laser vitreolysis due to symptomatic vitreous floaters in both eyes.

RESULTS The mean age of patients enrolled in this study was 59.2, 42.9% of patients were female. 26 eyes (74.3%) required additional YAG laser vitreolysis after the first treatment due to ongoing symptomatic floaters, and 14 eyes (40.0%) required an additional third YAG vitreolysis. There was a significant improvement in overall mean BCVA before treatment (0.14±0.20 LogMAR units) and after the first YAG laser vitreolysis (0.11±0.20 LogMAR units), p = 0.02 (paired t test). After second treatment with YAG laser vitreolysis in the same eye, BCVA was not significantly different compared to the initial BCVA (p = 0.06) or the first post-YAG vitreolysis BCVA (p = 0.24). Overall, 55% of treated eyes resulted in patient-reported symptomatic improvement after their last YAG laser vitreolysis treatment. 18% of treated eyes reported noticeable residual floaters.

CONCLUSION YAG laser vitreolysis was effective in improving patient symptoms for a majority of patients in this study. BCVA significantly improved after the first treatment (p =

0.02), and although there was no significant difference in BCVA after the second and third YAG vitreolysis treatments compared to initial baseline ($p = 0.06$, $p = 0.08$ after second and third YAG vitreolysis, respectively), the majority of patients reported symptomatic improvement after the procedure(s).

HUMAN RESEARCH Yes: Approved by institutional review board



Swept-Source OCT of a 54 year-old male with persistent floaters. The hyperreflective collection above the macula represents the vitreous with collapsed collagen.

Amniotic Membrane Subretinal Transplantation to Promote Closure of Persistent Full-Thickness Macular Holes

- Jessica G Lee, MD
- Michael Chua, MD
- Michael Eric Jansen, MD
- Jerome V Giovinazzo, MD
- Brittany E Powell, MD
- Ronald C. Gentile, MD
- Gennady Landa, MD
- Alan R. Dayan, MD
- Richard B. Rosen, MD, DSc(Hon)

OBJECTIVE To report a clinical case series of using amniotic membrane subretinal transplantation to promote closure of persistent full-thickness macular holes

PURPOSE While the failure rate of macular hole (MH) closure with primary surgery is <10%, repair of large MH (defined as diameter >400 µm) remain surgically challenging. Rizzo et. al described a novel surgical technique using amniotic membrane transplantation for recurrent MH and retinal detachments. We report a case series of patients with persistent large MH, that achieved anatomic success with amniotic membrane subretinal transplantation.

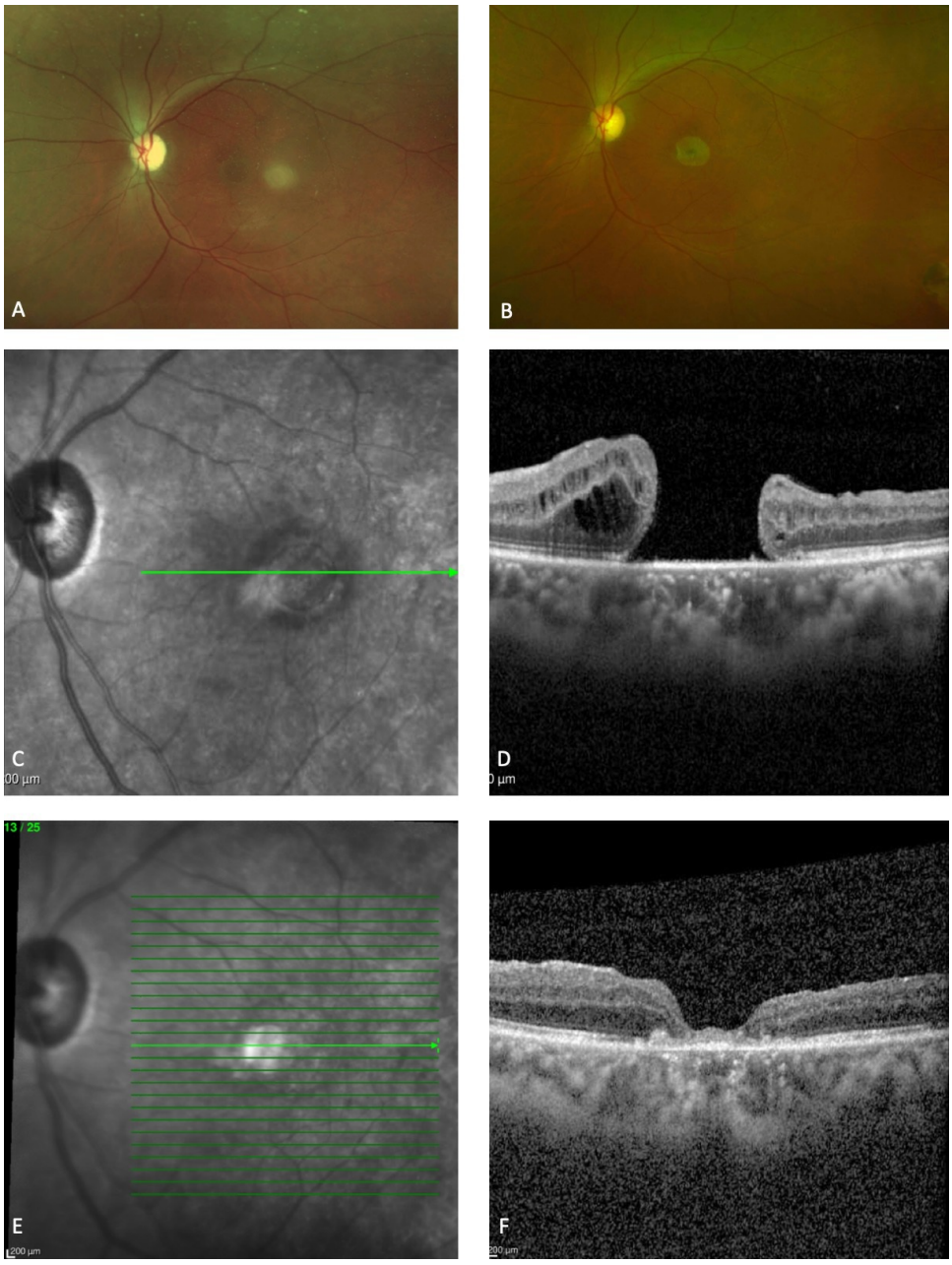
METHODS A retrospective chart review of a non-consecutive case series was conducted at The New York Eye and Infirmary of Mount Sinai. Eight patients from March 2019 - September 2019 presented with persistently open large MH following failed primary surgery with internal limiting membrane peeling. The patients underwent repeat standard macular hole repair. Using vitreoretinal forceps with light pipe assistance, a circularly-punched patch of amniotic membrane was inserted through the valved trocar and into the subretinal space through the macular hole. Tamponade with gas or silicone oil (SO) was used at the conclusion of surgery. The surgeries were performed by 5 different experienced

surgeons.

RESULTS Eight patients, 5 women and 3 men were included in the series. The mean age was 56.62 years (range 20-77 years). All the patients had undergone MH repair with ILM peeling. The mean preoperative BCVA was 1.73 logMAR (20/1000) ranging from 2 to 0.8 logMAR (20/2000 – 20/150). Two patients were phakic and six patients were pseudophakic. Six patients received gas as tamponade, either SF6 20-25% or C3F8 12 - 14% and 2 patients received SO. Patients were examined 1 day, 1 week, 1 month, 3 months and 6 months. BCVA improved from mean 1.73 logMAR preoperatively (20/1000) to 1.40 logMAR (20/500) 1-month after surgery, for 7 of the 8 patient records available, and to 1.21 logMAR (20/320) 3-months after surgery, for 5 of the 8 patient records available. In all 8 cases, the MH appeared closed 1 week post-operatively. No adverse events such as increase in intraocular pressure or intraocular inflammation were reported during the post-operative period. OCT showed MH closure in all the cases.

