



**UC DAVIS**  
EYE CENTER



# A Multicenter Study of Pneumatic Retinopexies Performed by Vitreoretinal Fellows

Parisa Emami, MD, MPH

Glenn Yiu, MD, PhD

University of California, Davis  
Eye Center, Sacramento, CA



**UC DAVIS**  
EYE CENTER



- No financial disclosures.





# MY ROLE IN THIS RESEARCH:

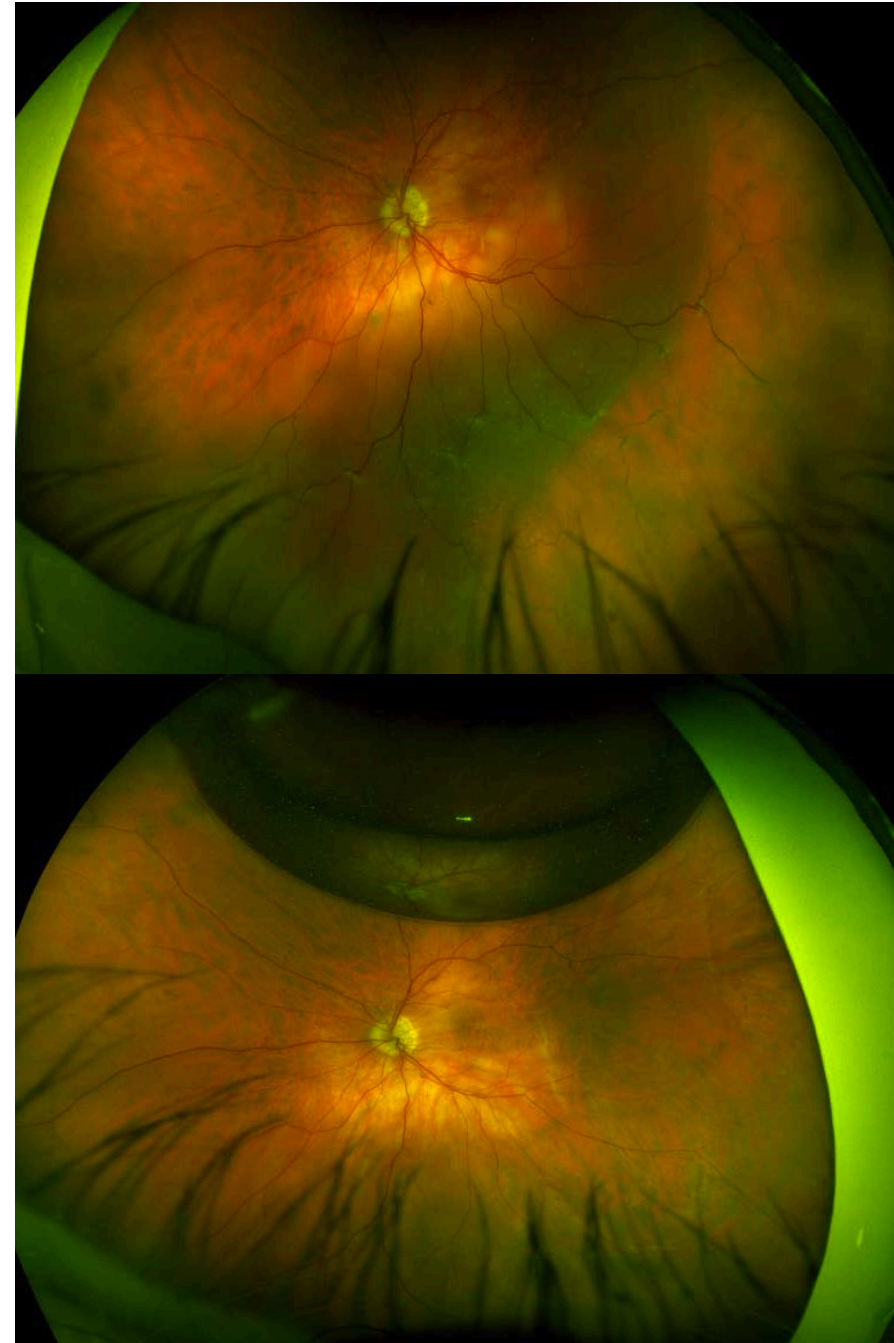
- ✓ Conception and design of the work/project
- ✓ Acquisition of data
- ✓ Analysis and interpretation of data
- ✓ Creation and/or critical review of the presentation





# BACKGROUND

- Pneumatic retinopexy (PR) is a minimally invasive, in-office procedure used for treatment of RD
- Use of PR varies among different retina specialists, clinical practices, and geographic regions.
- 2<sup>nd</sup> most common procedure for RD repair despite lower success rate (~43.7 -95.5%.)





