7/14/2022 11:10 am

Surgery Symposium 1

Visual Outcomes and Complications of Combined vs Sequential Cataract Surgery and Pars Plana Vitrectomy: Multicenter Database Study

- Ahmed Sallam, MD PhD FRCOphth
- Mohmed Soliman, MD, MSc, PhD
- Abdelrahman Elhusseiny, MD, MSc

Objective:
What are the visual outcomes and intraoperative complications rates of of combined versus sequential phacovitrectomy?

Purpose:
To compare the visual outcomes and rates of intraoperative complications, in eyes that underwent combined phacovitrectomy to those that underwent sequential surgery using a large dataset from 8 centers using one electronic medical record in the UK.

There is paucity of high quality data on this subject, with the majority of the existing studies being limited by their sample size and differing reporting outcomes.

Methods:
Retrospective chart review of cataract surgery dataset pooled from 8 UK sites between January 2000 –May 2015. Eyes that underwent pars plana vitrectomy (PPV) prior to or combined with cataract extraction (CE) were included. We classified the eligible eyes into 2 groups: eyes that underwent combined CE and PPV (group 1) and those who underwent sequential PPV then CE (group 2). The main outcome measures were the mean postoperative vision and the rate of intraoperative complications in each group.

Results:
The study included 2236 eyes in group 1 and 2270 eyes in group 2. Mean preoperative visual acuity was 1.0 logMAR in both groups. Main indications for vitrectomy were retinal detachment, diabetic vitrectomy and vitreoretinal interface pathology. The mean postoperative visual acuity was worse in group 1 than group 2 ($p<0.0001$) at all times points, however, the differences in visual improvement between the study cohorts narrowed down with increased follow up time; 1.0±0.7vs. 0.6±0.6, 0.7±0.6 vs. 0.4±0.5 and 0.7±0.6 vs. 0.5±0.5 at 0-4 weeks, 4-12 weeks and 12-24 weeks, respectively. Proportions of eyes that gained >3 logMAR units were 49% in group 1 and 66.2% in group 2 ($p<0.0001$). Logistic regression analysis showed that better VA at baseline and sequential surgery were good predictors for reaching 20/40 vision by 6 months. In group 1, there was a higher rate of posterior capsular rupture (2.5% vs 0.8%, $p<0.0001$), Iatrogenic retinal injury (1.7% vs 0; $p=p<0.0001$) and choroidal hemorrhage (0.4% vs 0%, $p=0.003$).

Conclusion:
Postoperative visual gain was higher in the sequential cataract group with lower rates of intraoperative complications as compared to combined phacovitrectomy. However, we observed small differences in visual improvements between the 2 groups by the 6-month.

IRB APPROVAL No - exempt

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Surgery Symposium 1

Retinal Displacement After Scleral Buckle vs Combined Scleral Buckle and Vitrectomy for the Management of Rhegmatogenous Retinal Detachment: ALIGN SB vs PPV-SB

- Aditya Bansal, MD
- James Kohler, MD
- Edwin Ryan, MD
- Muna Bhende, MD
- Pradeep Susvar, DNB
- Shilpa IN, MS, DNB
- Priyanka Mahendrakar, MS, DNB, FICO
- Garima ., DNB ophthalmology, fellowship in retina
- Samara Marafon, MD, MSc
- Sumana Naidu
- Rajeev Muni, MD, MSC, FRCS(C), FASRS

Objective:
Are retinal pigment epithelium (RPE) pump based procedures for primary macula-off rhegmatogenous retinal detachment (RRD) associated with less retinal displacement?

