What's New in RD Management?

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Overview

- Will discuss a new technique for scleral buckling
- Will review an important recent paper on influence of day of the week on RD repair
- Insights from the PIVOT, INTEGRITY Trials
- Future directions for study of optimizing outcomes of RRD repair

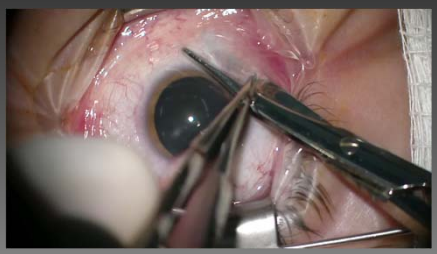
Chandelier SB

- A PubMed search of "rhegmatogenous retinal detachment and 2019" produced 215 entries
- Eleven were related to "chandelier scleral buckling"
  - Wide-angled endoillumination vs traditional scleral buckling surgery for retinal detachment - a comparative study. Cohen E[1,2], Rosenblatt A[1,2], Bornstein S[2], Loewenstein A[1,2], Barak A[1,2], Schwartz S[1,2]. Clin Ophthalmol. 2019 Feb 8;13:287-293.
    - Retrospective, interventional study from Israel showed similar outcomes for conventional SB vs chandelier SB
  - Two other case reports of endophthalmitis post-procedure

Chandelier SB – what is it?

- Scleral buckling done without using the indirect ophthalmoscope
- Endoillumination with a chandelier light, combined with a non-contact viewing system (as is used in vitrectomy surgery) is used to view the retina
- Whole case done under the scope
- No use of the indirect ophthalmoscope

Chandelier SB video

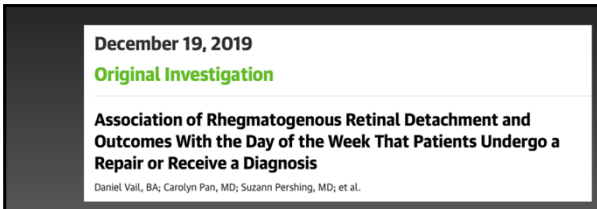


Chandelier SB

- Positives:
  - May have utility for training of fellows, residents (videos)
  - Can show to multiple viewers cryo application, buckle placement
  - Can observe drainage
- Negatives
  - Added penetration of eye for chandelier
    - Vitreous loss, endophthalmitis risk
    - Risk of lens touch
  - Slower surgery
  - View poor if cortical cataract
  - More expensive than standard SB
  - Slippery slope re indirect skills

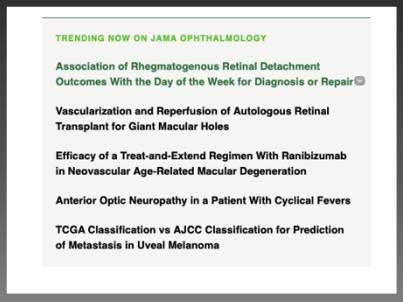
What is “chandelier scleral buckling”?

- A. a novel way to use endoillumination and wide-angle microscope viewing to replace the indirect ophthalmoscope for RD repair
- B. an admission that the indirect ophthalmoscopic skills of most new trainees are completely inadequate to do a standard buckle
- C. training wheels, let’s be honest
- D. all of the above



Does it matter what day of the week your RD is diagnosed?

Does that affect which procedure is chosen, and the outcome?



From 1/23/20 JAMA Ophth email

RD repair and day of the week study

- Authors looked at IBM MarketScan insurance claims data for patients with dx of RRD from 1/1/08 to 12/31/16 (240M covered lives)
- 265,615 patients underwent RRD repair, and 38,144 met inclusion criteria for the study
- Regression models were used to calculate likelihood of repair with different methods, likelihood of return to OR within 30 days, and time from dx to repair