- In fellowship, compared to other VR procedures, PR often involves less supervision.
- PR success depends highly on patient selection, examination skills, and manual dexterity which improves with practice.
- Although this procedure is tracked by the ASRS (Fellows' Activity Log), the experience and training of fellows varies widely



# OBJECTIVES

- To evaluate the experience of VR fellows performing PR and outcomes of patients who underwent PR by VR fellows at 6 academic centers in the United States.



# METHODS

- Multicenter, retrospective consecutive case series
- 6 sites; 2002-2016
- We excluded patients with
  - <3m follow-up
  - prior history of intraocular surgery except for uncomplicated cataract extraction

## Institutions Included in the Study

Associated Retinal Consultants

Duke University Eye Center

New York Eye & Ear Infirmary

University of California Davis

University of California San Diego

Wills Eye Hospital



**UC DAVIS**  
EYE CENTER

---

# RESULTS







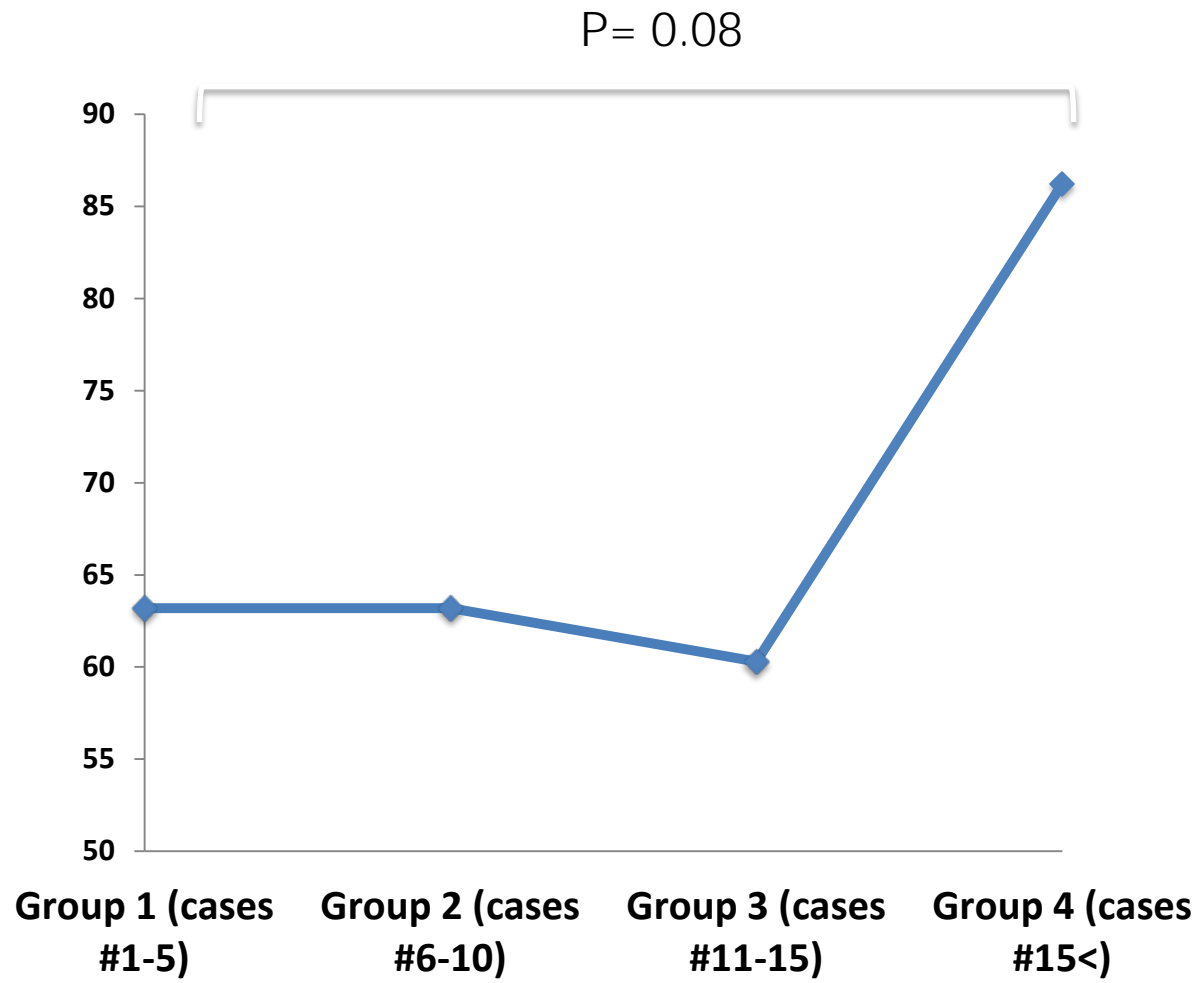
- 483 eyes of 483 pts
- 49 VR fellows;  
median:7 /fellow (range 1-24)
- Most of the procedures (270, 65.7%) done by 1<sup>st</sup> yrs
- Single-procedure success rate: 66.8%