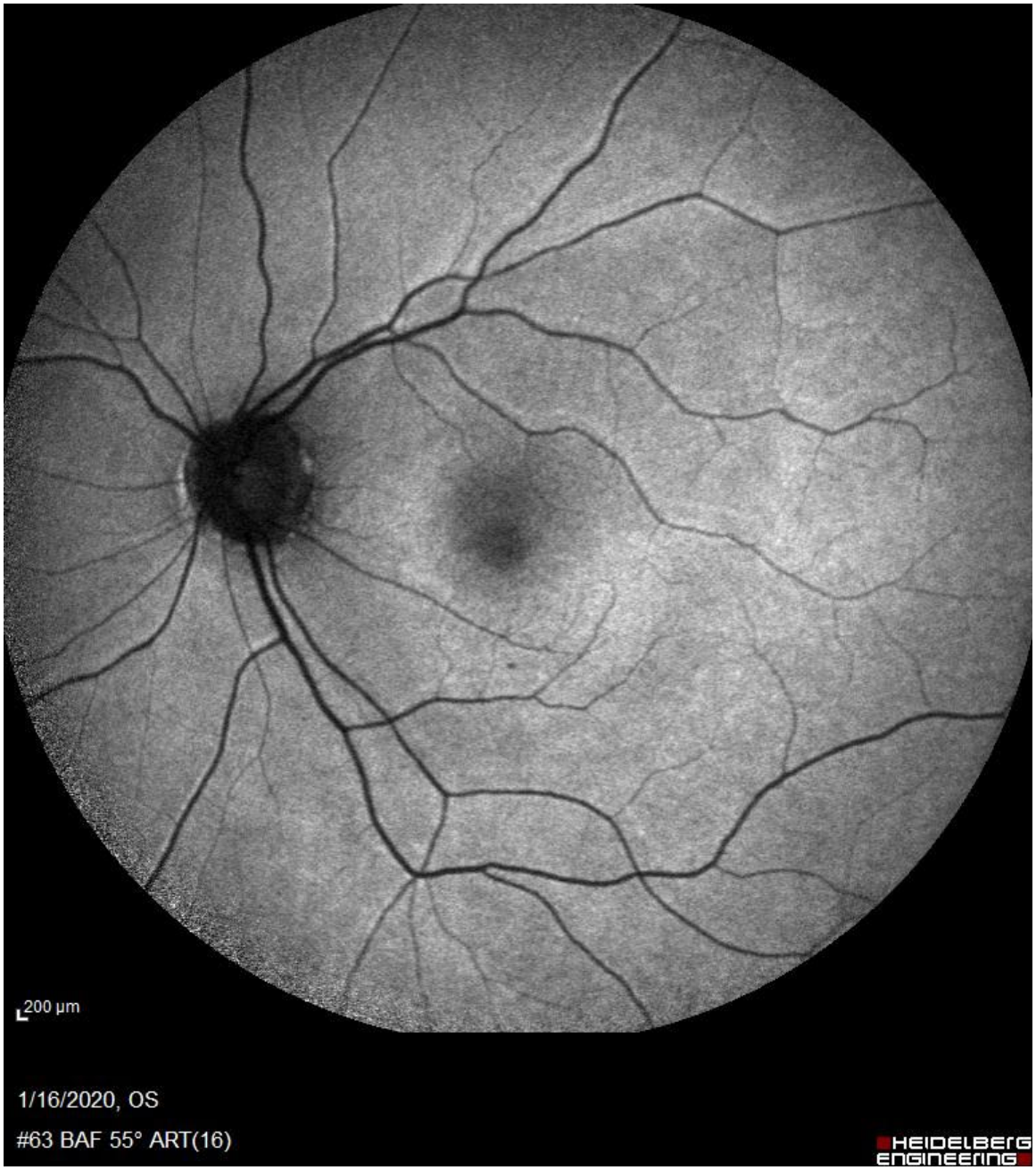
Purpose:
Low-integrity retinal attachment (LIRA) is characterized by retinal displacement on fundus autofluorescence (FAF) imaging. Recent evidence suggests LIRA occurs more commonly with pars plana vitrectomy (PPV) compared to RPE-pump based procedures such as pneumatic retinopexy. This is likely related to the full-gas fill during PPV that exerts a buoyant force on the retina and residual subretinal fluid leading to retinal stretching and worse functional outcomes. We set out to assess the risk of LIRA following RRD repair with scleral buckle (SB), also an RPE-pump based procedure, versus combined PPV-SB.

Methods:
Multicenter prospective non-randomized comparative trial including patients (age >18 years) presenting with primary macula-off RRD undergoing SB or PPV-SB were included. Patients with significant media opacity or proliferative vitreoretinopathy grade B or worse were excluded. Study was conducted at St. Michael's Hospital in Toronto, Canada, VitreoRetinal Surgery PA in Minneapolis, Minnesota and Sankara Nethralaya in Chennai, India. All patients had FAF and assessment of functional outcomes. Metamorphopsia was assessed with MCHARTs and aniseikonia was assessed with the New Aniseikonia Test at 3 months post-operatively. FAF images were assessed for retinal vessel printings by two masked graders with any differences adjudicated by consensus. Patients with poor quality ungradable FAF images were excluded from the study. The primary outcome was the risk of LIRA following SB vs PPV-SB.