RD repair and day of the week study

- Average age was 56.8 years, and 60.4% were men
- Monday dx was most common (21.9%), Sunday least (1.6%)
- Thursday surgery most common (21.1%), Sunday least (1.3%)
- Most common repair was PPV (57.0%), then laser (17.7%), then PnR (13.7%), SB (9.8%), then cryo (1.3%)
  - “PPV” includes PPV and PPV/SB
  - subtracting laser and PnR from dataset, PPV+PPV/SB = 85.3%, SB = 14.7%
- 26% of PnR patients needed 2nd procedure within 30 days
- PnR was 25% of procedures on Sunday, and 11.2% on Wed

RD repair and day of the week study

- Surgeons more likely to use PnR if RRD diagnosed on Friday-Sunday
  - Presumably due to limited OR access
  - PnR done on Sunday had lower success rate
- Patients diagnosed with RRD on Friday waited 0.28 days longer for treatment than those diagnosed on Wednesdays
- SB done more commonly on Saturday than other days
- Limitations
  - Lack of detailed clinical information
  - Couldn’t identify RD severity, location
  - PPV and PPV/SB grouped together

PRO Study and day of the week

- We have 2620 cases with RRD and very detailed data from 2015
  - Methodology paper accepted in Ophth Retina
- 5 centers in the US – looking at OR cases only
  - We did not get office treatment data from all centers
  - We do not have PnR data in detail
    - Though VRS use of PnR much lower; <2% of cases
- Let's ask the same questions (given caveats):
  - Thanks to Sushant Wagley, MD for data analysis

PRO Study and day of the week

- Average age was 59.8 years, and 63.9% were men (56.8 and 60.4%)
- Monday *dx* at 21.4% was most common, Sunday least at 1.9% (same days noted at 21.9% and 1.6%)
- Tuesday *surgery* most common at 21.4%, Sunday least at 2% (versus Thursday at 21.1% and Sunday at 1.3%)
- Most common repair approach was PPV (51.7%), then PPV/SB (34.8%), then SB (13.5%)
  - So, PPV combined was 86.5% of cases in PRO, SB was 13.5%
  - In Vail study, 85.1% were PPV or PPV/SB, and SB was 14.9%

PRO Study and day of the week

- Demographics very similar to those in Vail study
  - Average age = 59.8 years, and 63.9% were men
  - Patients diagnosed with RRD on Friday waited 0.25 days longer for treatment than those diagnosed on Wednesdays (vs 0.28 days)
- Day of week did not impact surgery choice
  - Mac off RDs waited 2.35 days vs. 1.62 days for mac on
- SSAS outcomes worst on Sunday at 77.3%
- Limitations
  - Did not document laser, pneumatic retinopexy cases

Vail Study vs. PRO Study

- "Very big data, but not detailed" vs. "Pretty big, very detailed data"
- Findings are quite similar re case selection
- Patient demographics are similar
- Makes it likely that PRO patient population reflects accurate representation of RRD incidence, treatment in the US

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The **P**neumat**I**c Retinopexy versus **V**itrectomy **O**utcomes (PIVOT) **T**rial: 1 year Results

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(Aside) Canada-US differences

- Pneumatic Retinopexy done far more frequently in Canada than in US
- SB done less, and PPV but not PPV/SB done more frequently
- Why is this?
  - OR access much more difficult
  - Billing practices don't penalize PnR
  - Marijuana is legal throughout Canada