CONCLUSION For large, chronic, persistent or recurrent macular holes, the use of amniotic membrane subretinal transplantation may serve as a useful surgical adjunct to achieve macular hole closure.

HUMAN RESEARCH Yes: Exempt from approval



A.Pre-operative fundus photograph B. 2 month post-operative fundus photograph C. Pre-operative en face OCT D. Pre-operative OCT depicting full thickness macular hole E. 2 month post-operative en face OCT F. 2 month post-operative OCT

Acute Intraoperative Hypotony During Automated Infusion Control

- Raymond Iezzi, MD, MS
- Keirnan Willett, MD

OBJECTIVE To educate members on the caveats of automated infusion control during pars plana vitrectomy

PURPOSE Automated infusion control systems compute IOP based on measurement of infusion line flow. IOP is not measured directly. If infusion flow is slowed by lens or vitreous, the software may shut off the pump and efforts to raise the IOP manually will fail, leaving the eye hypotonous. We will discuss automatic infusion pump shutdown and how to manage intraoperative hypotony caused by these systems.

METHODS We reviewed two cases of acute intraoperative hypotony associated with pump shutdown by the infusion control software. To study intraoperative conditions that cause inadvertent infusion pump shutdown during PPV, we used a silicone model eye and designed a two-channel pressure measurement system to continuously measure the IOP and infusion line pressure, simultaneously.

RESULTS Case 1: During separation of the posterior vitreous, infusion line flow was partially restricted. The infusion pump then shut off, leading to hypotony. IOP was restored to normal by shutting off the infusion control system, repositioning the infusion line and elevating the IOP via the footswitch. Case 2: During PPV, softening of the eye caused flattening of the infusion line. This reduced infusion flow causing automatic pump shutdown. IOP was normalized as described above. Model eye measurements showed that when infusion flow into the model eye was reduced via a stopcock valve, infusion line pressure greatly exceeded intraocular pressure. Erroneous calculations of IOP by the infusion control software led to infusion pump shut off. During this time, raising the pressure to 60mmHg did not change the IOP. Hypotony could be corrected by shutting off infusion control at the vitrectomy screen, correcting the position of the infusion cannula and

raising IOP via the footswitch.

CONCLUSION Automated infusion control software introduces added risk of acute intraoperative hypotony. Restriction of infusion flow may result in infusion pump shutdown and hypotony when automated infusion control software is active. Management of acute hypotony in such cases requires that the surgeon immediately bypass the infusion control software, correct the infusion line position and elevate the IOP.

HUMAN RESEARCH Yes: Approved by institutional review board

7/26/2020 3:32PM

Update on Paracentral Retinotomy for Resistant Macular Hole

- Michael S Tsipursky, MD
- Matthew J Byun, MD
- Veeral S. Sheth, MD, MBA
- Rama D. Jager, MD, MBA, FACS

OBJECTIVE Can a paracentral retinotomy help close resistant macular holes?

PURPOSE Large resistant macular holes are very difficult to close and no single technique has proven 100% effective. This is an update with more patients from the presentation that was done on the same subject in Boston ASRS, 2017.

METHODS The study is a multicenter retrospective interventional study of 15 eyes of 15 patients that underwent relaxing parafoveal nasal retinotomy for refractory and/or large macular hole repair from June 2016 to January 2019. Thirteen out of 15 eyes had idiopathic macular hole, one had traumatic macular hole and one had a macular hole following a retinal detachment repair. Thirteen out of 15 eyes had a persistent macular hole despite one or multiple vitrectomies with ILM peel with or without ILM flap overlay. 2 eyes had the procedure as a primary surgery due to the size of the hole being >1600 microns. Status of macular hole closure was determined with OCT. Post-operative OCT of rNFL thickness and HVF were done.

RESULTS Thirteen out of 15 macular holes closed. 8/13 eyes had partial or complete restoration of ellipsoid zone. The mean logMAR BCVA showed significant improvement from 1.29 to 0.87 after the surgery ($p<0.05$). 11/15 eyes showed improvement in BCVA post-operatively. Post-operative rNFL OCT did not show significant changes. Post-operative HVF showed paracentral scotomas in 8 eyes that were well tolerated.

CONCLUSION Paracentral nasal retinotomy is a viable surgical option in refractory cases where other surgical options are not likely to work.

HUMAN RESEARCH Yes: Approved by institutional review board

Anterior Vitrectomy (AV) Versus Pars Plana Vitrectomy (PPV) in the Yamane Double Needle Technique: Refractive Outcomes and Complication Rates

- Rizwan a Shaikh, MD
- Mahmood Khan, MD
- Ella H Leung, MD
- Zaina N Al-Mohtaseb, MD

OBJECTIVE Is there is difference in refractive outcome and postoperative complication rate between anterior vitrectomy and pars plana vitrectomy in intrascleral haptic fixation of secondary intraocular lens?

PURPOSE To report the outcomes of vitreous management in patients undergoing secondary intraocular lens (IOL) fixation using the Yamane technique. To determine if AV vs PPV had an effect on refractive outcomes and if there was a difference in elevated intraocular pressure (IOP), cystoid macular edema (CME), vitreous hemorrhage (VH), retinal detachment (RD), etc. at 3 months of follow up.

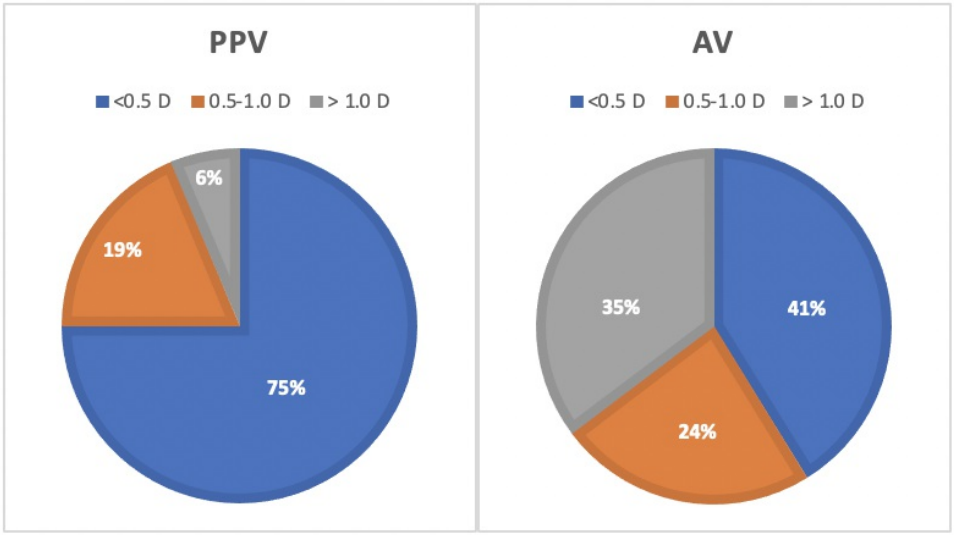
METHODS Retrospective review of consecutive cases, 50 eyes from 50 patients. Inclusion criteria: at least 18 years old, aphakic, unstable anterior chamber IOL, subluxated crystalline lens or IOL, with minimum 3 months follow up. Exclusion criteria: less than 18 years old, less than 3 months of follow up. Procedure: Two angled incisions made by 30-gauge thin-wall needles. Haptics were externalized and cauterized to make flanges of the haptics that were then fixed into scleral tunnels. Measurements: difference from refractive targets and rates of postoperative complications within 3 months of follow up.