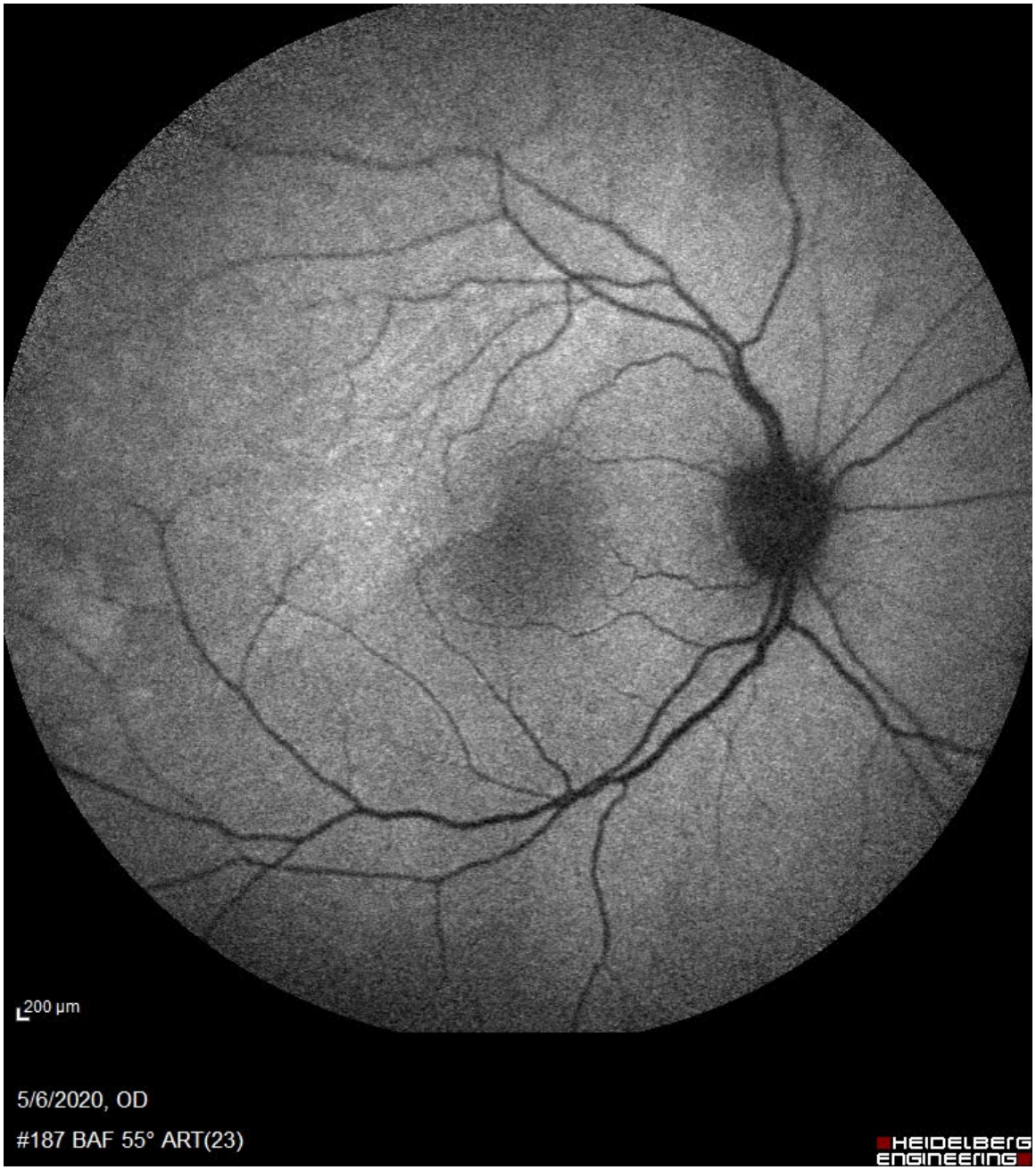
Results:
Eighty-three eyes of eighty-three patients were enrolled and had gradable FAF images. 40.96% (34/83) underwent SB and 59.03% (49/83) underwent PPV-SB. There was substantial agreement between the two graders in detecting LIRA (85.5%, Kappa=0.629 (95%CI=0.439-0.819). Baseline characteristics differed with younger phakic patients in the SB group and patients with more extensive detachments in the PPV-SB group. 17.6% (6/34) of patients had LIRA in the SB group vs 38.8% (19/49) in the PPV-SB group (p=0.039). The association between LIRA and procedure type remained statistically significant after a multivariable logistic regression adjusting for gender, lens status, extent of retinal detachment in quadrants and baseline logMAR visual acuity with an odds of retinal displacement of 3.875 (95% CI=1.18-12.723, p=0.026) in the PPV-SB group vs the SB group. There were no statistically significant differences in functional outcomes between the two groups.