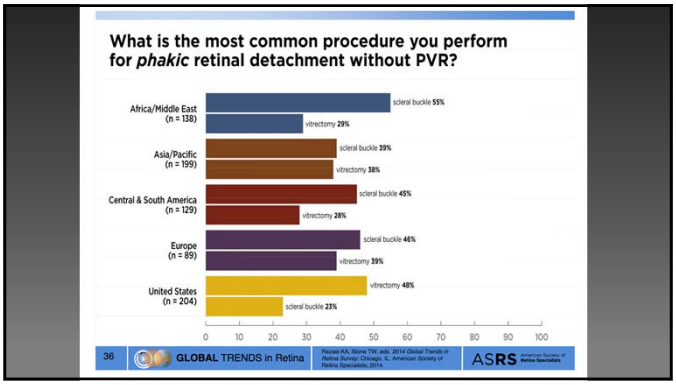
Introduction

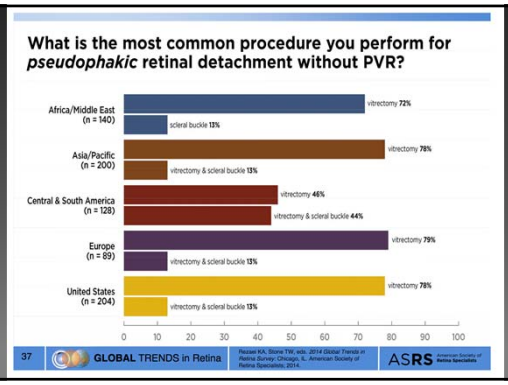
Considerable variation among retinal surgeons in their management of Primary Rhegmatogenous Retinal Detachment (RRD)

Management of relatively straightforward cases can vary from

1) Vitrectomy (PPV)
2) Scleral Buckle (SB)
3) Pneumatic Retinopexy (PnR)
4) Vitrectomy/Scleral Buckle (PPV/SB)

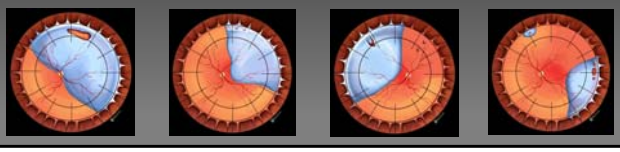
PIVOT compared PnR to PPV, as SB and PPV/SB done rarely





PIVOT Trial

- Randomized controlled trial, 5 surgeons, 176 patients
- Detachments fit criteria such that PnR likely to work
  - Break(s) w/N 1 clock hour in **DETACHED** retina **above** the **8 and 4** meridian
- Moderately complex RD only
- Standardized surgical technique



Outcome Measures

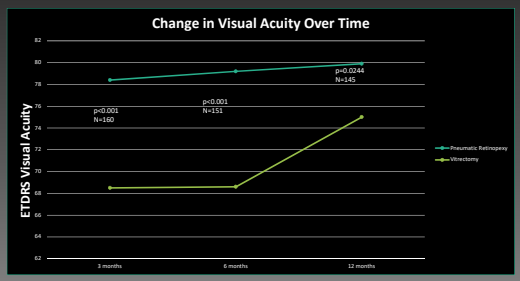
Primary: 1 year ETDRS Visual Acuity

Secondary: a) Primary Reattachment Rate
b) Quality of Life Changes: SF36 at 1 month and NEI-VFQ25 at 3, 6 and 12 months
c) Proportion of Patients who required cataract surgery

PRIMARY OUTCOME

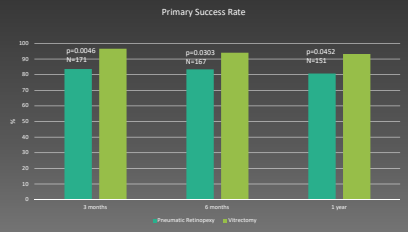
ETDRS Visual Acuity at 1 year

ETDRS Visual Acuity Over Time



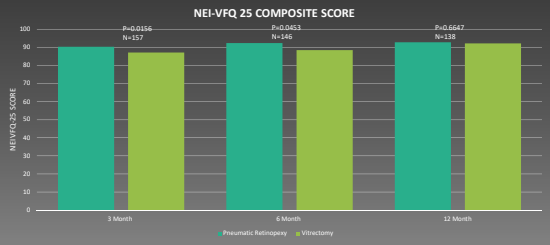
Secondary Outcomes

Primary Anatomical Success Rate

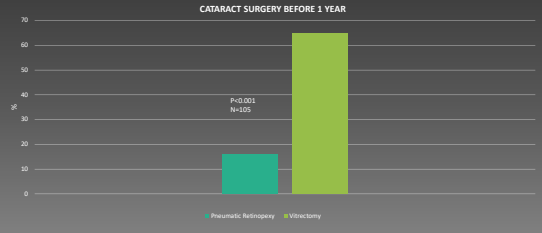


Primary Anatomical Success: Complete Retinal Reattachment in the Absence of Silicone Oil Tamponade, after a single operative procedure (PPV or PnR)