Baseline	
Mean Age (SD)	63.44 (10.97)
Sex	
Female	313 (65.1%)
Male	168 (34.9%)
Mean logMAR BCVA (SD)	0.66 (0.72)
Lens status	
Phakic	346 (71.8%)
Pseudophakic	136 (28.2%)
Lattice degeneration (present)	91 (19.0%)
Vitreous hemorrhage (present)	56 (11.6%)
Location of break	
Superior 8 clock hours	454 (98.9%)
Inferior 4 clock hours	5 (1.1%)
Macula status	
Attached	294 (61.1%)
Detached	187 (38.8%)
Size of RD	
<4 clock hours	258 (54.4%)
≥4 clock hours	216 (45.6%)
3-month Follow-up	
Single-procedure success	322 (66.8%)
Mean logMAR BCVA (SD)	0.43 (0.52)
Mean number of re-operations (SD)	1.19 (0.44)



# PR Experience

	<b>Group 1 (1-5) (n=212)</b>	<b>Group 2 (6-10) (n=106)</b>	<b>Group 3 (11-15) (n=63)</b>	<b>Group 4 (15+) (n=29)</b>	<b>P</b>
<b>BASELINE CHARACTERISTICS</b>					
<b>Mean Age (SD)</b>	61.24 (11.91)	65.03 (10.38)	66.34 (8.49)	65.68 (9.50)	0.001*
<b>Baseline logMAR BCVA (SD)</b>	0.70 (0.74)	0.65 (0.71)	0.53 (0.66)	1.11 (0.90)	0.007*
<b>Lens status</b>					0.01*
<b>Phakic</b>	166 (78.3%)	71 (67.0%)	42 (66.7%)	16 (55.2%)	
<b>Pseudophakic</b>	46 (21.7%)	35 (33.0%)	21 (33.3%)	13 (44.8%)	
<b>Lattice degeneration</b>	44 (21.0%)	20 (18.9%)	14 (22.2%)	6 (20.7%)	0.95
<b>Vitreous hemorrhage</b>	24 (11.3%)	10 (9.4%)	8 (12.7%)	5 (17.2%)	0.68
<b>Macula status</b>					0.26
<b>Attached</b>	116 (55.0%)	66 (62.3%)	41 (65.1%)	20 (69.0%)	
<b>Detached</b>	95 (45.0%)	40 (37.7%)	22 (34.9%)	9 (31.0%)	
<b>Size of RD</b>					0.86
<b>&lt;4 clock hours</b>	103 (51.0%)	48 (54.7%)	32 (49.2%)	16 (55.2%)	
<b>≥4 clock hours</b>	103 (49.0%)	48 (45.3%)	32 (50.8%)	13 (44.8%)	
<b>3-MONTH FOLLOW-UP</b>					
<b>logMAR BCVA at 3- mo (SD)</b>	0.45 (0.51)	0.47 (0.56)	0.45 (0.56)	0.60 (0.71)	0.57
<b>Single-procedure reattachment</b>	134 (63.2%)	67 (63.2%)	38 (60.3%)	25 (86.2%)	0.08