Conclusion:
SB, an RPE-pump based procedure, is associated with less retinal displacement/LIRA compared to PPV-SB. There were no significant differences in functional outcomes between the groups. Further prospective studies with a larger sample size are required to assess the impact of retinal displacement on functional outcomes in patients undergoing SB or PPV-SB.

IRB APPROVAL Yes



Retinal vessel printing / LIRA following PPV-SB



No retinal vessel printing following SB

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Surgery Symposium 1

Randomized Controlled Trial of Perioperative Intravenous Dexamethasone on Postoperative Analgesia in Scleral Buckle Surgery

- Jonathan Prenner, MD, FASRS
- Howard Fine, MD, MHSc
- Matthew Henderson, BA
- Konstantin Astafurov, MD, PhD

Objective:
To assess the efficacy of a single-dose of perioperative dexamethasone on postoperative pain and opioid use following SB surgery.

Purpose:
To determine if perioperative steroid exposure will reduce postoperative pain after scleral buckle use.

Methods:
Consecutive patients with rhegmatogenous retinal detachment scheduled for SB and/or PPV/SB were approached for study participation. All patients received anesthesia with propofol induction followed by a 5cc peri/retrobulbar injection of a 50-50 mixture of 4% lidocaine and 0.75% bupivacaine by the retina surgeon. Patients were randomly assigned to control (standard of care) versus the treatment group who received standard of care plus a single dose of 8 mg of dexamethasone administered intravenously at the conclusion of the case. All other physicians and members of the patient's care team were masked to the treatment assignment.

Post-operatively, patients were asked to take acetaminophen up to 1000 mg every 6 hours for mild or moderate pain, or oral oxycodone/acetaminophen 5mg/325mg every 6 hours as needed for severe pain only. Patients were masked to their assigned treatment group. A standarized pain questionnaire was administered to patients at post-operative day 1 and post-operative week 1 to determine their level of pain and the number of oxycodone/acetaminophen tablets consumed.

The dexamethasone treatment group was compared against the control group. Continuous variables were presented as mean ± standard deviation and were analyzed using the Student's *t*-test. Descriptive statistics were computed for both groups and comparisons of categorical variables were analyzed using Fisher's exact test. The significance level was set at $\alpha = 0.05$ and tests were two-tailed. Statistical analyses were performed using IBM SPSS Statistics for Windows, version 27 (IBM Corp., Armonk, N.Y., USA).

Results:
On POD 0, the treatment group showed a significantly lower mean VAS pain score than the control group (2.76 ± 1.96 vs. 5.64 ± 3.40, p-value = 0.002). At POD 1, the mean VAS score in the dexamethasone group tended to be lower than the control group (3.02 ± 2.12 vs. 4.23 ± 2.25), but this difference was not statistically significant (*p*-value = 0.078). At postoperative day 7, there was no statistically significant difference in mean VAS score between groups (1.04 ± 1.37 vs. 1.50 ± 1.08, p-value = 0.311).