RESULTS 50 eyes studied, 25 were right eye and 25 were left eyes, 58% male, 42% female,

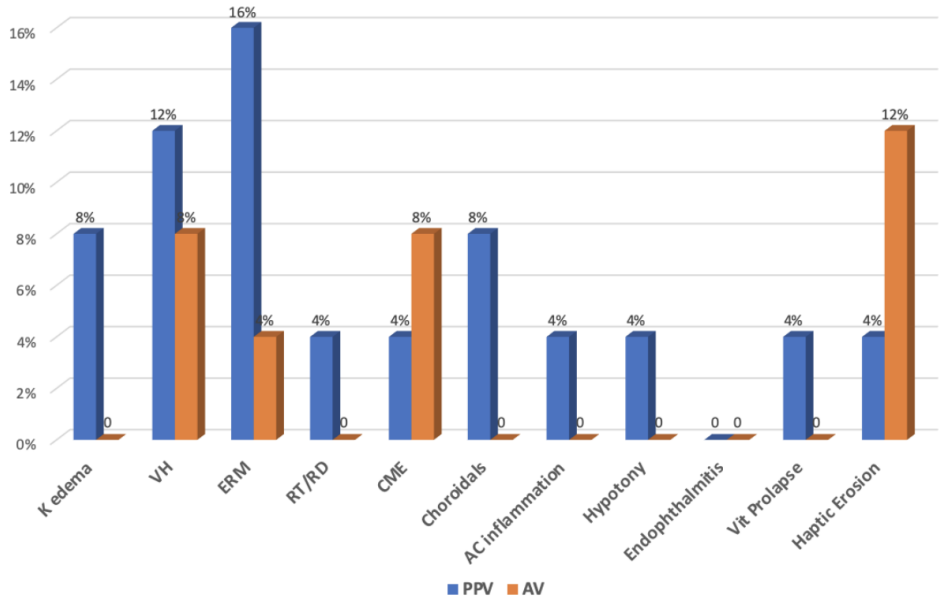
mean age 65.74 ±13.87 years old, youngest patient was 30 years old, eldest 90 year old. PPV was performed in patients with posterior dislocated IOLs and subluxated crystalline lenses ($p<0.0003$), those with a history of retinal detachment ($p<0.0003$), and with other retinal pathology at or prior to evaluation (diabetic retinopathy, age-related macular degeneration, retinal dystrophy, etc.) ($p< 0.0002$). There were no statistically significant differences in patients with glaucoma or corneal pathology. There were no statistically significant differences (all $p>0.05$) in the incidence of postoperative complications, postoperative logMAR visual improvement, or targeted refractive outcomes between AV or PPV ($p= 0.082$). In eyes with a history of glaucoma, retinal detachment, previous trauma or ocular surgery there were no statistically significant differences (all $p>0.05$) in the rates of postoperative complications or refractive outcomes.

CONCLUSION In the setting of the likelihood of posterior dislocation of lens/IOL complex when approaching intrascleral flanged haptic fixation with PPV, though more invasive, carries no statistically significant risk of postoperative complications and has comparable refractive outcomes compared to the anterior approach. We aim to include more eyes to increase the power of the study which may yield more conclusive results regarding outcomes.

HUMAN RESEARCH Yes: Approved by institutional review board

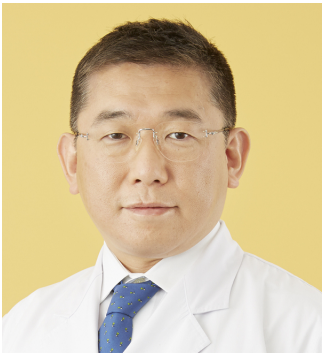


Refractive Outcomes of PPV vs AV Utilizing the Yamane Double-Needle Technique. Figure 1. In eyes with BCVA > 20/40, PPV eyes were closer to <0.50 D of the preoperative target refraction (75.0% vs 41.0%), however, this result was not statistically significant ($p = 0.082$). Visual improvement was analyzed with the Mann-Whitney U test. And Chi-squared test was used to analyze the accuracy of refractive targets between the groups.



Postoperative Complication Rates in PPV vs AV Utilizing the Yamane Double-Needle Technique. Figure 2. There were no statistically significant difference in incidence of any postoperative complications in the course of patients that underwent AV and PPV. Data analysis: Shapiro-Wilk test with paired t-test with equal variance was used to analyze data with normal distribution. Non-normally distributed rates of complication were analyzed with Fisher Exact test.

Intraoperative OCT Guided Vitrectomy for Optic Pit Maculopathy



- Makoto Inoue, MD
- Akito Hirakata, MD

OBJECTIVE Intraoperative optical coherence tomography OCT (iOCT) is useful to detect vitreous strand connected to the optic disc pit and cleft at the edge of the optic disc pit intraoperatively and is useful to guide the surgical procedure of inverted prepapillary membrane for optic disc pit maculopathy.

PURPOSE To evaluate the efficacy of intraoperative optical coherence tomography OCT (iOCT) guided vitrectomy for optic pit maculopathy

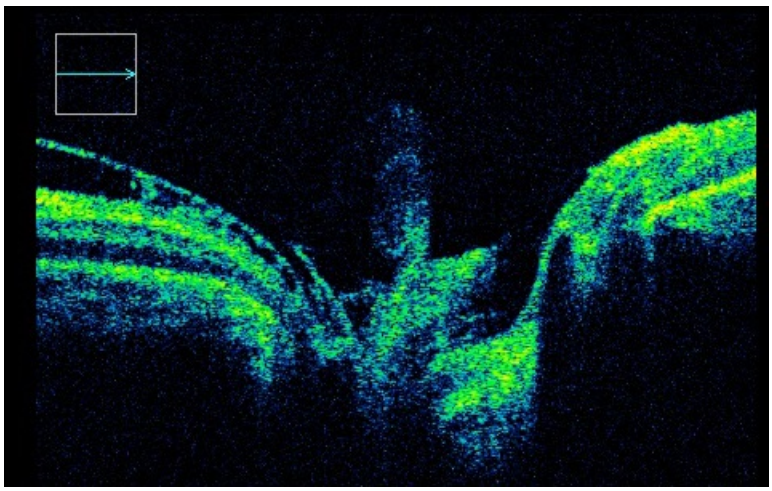
METHODS Retrospective case series. The medical charts of 4 eyes of 4 patients aged from 14 to 33 year-old who underwent 27-gauge pars plana vitrectomy without gas tamponade for optic disc maculopathy with foveal detachment and retinoschisis were reviewed. An iOCT (Rescan, Carl Zeiss Meditec) was used to scan the area around optic disc pit at each step off the surgery of beginning of the surgery, after creation of posterior vitreous detachment, after peeling of prepapillary membrane. The surgical outcome of retinal reattachment, preoperative and postoperative vision, and findings of spectral domain OCT and swept source OCT were evaluated.