Vision Related Quality of Life: NEI-VFQ-25 Composite Score



NEED FOR CATARACT SURGERY



Summary

- Pneumatic Retinopexy had superior ETDRS visual acuity results at 1 year compared to Vitrectomy (p=0.0244)
- Vitrectomy had a 12% higher Primary Anatomical Success Rate (p=0.0452)
- Pneumatic failures did not jeopardize subsequent retinal reattachment with good final visual acuity
- Very few patients re-detached (1 Pneumatic and 2 PPV) after the 3 month time point
- Pneumatic Retinopexy has reduced morbidity, with reduced rates of cataract surgery compared to Vitrectomy

Distortion

- There was a statistically significant difference in vertical distortion between the groups favoring PnR
- No significant difference in horizontal distortion

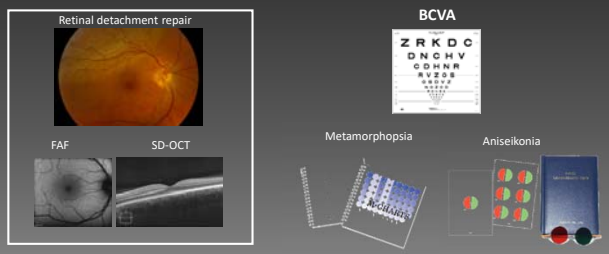
Conclusion - PIVOT

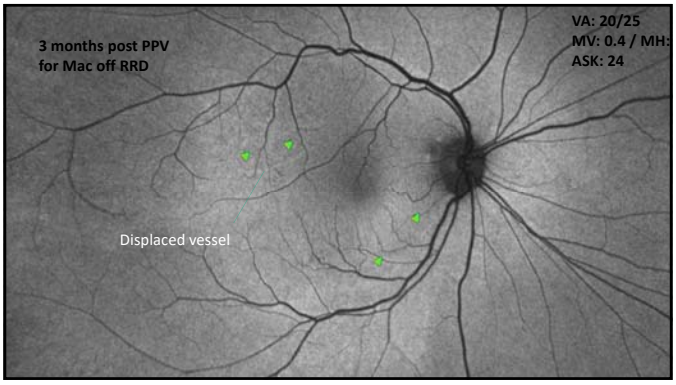
- Patients receiving Pneumatic Retinopexy as first line-treatment have better visual acuity results with less morbidity compared to patients receiving primary Vitrectomy
- Pneumatic Retinopexy as per PIVOT trial criteria should be considered and offered to patients before Vitrectomy in Phakic and Pseudophakic patients

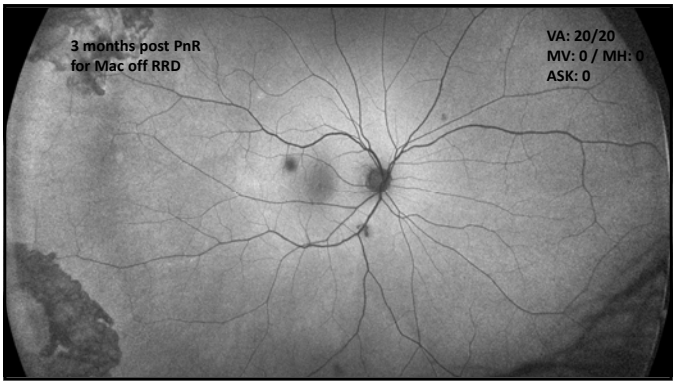
INTEGRITY Study – U of Toronto

- Multicenter retrospective study comparing Fundus Autofluorescence (FAF), metamorphopsia and aniseikonia testing outcomes between Pneumatic Retinopexy and PPV
- How is FAF useful?
  - Can show and quantitate retinal blood vessel displacement post RD
    - Shadow effect shows where vessels were before RD
  - Remember – PIVOT Trial only measured metamorphopsia