On POD 0, the dexamethasone group showed a significantly lower opioid use than the control group (0.41 ± 0.92 vs. 1.34 ± 1.43, *p*-value = 0.021) (Table 2). At POD 1 and 7, there were no significant differences in opioid use between groups (0.52 ± 1.02 vs. 0.95 ± 1.75, *p*-value = 0.363; 0.00 ± 0.00 vs. 0.13 ± 0.50, *p*-value = 0.333). Total opioid use in the first week was significantly lower in the dexamethasone group than the control group (0.97 ± 1.88 vs. 3.69 ± 5.32, *p*-value = 0.047).

Conclusion:
Single-dose intravenous dexamethasone following scleral buckle surgery can significantly reduce postoperative pain and opioid use.

IRB APPROVAL Yes

7/14/2022 11:26 am

Surgery Symposium 1

Surgical Outcomes of Combined Pars Plana Vitrectomy and Scleral Fixation of Intraocular Lenses: Comparison of Gore-Tex Suture vs Intrascleral Haptic Fixation

- David Xu, MD
- Glenn Oh
- Raziyeh Mahmoudzadeh, MD
- Samir Patel, MD
- M. Ali Khan, MD, FACS, FASRS

Objective:
Limited data exists that directly compares surgical outcomes for secondary intraocular lens (IOL) techniques in the hands of the same surgeons.

Purpose:
To compare clinical outcomes of combined pars plana vitrectomy (PPV) and secondary scleral fixation of an IOL using Gore-Tex suture versus intrascleral haptic fixation using double needles (the Yamane technique).

Methods:
Single-center, retrospective, consecutive case series conducted at Wills Eye Hospital (Philadelphia, PA, USA) between 12/01/2017 and 12/01/2021. Eyes that underwent scleral fixation of a Bausch and Lomb Akreos AO70 or enVista MX60E IOL using Gore-Tex suture or a Tecnis ZA9003 or Zeiss CT LUCIA 602 IOL using the Yamane technique, were included. Eyes with corneal, optic nerve, or retinal pathology limiting final vision were excluded. Primary outcome measures were change in visual acuity (VA) and occurrence of intraoperative and postoperative complications with minimum follow-up of 120 days.

Results:
Sixty-eight eyes of 64 patients (47% male, mean (± SD) age 72(±12) years) were included. Indications for secondary IOL surgery were dislocated IOL (n=42), retained lens material (n=11), subluxed crystalline lens (n=8, and aphakia (n=7). Mean follow-up was 501 days (median 366 days, range 132-1254 days). Fifty-two eyes (76.5%) underwent Gore-Tex suture fixation and 16 eyes (23.5%) underwent Yamane fixation. Across all eyes, VA improved from 1.34 ±0.74 (20/437) preoperatively to 0.36 ±0.37 (20/46) at 3 months and 0.32±0.36 (20/42) at final follow-up ($p<0.001$ for both timepoints). VA improved in statistically significant fashion for each secondary IOL technique, and no difference in pre-operative VA ($p=0.468$), 3 month VA ($p=0.286$), and final VA ($p=0.142$) were noted between techniques. No intraoperative complications were noted. Postoperative complications are included in Table 1, and there was no statistically significant difference between groups. In the Gore-Tex group, 2/52 eyes (3.8%) required reoperation for conjunctival erosion with exposed suture (n=1) and for IOL decentration (n=1). In the Yamane group, 2/16 (12.5%) eyes required reoperation for epiretinal membrane formation (n=1) and for retinal detachment (n=1). There were no cases of postoperative endophthalmitis in the post-operative follow-up period.

Conclusion:
Scleral fixation of IOLs with Gore-Tex suture and intrascleral haptic fixation (Yamane technique) resulted in improvement of VA. No significant difference in post-operative complication profiles was noted. Both techniques appear to be safe and effective for secondary IOL surgery in combination with PPV.