RESULTS The preoperative vison ranged from 20/100 to 20/50. The refractive errors of the affected eyes were from -0.25D to -1.75D. Posterior vitreous detachment was created in all eyes but internal limiting membrane peeling was not performed nor gas tamponade. The vitreous strands connected to the optic disc pit were detected with iOCT in all eyes which also were detected with preoperative OCT. The clefts connected to the inner retinoschisis at the edge of the optic disc pit were detected in 3 eyes which was detected only in one eye with preoperative OCT. The prepapillary membrane was peeled in all eyes and inverted or stuffed into the optic disc pit which was guided with iOCT. The foveal detachment and retinoschisis resolved completely in 3 eyes at postoperative13 to 15 months and decreased in one eye at postoperative 3 months. The postoperative vison

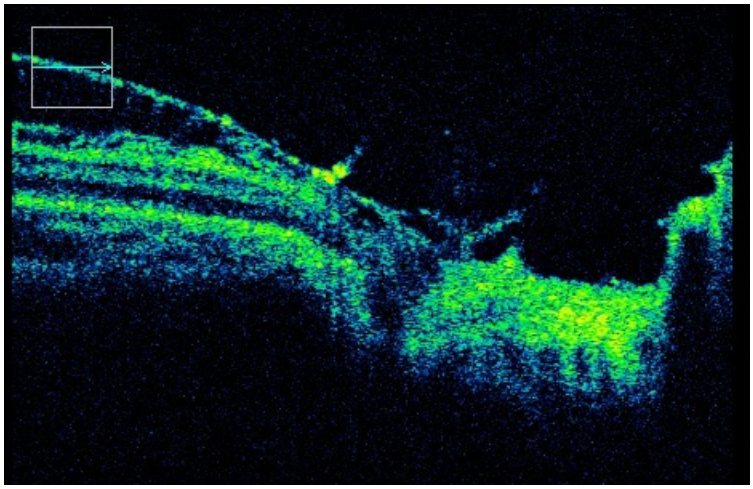
increased to 20/25 to 20/18 in 3 eyes and did not change in one eye due to short postoperative period.

CONCLUSION iOCT can detect vitreous strand connected to the optic disc pit and cleft at the edge of the optic disc pit intraoperatively and is useful to guide the surgical procedure of inverted prepapillary membrane.

HUMAN RESEARCH Yes: Approved by institutional review board



iOCT image indicating vitreous strand and cleft at the edge of the optoc disc pit



iOCT image indicating inverted prepapillary membrane above the optic disc pit

Presence of Neurofilament Light Chain (NfL) Proteins in the Vitreous Humor Can Serve as a Potential Ocular Biomarker for Neurodegeneration

- Manju L. Subramanian, MD
- Viha Vig
- Jaeyoon Chung, PhD
- Marissa Fiorello, BS
- Henrik Zetterberg
- Thor D Stein, MD, PhD

OBJECTIVE To identify neurofilament-light chain (NfL) protein, a marker of neurodegeneration, in the vitreous humor and determine a potential association with systemic and ophthalmic factors.

PURPOSE Detecting NfL in the eye can potentially provide a way to comprehend neurodegeneration and disease progression. We investigated the presence of NfL in the vitreous humor and its association with biomarkers for Alzheimer's Disease (AD) a-beta (Aβ) and Tau, other ocular proteins, mini-mental state examination (MMSE) scores, apolipoprotein E (APOE) allele status, systemic and ophthalmic diseases.

METHODS We conducted a single site, multi-surgeon, prospective, cross-sectional cohort study. Undiluted vitreous humor samples were taken from patients undergoing vitrectomy surgery for vitreoretinal disease in a cohort of patients without known systemic neurodegenerative disease. ELISA immunoassays were used on 77 specimens to quantitatively measure NfL protein levels. Linear regression was used to test associations of NfL proteins with Aβ and Tau levels, various cytokines, interleukins, and vascular proteins, MMSE scores, ophthalmic and systemic diseases, and APOE allele genotype. Results were adjusted for age, sex and eye disease.

RESULTS This study identified a normal distribution of NfL in the vitreous humor after quality control and a log2 transformation. NfL was positively identified in over 77.9 % of the sample population at 500 pg/mL or more. NfL was found to have statistically significant association with Aβ40 (p=0.0008), Aβ42 (p=0.0003), and t-tau (p=0.0000006) and a positive correlation (correlation coefficient [β, SE]: 0.8, 0.2; 1.2, 0.3; 0.6, 0.1). NfL was not significantly associated with p-tau 181 (p=0.53). NfL also had positive correlations with various inflammatory cytokines and receptor of vascular endothelial growth factor – proteins related to neurodegeneration and cognitive decline respectively (see table 1.1). NfL was not found to be significantly associated with MMSE scores or ophthalmic or systemic disease.

CONCLUSION This is the first study where NfL was positively identified in the vitreous humor of the eye and significantly correlated with other vitreous proteins associated with neurodegenerative diseases. Further investigation of NfL in ocular fluids in patients with specific neurodegenerative diseases could inform us about NfL's accuracy in potentially identifying neurodegeneration and disease progression.

HUMAN RESEARCH Yes: Approved by institutional review board

Creating Blebs for Subretinal Gene Delivery

- Andreas K. Lauer, MD

OBJECTIVE To characterize the intraoperative pressure levels for creating retinal blebs during sub-retinal delivery of ocular gene therapy.

PURPOSE To examine the intraoperative pressure levels for creating retinal blebs during sub-retinal delivery of ocular gene therapy.

METHODS The procedure records of 112 ocular gene therapy patients across nine conditions treated at Casey Eye Institute - Oregon Health & Sciences University were reviewed. Fifty-six patients were treated using the pneumatic-assisted subretinal delivery with foot-pedal control as pioneered by Robert MacLaren using the Alcon Constellation vitectomy system. The recorded balanced salt solution pre-bleb maximum pressure (BSS pre-bleb max) and the bleb propagation minimum and maximum pressures in pounds per square inch (PSI) were reviewed.

RESULTS The average BSS pre-bleb max to initiate a retinal bleb was 9.5 PSI (range 4-20). The range of average BSS pre-bleb max across retinal conditions was 8.8 -10.1 PSI. The average minimum pressure to propagate a retinal bleb was 4.4 PSI (range 2-10). The average maximum pressure to propagate a retinal bleb was 7.7 PSI (range 4-16). The average minimum pressure to propagate a retinal bleb across retinal conditions was 3.7 - 5.3 PSI. The average maximum pressure to propagate a retinal bleb across retinal conditions was 6.6 - 9.6 PSI.

CONCLUSION Our series characterizes the intraoperative pressure levels for creating retinal blebs during sub-retinal delivery of ocular gene therapy. On average, there was slight variation in the intraoperative pressure levels required to initiate a retina bleb across conditions. There appeared to be some variation in minimum intraoperative pressure levels

and greater variation in maximum intraoperative pressure levels for bleb propagation. These results allow us to further refine our surgical technicque for subretinal delivery of ocular gene therapy.

HUMAN RESEARCH Yes: Approved by institutional review board

Macular Support for Posterior Staphyloma in High Myopia - Does Buckle Have a Beneficial Effect in Myopic Tractional Maculopathy?

- Pradeep Susvar, DNB, FRCS(Glasg), MBA
- Pramod S. Bhende, MBBS, MS
- Chetan Rao, MS

OBJECTIVE Can macular buckle be a viable option in posterior staphyloma associated high myopic eyes having tractional maculopathy ?

PURPOSE Anatomical and functional outcome of placing buckle to support posterior staphyloma in myopic tractional maculopathy.