INTEGRITY Study







INTEGRITY Study

- Showed that PPV had significantly more displacement compared to PnR (44.4% vs. 7%) and that vertical distortion was more severe in patients with retinal displacement compared to those without (76.5% vs 55.9%)
- Why is this significant?
- Of the 4 ways to repair an RRD, PPV is now dominant. But:
  - PIVOT trial shows better visual function outcomes with PR
  - PRO study shows better vision outcomes with SB
  - Given that the retina reattaches similarly in PnR and SB, would outcomes of displacement and metamorphopsia testing be similar?
- SB and PPV/SB need to be evaluated in the same manner as was done for PPV and PnR

Outcomes – PRO Study phakic subset

- PPV is inferior to both SB and PPV/SB for SSAS (~84 vs 90%)
- SB had superior visual outcomes to PPV and PPV/SB even when controlling for cataract and macular status (20/28 vs 20/46 mac on)
  - Principal reason was the much higher number of cases of severe vision loss in PPV and PPV/SB groups
  - But in mac off cases, SB vs PPV and PPV/SB was ~ 20/35 vs 20/55
  - Is there less metamorphopsia, displacement, and aneisokonia in SB cases?

ALIGN Study – P.I. is Dr. Muni in Toronto

- Basically adding SB, PPV/SB to the INTEGRITY analysis
  - Retinal displacement, vision, visual function in mac off RD
- Prospective, multicenter (Canada, US, England)
- FAF
- Metamorphopsia testing
- Aneisokonia testing

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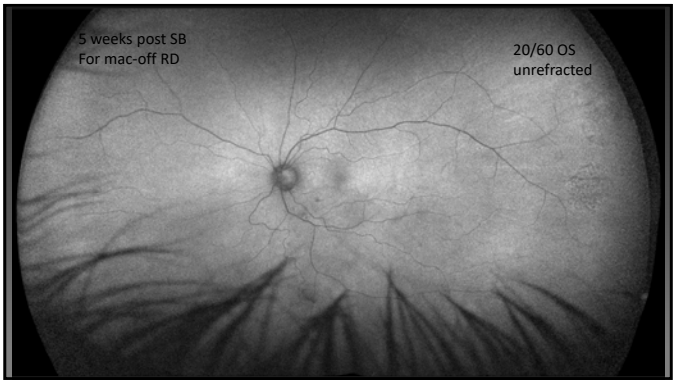
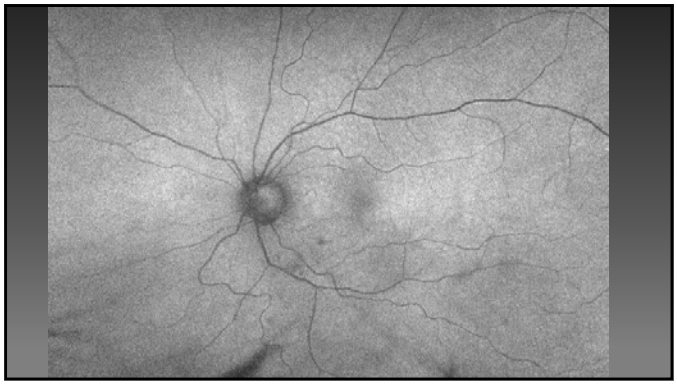
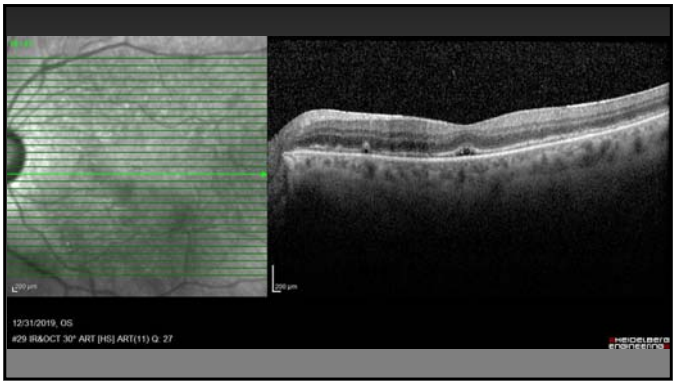