IRB APPROVAL Yes

	All eyes (n=68)	Gore-Tex (n=52)	Yamane (n=16)	P-value*
Hyphema	1 (1.5%)	1 (1.9%)	0 (0%)	1.000
Corneal edema	11 (16.2%)	7 (13.5%)	4 (25%)	0.272
Hypotony	2 (2.9%)	2 (3.8%)	0 (0%)	1.000
Ocular hypertension	15 (22.1%)	13 (25%)	2 (12.5%)	0.492
Vitreous hemorrhage	6 (8.8%)	6 (11.5%)	0 (0%)	0.323
Choroidal detachment	1 (1.5%)	0 (0%)	1 (6.3%)	0.235
Transient cystoid macular edema	23 (33.8%)	17 (32.7%)	6 (37.5%)	0.418
Persistent post-operative inflammation	1 (1.5%)	1 (1.9%)	0 (0%)	1.000
Suture or Haptic complication	1 (1.5%)	1 (1.9%)	0 (0%)	1.000
IOL tilt	2 (2.9%)	2 (3.8%)	0 (0%)	1.000
Conjunctival erosion	1 (1.5%)	1 (1.5%)	0 (0%)	1.000
IOL dislocation	1 (1.5%)	1 (1.5%)	0 (0%)	1.000
Epiretinal membrane	2 (1.5%)	0 (0%)	2 (6.3%)	0.053
Retinal Detachment	1 (1.5%)	0 (0%)	1 (6.3%)	0.235

Postoperative complication PPV and secondary IOL fixation techniques

7/14/2022 11:41 am

Surgery Symposium 1

Study of Simulated Vitreoretinal Performance After Multimodal Pharmacological and Behavioral Exposures Among Surgeons With Varying Levels of Surgical Experience

- Mauricio Maia, MD, PhD
- Marina Roizenblatt, MD, PhD
- Mitchell Wolf, MD
- Kim Jiramongkolchai, MD
- Vitor Marin, MD
- Michel Farah, MD, PhD Peter
- Gehlbach, MD, PhD Mauricio Maia, MD, PhD

Objective:
To assess whether changes in simulated microsurgical dexterity present with weight-adjusted caffeine and propranolol doses, upper-limb physical exercise, and alcohol intake differ with surgeon level of experience.

Purpose:
To analyze if surgeons level of experience affects factors reported to influence simulated vitreoretinal surgical dexterity.

Methods:
Nine novice and 11 senior surgeons (<2 years and >10 practice years, respectively) were prospectively and randomly recruited. A fixed sequence of Eyesi-simulator tasks was repeated over 4 days after the following self-controlled exposures. Day 1: placebo, 2.5 mg/kg caffeine, and 5.0 mg/kg caffeine. Day 2: placebo, 0.2 mg/kg propranolol, and 0.6 mg/kg propranolol. Placebo, caffeine, and propranolol intake were all masked by using visually identical pills. Day 3: baseline, breathalyzer reading of 0.06%-0.10% and 0.11%-0.15% blood alcohol concentration (BAC). Day 4, baseline, push-up sets with 50% and 85% repetition maximum (RM). The analyzed outcomes were Eyesi-generated score (0-700, worst-best), time for task completion (min), intraocular pathway (cm), and tremor rate (0-100, worst-best). The median delta was calculated to quantify the changes in performance and data were statistically analyzed with the Friedman test.

Results:
Total score performance declined following increased alcohol exposure for novice ($p=0.03$) and senior surgeons ($p<0.001$). Pathway ($p=0.03$) and tremor ($p=0.02$) measurements declined for novices only. Novice surgeons performed worse after 0.11%-0.15% BAC compared to 0.6-mg/kg propranolol for score ($\Delta=-52.3$ vs $\Delta=+23.4$, $p=0.01$) and time ($\Delta=+1.5$ vs $\Delta=-1.7$, $p=0.01$) and had a higher tremor rate when 0.06%-0.10% BAC was compared with 0.6 mg/kg propranolol ($\Delta=-3.2$ vs $\Delta=0.9$, $p=0.05$), and when 0.06%-0.10% BAC was compared with 5.0 mg/kg caffeine ($\Delta=-3.2$ vs $\Delta=+3.5$, $p=0.01$). Seniors had a lower score after 0.11%-0.15% BAC compared to 5.0 mg/kg caffeine ($\Delta=-47.4$ vs $\Delta=+1.0$, $p=0.03$) and 85% RM ($\Delta=-47.4$ vs $\Delta=-1.0$, $p=0.03$).

Conclusion:
The novice surgeon's performance was more susceptible to pharmacologic and behavioral exposures as compared to the seniors. Alcohol was the variable that most negatively affected the performance of both groups. The beneficial impact of propranolol on simulated performance was detected only among novice surgeons.