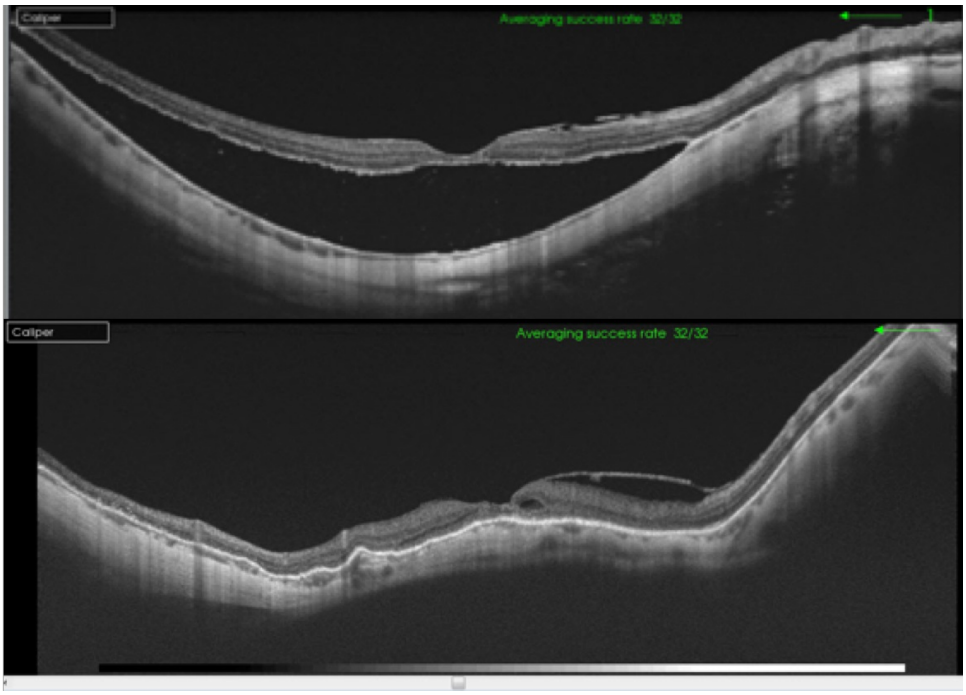
METHODS Consecutive interventional case series of myopic tractional maculopathy (MTM) operated macular buckling were studied from Jan 2015 to June 2019. Refractive status of either eye, BCVA, photographic and ultrasound documentation of posterior staphyloma(PS) and Swept Source (SS) OCT were analyzed. Cases were taken up for buckling the macula either as single procedure or combining with vitrectomy, ILM peeling and silicone oil tamponade. Morin Devin macular Wedge implant was used in all the cases. Post-surgery BCVA and OCT changes were analysed for anatomical restoration and visual outcome.

RESULTS Case series had 25 eyes of 24 patients (Female: Male-16: 9), with progressive macular schisis with posterior staphyloma and macular retinal detachment with or without macular hole. Mean age was 54.17 years (range, 35–74 years). 20 eyes were selected for macular buckle(MB) alone and 5 eyes had MB along with vitrectomy. Of 25 eyes, anatomical resolution was seen in all but one case at last visit. Reshaping of the posterior staphyloma by buckle was achieved in 84% thereby relieving anteroposterior traction and reduction of SRF. The mean BCVA increased from 1.16 Log MAR to 1.096 Log MAR (p =0.165). Visual

acuity had favorable outcome in 21 eyes (84%). Follow up ranged from 3-54 months.

CONCLUSION MB surgery showed favorable anatomic and visual outcomes in patients with posterior staphyloma having myopic macular schisis, macular detachment with or without macular hole. Study also guided to choose cases appropriately either as MB alone or to combine MB with vitrectomy, based on spectrum of MTM. Macular buckle can be a viable option in selected cases of PS associated pathological myopia.

HUMAN RESEARCH Yes: Exempt from approval



Remodelling posterior staphyloma with buckle to address myopic macula

Comparative Assessment of Conventional Microscope-Integrated to Digitally-Enabled Intraoperative OCT in Vitreoretinal Surgery in the DISCOVER Study

- Katherine E Talcott, MD
- Natalia Albuquerque Lucena Figueiredo, MD
- Sunil Srivastava, MD
- Ming Hu, Ph.D.
- Aleksandra V. Rachitskaya, MD
- Sumit Sharma, MD
- Rishi P. Singh, MD
- Alex Yuan, MD, PhD
- Jamie Reese, RN
- Justis P. Ehlers, MD

OBJECTIVE The objective of this study is to evaluate how conventional microscope-integrated intraoperative OCT (iOCT) compares to digitally-enabled iOCT with a 3D visualization system in vitreoretinal surgery.

PURPOSE The purpose of this study is to compare the surgeon experience with conventional microscope-integrated intraoperative OCT (iOCT) and digitally-enabled iOCT with a 3D visualization system. The comparative assessment includes evaluation of perceived iOCT utility, surgical field visualization efficiency, and ergonomics feedback.

METHODS In this post-hoc analysis of the DISCOVER prospective iOCT study, two surgical groups were compared: (1) conventional microscope-integrated iOCT (i.e., conventional iOCT) and (2) digitally-enabled microscope-integrated iOCT with 3D surgical visualization system (i.e., digitally-enabled iOCT). The iOCT datastream could be reviewed by surgical field-based visualization (i.e., viewing iOCT while maintaining attention on surgical field) or non-surgical field-based visualization (i.e., viewing iOCT on the monitor of the microscope). Surgeon questionnaires were collected immediately following surgery, including iOCT utility and ergonomics assessment.

RESULTS A total of 187 subjects were included in the study, 91 in the conventional iOCT group with a mean age of 62.6±12.9 years and 96 in the digitally-enabled iOCT group with

a mean age of 64.7±12.4 years. There was no significant difference in surgeon-perceived iOCT utility (42.9% vs 50.0%, p=0.33) or iOCT directly impacting surgical decision-making (18.8% vs 20.9%, p=0.71) between the two groups. There was significantly higher surgical field-based visualization of the iOCT datastream in the digitally-enabled iOCT group (67.7% vs 3.3%, p<0.0001). Surgeon-reported significant back discomfort (1.0% vs 18.7%, p<0.0001) and headaches (5.2% vs 20.9%, p<0.002) were lower in the digitally-enabled iOCT group. There were no intraoperative surgical complications attributed to iOCT and the rate of postoperative complications was similar (p=0.64).

CONCLUSION Feasibility and utility of iOCT were similar in both groups. Digitally-enabled iOCT may provide superior ergonomics and increased attention on the surgical field during OCT review. Additional studies are needed to better assess patient outcomes, surgeon experience, and overall value of integrative technologies to enhance the surgical theater experience.

HUMAN RESEARCH Yes: Approved by institutional review board

Figure 1: Three-dimensional heads-up surgery layouts. (A) Vitreoretinal fellow in-training andretina specialist team visualizing the image on a 4K display placed at about 1.5 m from the surgeons and external screen on the right (digitally-enabled iOCT). (B) Surgeons visualizing the iOCT images on the external 2D screen (conventional iOCT).