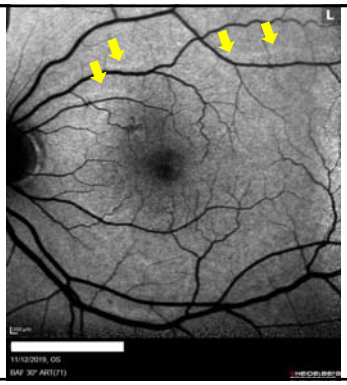


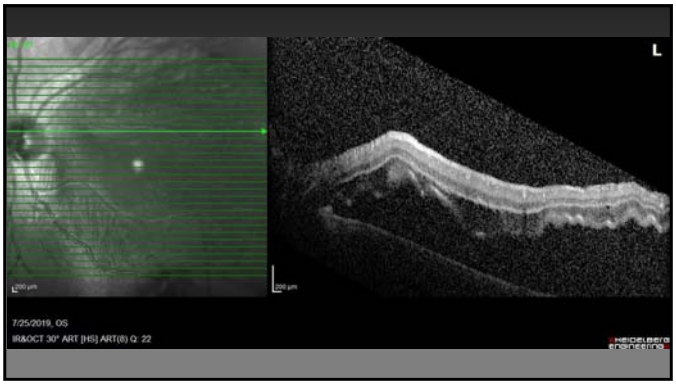


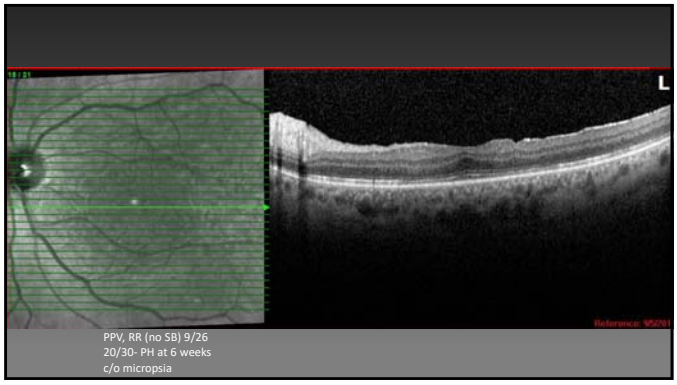
mac off OS-
25g Vit/SB/EL/14%C3F8 - 9/6/19

FAF done POW8 on 11/12/19

VA 20/50

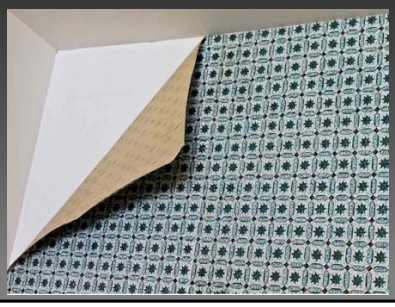






PPV, RR (no SB) 9/26
20/30- PH at 6 weeks
c/o micropsia

Wallpaper analogy for Retinal Detachment



LIRA vs HIRA

Low-integrity vs High-integrity Retinal Attachment (LIRA vs HIRA)
(acuity + distortion + aniseikonia all impact visual function)

100,000' view of PRO, PIVOT and ALIGN

- Given that PnR had less displacement, better visual acuity, and less metamorphopsia than PPV in PIVOT and INTEGRITY
- And SB had significantly better visual acuity outcomes than PPV in the PRO Study
- And both PnR and SB involve similar passive, indirect mechanisms of retinal reattachment (unlike PPV where the retina is flattened completely at surgery)
- Will SB show similar FAF, aniseikonia, and metamorphopsia testing findings to PnR, and will they be superior to PPV?
- Functional visual outcomes may drive RD repair method choices

Thank You!