IRB APPROVAL Yes

7/14/2022 11:47 am

Surgery Symposium 1

Retinal Massager: New Multifunctional Tool for Vitrectomy

- Manish Nagpal, MD, FRCS (UK) ,FASRS
- Navneet Mehrotra, DNB
- Gayathri Mohan, MS

Objective:
it allows relatively large macular holes to be closed without using a adjunct tissue and allows atrumatic ironic of retinal folds in PVR

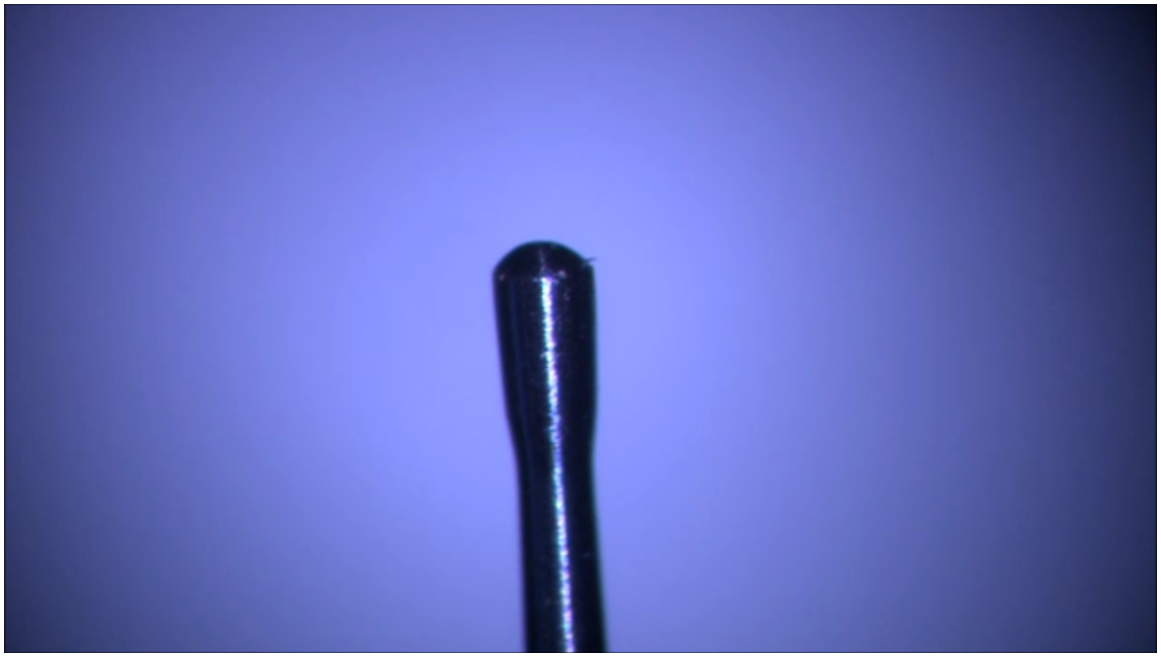
Purpose:
To describe a new 25 gauge multifunctional instrument, Retinal Massager (RM) designed to atraumatically massage the retina in macular hole surgery and to iron out folds in Proliferative Vitreo Retinopathy (PVR)

Methods:
RM, a 25 gauge titanium instrument having a smooth bulbous tip has been used for multiple indications such as massaging the edges of macular hole (N=30), ironing stiff folds in PVR (N=20). Pre and post operative (30 days post surgery) Optical coherence tomography(OCT)and Microperimetry (MP3) were noted in macular hole cases and surgical videos were recorded for all cases in this prospective , non consecutive interventional series

Results:
Macular hole approximated on table in all cases with a final closure 28/30 cases. Anatomical and functional improvement was confirmed on the OCT and MP3 tests. In PVR cases with stiff folds, retina could be flattened atraumatically using the RM in all cases

Conclusion:
RM is a safe , inexpensive, reusable tool for vitrectomy for macular hole without the use of any Internal limiting flaps and also for ironing stiff folds in surgery for PVR

IRB APPROVAL Yes



retinal massager tip

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Surgery Symposium 1

Surgical Outcomes of Scleral Buckling for Rhegmatogenous Retinal Detachment Using the NGENUITY 3-Dimensional Visualization System With a Guarded Light Pipe

- John Miller, MD
- Grace Baldwin
- Jared Sokol, MD, MBA
- Cassie Ludwig, MD, MS

Objective:
To compare the surgical outcomes of traditional scleral buckling (SB) under indirect ophthalmoscopy (ID) for primary rhegmatogenous retinal detachment (RRD) repair to a new SB technique that utilizes the NGENUITY heads-up three-dimensional visualization system with a guarded light pipe (3DGLP).