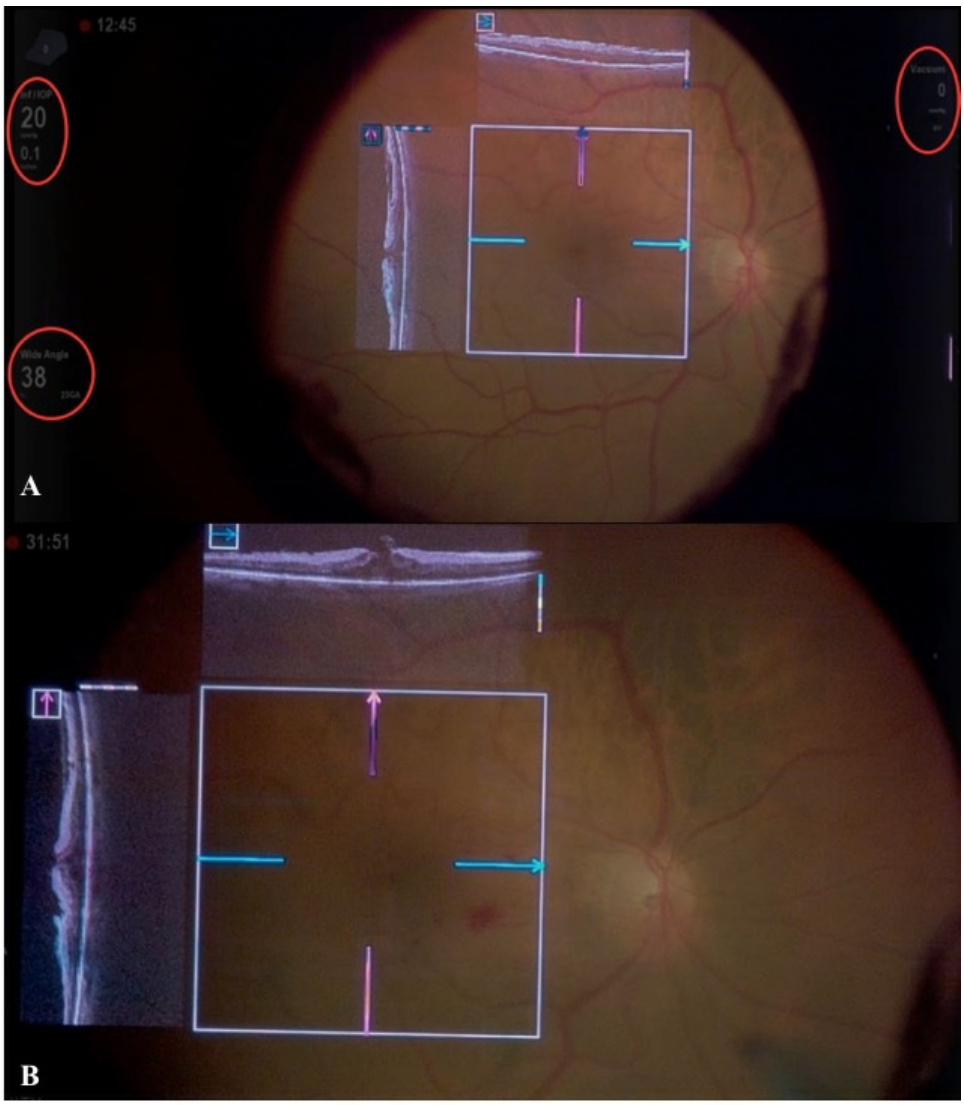


Figure 2: Surgical view of intraoperative OCT on a 3D screen of a case diagnosed with ERM (digitally-enabled iOCT). Datafusion software showing real-time surgical parameters (red circles). (A) Before ILM and ERM peeling iOCT is captured. (B) iOCT digital overlay is also obtained after membrane peeling to confirm complete peel. In this case, ILM and ERM peeling was performed using a membrane loop after indocyanine green staining.

Visual Acuity Outcome in Patients With Subretinal Hemorrhage, Office Procedure Versus Surgical Treatment

- Rita Ehrlich, MD
- Orly Gal-Or
- ASSAF DOTAN, MD
- Amir Hadayer, M.D.
- Maayan Fradkin, MD
- Judith Brody, MD
- Michal Sachaaf- Fogler, MD
- Alon Tiosano, MD

OBJECTIVE To investigate the outcome of patients treated with intravitreal injection of gas and tPA as first-line intervention for sub-retinal hemorrhage compared to pars plana vitrectomy.

PURPOSE Subretinal hemorrhage can occur due to many etiologies. However, there is a lack in consensus regarded the ideal treatment. Several treatments are currently available: Vitrectomy with or without tissue plasminogen activator(tPA), intravitreal injection(IVI) of tPA & gas and IVI of anti-vascular endothelial growth factor. We aimed to evaluate the effect of IVI of tPA & gas vs vitrectomy surgery.

METHODS This is a retrospective study of patients who were diagnosed and treated in Rabin medical center between 1.11.2008-1.11.2019. Patients who were diagnosed with sub-retinal hemorrhage and are older than 18 years old were included. Overall 956 patients were identified, and additional screening for injection of tPA & gas revealed 127 patients. A second validation of medical health records by a physician has identified 56 patients with an additional 46 random vitrectomy patients.

RESULTS We identified 102 patients diagnosed with subretinal hemorrhage who underwent vitrectomy with tPA and gas or air (N=46) or treatment by IVI of tPA & gas (N=56). There was no difference between groups in age ,sex, medical history, use of anticoagulants or antiplatelet, history of ocular surgeries and IVI of anti VEGF. Overall follow-up in years did not differ between the groups (3.11[1.6-4.41], 4.3[1.64-6.8],p=0.156). Time from diagnosis to first intervention in days for the tPA & gas group was shorter (0.00[0.00, 1.00], 1.00[0.00,4.00],p=0.03). Additional vitrectomy was needed in 14 (25%) of the tPA & gas group. A similar percentage of patients from both groups had their hemorrhage shifted in the tPA & gas group 37 (68.5%) vs vitrectomy 26 (61.9%),p=0.523). Visual acuity (VA) in LogMAR prior to diagnosis of sub-retinal hemorrhaged was similar between groups (0.30[0.22,0.48] vs 0.30[0.15,1.30],p=0.682). VA at diagnosis was better in the tPA & gas group (1.30[0.84,1.80] vs 1.90[1.56,2.30],p<0.001) and at end of follow up (0.91[0.40,1.30] vs 1.38[1.12,1.90],p<0.001).

CONCLUSION Injection of tPA & gas can be performed as soon as diagnosis is made and as an office procedure with a good VA outcome. Only 25% of the patients might require

additional vitrectomy as a second intervention strategy

HUMAN RESEARCH Yes: Approved by institutional review board

BCVA in LogMAR of the two groups at the different time points along the study.

A Microsurgical Vacuum Pick for Membrane Peeling Without Forceps

- Carl C. Awh, MD

OBJECTIVE To describe a new method and device for peeling membranes without forceps during vitreoretinal surgery.

PURPOSE The Micro-Vacuum-Pick (MVP) is a new device for peeling internal limiting membrane (ILM) and epiretinal membrane (ERM). The MVP may reduce the number of instrument exchanges (e.g., to wipe pieces of membrane from forceps tips), may be less traumatic to the macula, may eliminate the need for multiple devices, and may be a useful alternative to traditional forceps, scrapers, and loops.

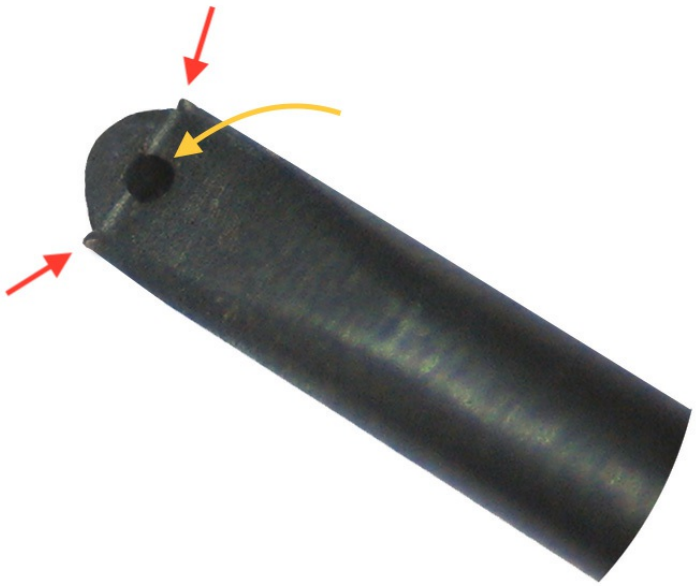
METHODS A non-randomized consecutive case series using the MVP in 40 eyes of 40 patients for ERM and/or macular hole. The MVP is connected to the active aspiration of a vitrectomy machine. The shaft of the MVP is a 23-, 25-, or 27-gauge tube. At the distal end is a smooth spatula to lift membranes and to guard the retina from a vacuum port located proximal to the spatula. On each side of the spatula is a sharp "micropick" to create an edge in intact ILM or ERM. The primary outcome was whether membrane peeling could be accomplished using only the MVP. Secondary outcomes were the number of instrument exchanges, the number of iatrogenic retinal breaks, and subjective observations of ease of use.