Purpose:
SB is a well-known technique for the treatment of RRD with excellent outcomes and is preferred in certain patient populations, such as young, phakic patients. However, the development of pars plana vitrectomy (PPV), especially smaller gauge, has caused a shift towards PPV over SB despite comparable results. The trend towards PPV has many factors, but most commonly includes quicker and easier visualization with integrated wide field viewing systems to the operating microscope, excellent illumination tools, and reduced SB volume in fellowship training programs. Here, we apply recent advances in endoillumination and heads-up three-dimensional visualization to SB surgery to address the drawbacks of traditional SB techniques.

Methods:
A retrospective comparative study of 47 eyes that underwent SB for primary RRD by a single surgeon was performed. Electronic medical records of the ID group (n = 31) and the 3DGLP group (n = 16) were evaluated. In the 3DGLP group, the scleral buckle was attached to the eye in the traditional manor, but the retina was visualized with the NGENUITY 3D visualization system with a guarded light pipe as replacement for the standard indirect ophthalmoscope. The guarded light pipe was created by sliding a trimmed Watzke-Allen sleeve onto the shaft of a light pipe as a guard to prevent insertion into the vitreous past the internal os of a single 25 or 27-gauge trocar cannula. The primary outcome of the study was single surgery anatomic success and secondary outcomes included final anatomic success, visual acuity, operative time, and intra and post-operative complications.

Results:
The single surgery anatomic success rate was 87.0% in the ID group and 87.5% in the 3DGLP group ($p = 1.00$). The final anatomic success rate was 100% in both groups. The mean post-operative logMAR was 0.206 in the ID group and 0.339 in the 3DGLP group ($p = 0.4339$). The mean operative time was 110.3±24.9 minutes in the ID group and 101.0±16.4 minutes in the 3DGLP group ($p = 0.2533$). Among eyes that underwent subretinal fluid drainage, the operative time was significantly longer in the ID group compared to the 3DGLP group, 116.8±24.1 minutes vs. 99.18±19.1 minutes ($p = 0.0345$). There were no post-operative complications in the ID group and one complication of self-resolving vitreous hemorrhage in the 3DGLP group ($p = 0.3404$). There were no cases of endophthalmitis in either group and there was no significant difference in cataract progression between the groups ($p = 0.5054$).

Conclusion:
Compared to traditional SB surgery for the treatment of RRD, SB surgery utilizing NGENUITY three-dimensional visualization with a guarded light pipe results in similar anatomical, visual, and peri-operative outcomes and may result in a shorter operative times in cases where subretinal fluid drainage is performed. Instead of relying on the indirect ophthalmoscope for visualization as in traditional scleral buckling, this new technique allows for all participating surgeons, including trainees, to view critical procedural steps simultaneously while using the familiar light pipe tool for illumination.

IRB APPROVAL Yes

TABLE 1. Post-Operative Outcomes

Characteristic[a, b]	INDIRECT (n = 31)	NGENUITY Guarded light pipe (n = 16)	P-value
Reattachment			
Single Surgery Anatomic Success Rate, %	87.0%	87.5%	1.00
Reoperation, n	4	2	1.00
Final Attachment Rate, %	100%	100%	1.00
Post-operative visual acuity			
BCVA, LogMAR mean±SD	0.194±0.305	0.311±0.413	0.51
BCVA ≤ 20/40, n	24	11	0.73
BCVA > 20/40 and < 20/200, n	5	2	1.00
BCVA ≥ 20/200, n	2	3	0.32
Post-operative complications, n	0	1	0.34
Cataract progression, n	9	3	0.51
Cataract surgery, n	1	1	1.00
Post operative PVR, n	0	0	1.00

a. *Mann-Whitney U non-parametric used to compare continuous variables.*
b. *Fisher's exact test used for binary and nominal variables.*

BCVA = Best-corrected visual acuity; PVR = proliferative vitreoretinopathy; SD = standard deviation