RESULTS In each of 40 cases, the MVP was the only device used to create a membrane edge, engage the membrane edge, strip the membrane from the retina, and remove the membrane from the eye. The MVP was used to perform air-fluid exchange in macular hole cases. 38 cases were with a 25-gauge device, 1 with a 23-gauge device, and 1 with a 27-gauge device. In 4 cases the vacuum port was clogged by a piece of membrane and an instrument exchange was necessary to remove the MVP from the eye, wipe the membrane from the port, and reinsert the MVP to complete the membrane peel. In 36 cases, no instrument exchanges were necessary to clear the port and the MVP was used to aspirate

peeled ILM and ERM from the vitreous cavity. No iatrogenic retinal breaks were identified during or after any case. My subjective impression is that creating a membrane edge or flap is easier with the MVP than with forceps and that operating with the MVP is less fatiguing for the surgeon's hand than with conventional forceps.

CONCLUSION The MVP was an effective alternative to forceps for peeling ILM and/or ERM. The MVP was the sole device used to create a membrane edge, engage and strip membrane, and remove membranes from the eye. The MVP may reduce the number of devices needed and the frequency of instrument exchanges in membrane peeling cases. Other advantages or disadvantages observed with additional cases will be reported.

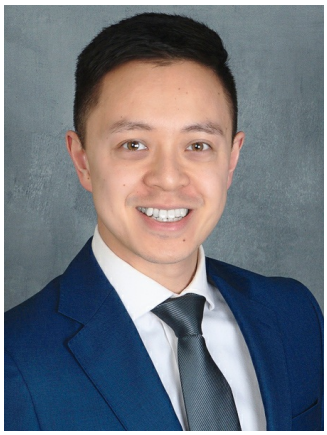
HUMAN RESEARCH Yes: Exempt from approval



Distal tip of the MVP (micro-vacuum-pick), consisting of a smooth spatula, a vacuum port (curved arrow) and two micropicks. When there is no obvious membrane edge, the surgeon can rotate the MVP so that a micropick is directed toward the membrane. Gentle pressure and stroking with the micropick creates a membrane edge or flap. The spatula is then positioned beneath the membrane to bring it toward the vacuum port. (Note: Prototype Image)

Side view of the MVP tip. The spatula is used to elevate and guide membrane to the vacuum port. Low vacuum (up to 100 mm Hg) is used to engage the membrane and bring it to the port. Once the port is fully occluded, higher vacuum (up to 600 mm Hg) is used to strip membrane pieces from the retina and then to aspirate them out of the eye.

Refractive Outcomes After Sutureless Intrascleral Fixation of Secondary Intraocular Lens With Pars Plana Vitrectomy



- Ramon Lee, MD
- Nathan Farley, MD
- Ashkan M. Abbey, MD
- Maxwell S Stem, MD
- George A Williams, MD
- Lisa J. Faia, MD
- Tarek S. Hassan, MD
- Alan J. Ruby, MD
- Sandeep Randhawa, MD
- Jeremy D. Wolfe, MD, MS

OBJECTIVE To study the refractive outcomes after sutureless intrascleral fixation of secondary intraocular lens with pars plana vitrectomy.

PURPOSE Sutureless intrascleral fixation of secondary (SIS) intraocular lens (IOL) with pars plana vitrectomy (PPV) can provide excellent visual potential for eyes with subluxed or dislocated intraocular or crystalline lenses, aphakia, or retained lens fragments. This study aims to evaluate refractive outcomes of this technique.

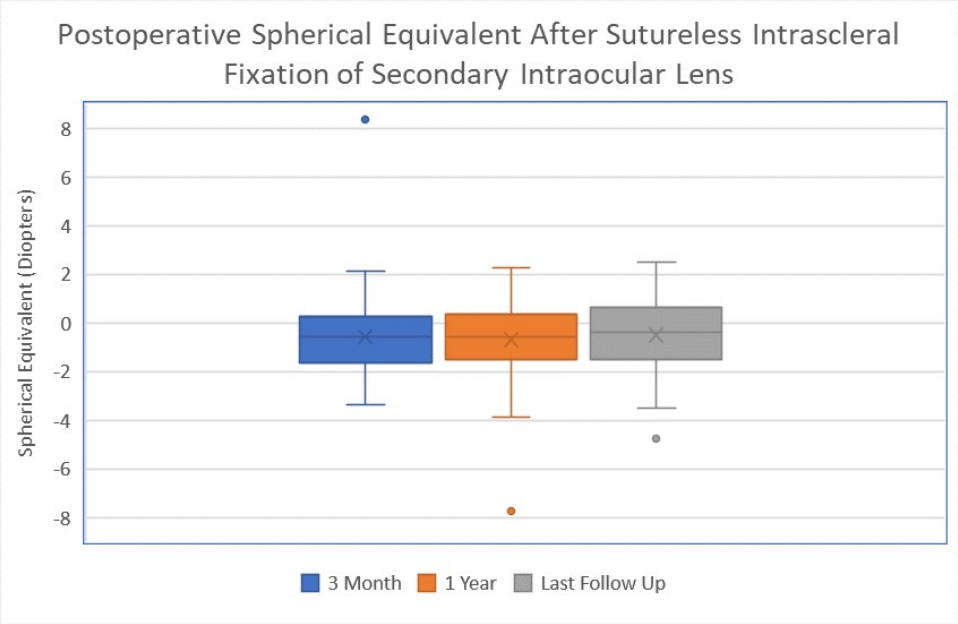
METHODS This study was a retrospective, consecutive cohort from multiple surgeons of a single center. Inclusion criteria included eyes that underwent SIS IOL with PPV and obtained refraction at 3 months and 1 year follow up. Eyes were excluded if refraction was unable to be obtained for any reason. Primary outcome measures included spherical equivalent (SEQ) and change in SEQ (ΔSEQ) at 3 month, 1 year, and last follow up compared to predicted preoperative SEQ aim of the implanted IOL. Secondary outcomes measures included visual acuity (VA) and refractive outcomes between IOL fixation at 1.5mm, 2mm, and 2.5mm posterior to the limbus.

RESULTS In total, 74 eyes of 70 patients were included. Preoperative logMAR VA was 1.21±0.67. Mean follow up times was 2.52±1.35 years. All eyes were implanted with an

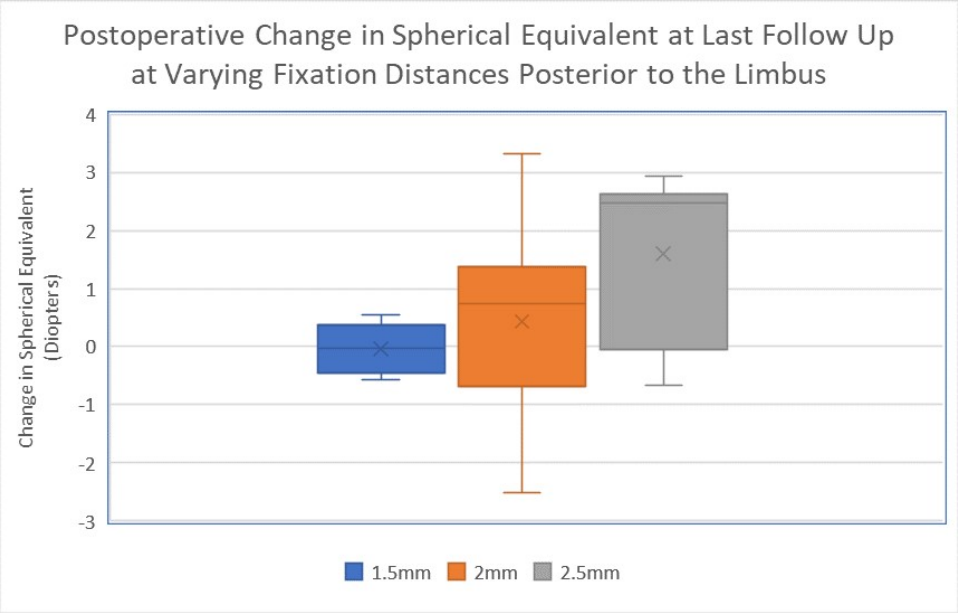
Alcon MA60AC IOL with predicted SEQ of -1.07±0.81D with in-the-bag calculation. During implantation, 5 eyes, 61 eyes, and 8 eyes had the IOL fixated 1.5mm, 2mm, and 2.5mm posterior to the limbus, respectively. At 3 month follow up, logMAR VA was 0.24±0.21, SEQ was -0.56±1.65D, and ΔSEQ was 0.51±1.54D. At 1 year follow up, logMAR VA was 0.22±0.21, SEQ was -0.68±1.56D, and ΔSEQ was 0.39±1.42D. At last follow up, logMAR VA was 0.23±0.21, SEQ was -0.54±1.47D, and ΔSEQ was 0.53±1.28D. At 3 months, 1 year, or last follow up, there was no difference between SEQ or ΔSEQ (p=0.83 and p=0.80, respectively). Comparing IOL fixation 1.5mm, 2mm, and 2.5mm posterior to the limbus, there was no difference in ΔSEQ at 3 months (p=0.11) or 1 year (p=0.051), but there was a difference at last follow up (p=0.03).

CONCLUSION The refractive outcomes for SIS IOL with PPV were favorable. This study showed postoperative SEQ to be more hyperopic compared to preoperative IOL calculations, particularly if IOL fixation was more posterior to the limbus. Also, this study showed stability in refraction during follow up. These results may aid surgeons with IOL power calculations to better predict refractive outcomes.

HUMAN RESEARCH Yes: Approved by institutional review board



Box-and-whisker plot showing postoperative SEQ at 3 months, 1 year, and last follow up after SIS IOL implantation.



Box-and-whisker plot showing postoperative ΔSEQ at last follow up at varying fixation distances posterior to the limbus during SIS IOL implantation.

Dexamethasone Intracameral Drug-Delivery Suspension for Inflammation Associated With Vitreoretinal Surgery

- Daniel F Kiernan, MD, FACS

OBJECTIVE Does a single intracameral dexamethasone drug-delivery suspension result in a similar post-operative anti-inflammatory effect as post-operative daily topical corticosteroids for patients undergoing vitreoretinal surgery?

PURPOSE To evaluate the efficacy of an anterior chamber intracameral dexamethasone drug-delivery suspension (Dexycu; EyePoint Pharmaceuticals, Watertown, MA) that provides medication for up to 21 days with a single application in treating postoperative inflammation in patients undergoing vitreoretinal surgery compared to daily post-opeative treatment with topical corticosteroids.

METHODS Retrospective case-matched comparison of patients undergoing initial vitreoretinal surgery by a single surgeon. Patients had a preoperative best-corrected visual acuity of 20/20 to light perception and a variety of vitreoretinal pathologies. 27 eyes of 27 patients received intracameral dexamethasone at the time of surgery and were compared to 27 eyes of 27 patients who received daily post-operative corticosteroid eye drops over 4 weeks. Primary outcome was anterior chamber cell (ACC) clearing (ACC score of 0) in the study eye at postoperative day (POD) 7. Ocular adverse events were assessed through POD 90. A chi-square test was used for statistical analysis.

RESULTS Anterior chamber cell clearing at POD 7 was achieved in 38% of eyes in the topical steroid-treated group and in 67% in the intracameral dexamethasone treatment group, respectively (P =0.029). No serious ocular adverse events were noted up to POD 90 in either group.

CONCLUSION The intracameral dexamethasone drug-delivery suspension placed in the

anterior chamber after vitreoretinal surgery was more effective than topical corticosteroids in treating inflammation occurring 1 week following vitreoretinal surgery and thus may be an alternative to daily corticosteroid drop installation in this patient population.

HUMAN RESEARCH Yes: Approval waived

Comparative Study of Single Port Versus Dual Port Vitrectomy for the Treatment of Vitreous Opacities

- Luiz Henrique Lima, MD

OBJECTIVE The addition of a second port 180 degrees opposite of the original port in the outer cylinder of a cutter tip may decrease bulky vitrectomy time in cases of vitreous opacities.

PURPOSE To compare the vitrectomy time, clinical outcomes, and complications between the single port (SP) and dual port (DP) vitrectomy in patients with vitreous opacities.

METHODS Custom 180 degree DP cutters were fabricated from a standard 23-gauge Constellation single port cutter. The second port with a 0.016-inch diameter was placed at the distal end of the cutter tip (same height of the original port) and 180 degrees opposite the original port. In this prospective, nonrandomized, comparative, interventional study, fifty-two consecutive patients with vitreous opacities were included, and twenty-six patients underwent the SP vitrectomy and twenty-six patients underwent DP vitrectomy performed by one surgeon. The amount of vitreous opacity was graded for each study eye using ultra-sound. The main outcome measure of the study was the bulky vitrectomy time, and the secondary outcomes were represented by visual acuity improvement, anatomical success rate and intraoperative complications. A linear mixed model was used to compare the continuous measures in the two groups. Anatomic success at 3 months was compared using a chi-square test. A p value of <0.05 was defined as statistically significant.

RESULTS The main etiologies for vitreous opacities were uveitis (72%) and old vitreous hemorrhage (28%). The mean duration of vitreous removal was 21.7 min (SD: 6.3) with SP vitrectomy and 12.5 min (SD: 7.2) with DP vitrectomy, resulting in a difference of 9.2 min ($p < 0.001$). Mean logMAR visual acuity improved from 1.67 ± 1.21 preoperatively to 0.14 ± 0.13 at final postoperative visit ($p < 0.001$) in the SP group and from 1.56 ± 1.18 preoperatively to 0.21 ± 0.32 at final postoperative visit ($p < 0.001$) in the DP group. The anatomical success rate after surgery was 95.5% and 96.3% in the SP and in the DP groups ($p = 0.63$), respectively. Intraoperative iatrogenic retinal breaks occurred in 2 eyes in the SP group and 3 eyes in the DP group.

CONCLUSION DP vitrectomy may reduce bulky vitrectomy time, and may represent a safe and effective surgical option for the treatment of vitreous opacities.

HUMAN RESEARCH Yes: Approved by institutional review board