# Comparison of Sites



UC DAVIS  
EYE CENTER

	Training Site 1 (n = 206)	Training Site 2 (n = 127)	Training Site 3 (n=71)	Training Site 4 (n=47)	Training Site 5 (n=18)	Training Site 6 (n=14)	Total (n=483)	P-value
Baseline								
Mean Age (SD)	66.22 (10.26)	62.32 (9.78)	64.15 (10.48)	55.54 (12.66)	60.55 (13.62)	57.07 (9.60)	63.44 (10.97)	<0.001*
Mean logMAR BCVA (SD)	0.71 (0.77)	0.76 (0.75)	0.47 (0.54)	0.52 (0.62)	0.52 (0.69)	0.67 (0.65)	0.66 (0.72)	0.06
Lens status								0.07
Phakic	134 (65.0%)	99 (78.0%)	50 (70.4%)	38 (80.9%)	14 (77.8%)	11 (78.6%)	346 (71.8%)	
Pseudophakic	72 (35.0%)	27 (21.3%)	21 (29.6%)	9 (19.1%)	4 (22.2%)	3 (21.4%)	136 (28.2%)	
Lattice degeneration	43 (20.9%)	26 (20.5%)	7 (9.9%)	12 (26.1%)	1 (5.9%)	2 (14.3%)	91 (19.0%)	0.14
Vitreous hemorrhage	26 (12.6%)	9 (7.1%)	8 (11.3%)	8 (17.0%)	3 (16.7%)	2 (14.3%)	56 (11.6%)	0.47
Macula status								0.002*
Attached	134 (65.4%)	58 (45.7%)	50 (70.4%)	31 (66.0%)	14 (77.8%)	7 (50%)	294 (61.1%)	
Detached	71 (34.6%)	69 (54.3%)	21 (29.6%)	16 (34.0%)	4 (22.2%)	7 (50%)	187 (38.8%)	
Size of RD								0.17
<4 clock hours	111 (54.1%)	64 (50.8%)	45 (69.2%)	23 (48.9%)	8 (44.4%)	7 (50%)	258 (54.4%)	
≥4 clock hours	94 (45.6%)	62 (49.2%)	20 (30.8%)	24 (51.1%)	10 (55.6%)	7 (50%)	216 (45.6%)	
3-Month Follow-Up								
Single-procedure success	62.6%	68.5%	81.7%	48.9%	77.8%	78.6%	66.8%	0.003*
Mean logMAR BCVA (SD)	0.52 (0.62)	0.46 (0.50)	0.21 (0.26)	0.40 (0.45)	0.26 (0.35)	0.27 (0.36)	0.43 (0.52)	<0.001*
Mean # re-operations (SD)	1.14 (0.38)	1.26 (0.44)	1.07 (0.27)	1.34 (0.64)	1	1	1.19 (0.44)	0.23





# Outcomes

<b>Anatomic Success</b>			
	<b>Estimate</b>	<b>SE</b>	<b>P-Value</b>
<b>Lens status (Pseudophakia)</b>	-0.13	0.05	0.01*
<b>Size of detachment (<math>\geq 4</math> clock hours)</b>	-0.12	0.05	0.02*
<b>Macula status</b>	0.06	0.05	0.23
<b>Procedure experience (<math>\geq 15</math> cases)</b>	0.06	0.03	0.06#
<b>Training site</b>	0.003	0.02	0.89

<b>Visual Outcome</b>			
	<b>Estimate</b>	<b>SE</b>	<b>P-Value</b>
<b>LogMAR BCVA</b>	0.23	0.03	$<0.001^*$
<b>Sex (Male)</b>	-0.75	0.04	0.11
<b>Macula status (Attached)</b>	-0.04	0.05	0.37
<b>Training site</b>	-0.49	0.01	0.001*



# CONCLUSION

- Anatomic success of PR in hands of fellows is comparable to rates reported from experienced specialists.
- Procedure experience (and not overall experience in fellowship) plays a significant role.
- These data can be used to design a more uniform curriculum and creation of educational milestones in fellowship training.



# ACKNOWLEDGMENTS

- Glenn Yiu, MD, PhD (University of California, Davis Eye Center)
- Wills Eye Hospital
  - Jordan Deanor, MD
  - Ferhina Ali, MD, MPH
  - Michael Klufas, MD
- Associated Retinal Consultants, Royal Oaks, MI:
  - Priyanka Chopra, MD
  - Jeremy Wolfe, MD
- New York Eye and Ear Infirmary
  - Richard Kaplan, MD
  - Meenakashi Gupta, MD
- Duke University Eye Center
  - Dilraj Grewal, MD
- University of California, San Diego, Shiley Eye Center
  - Kevin Chen, MD
  - Eric Nudelman, MD, PhD



# REFERENCES

- Hwang J. Regional practice patterns for retinal detachment repair in the United States. *Am J Ophthalmol* 2012;153:1125-1128.
- McLaughlin M, Hwang J. Trends in Vitreoretinal Procedures for Medicare Beneficiaries, 2000 to 2014. *Ophthalmology*. 2017;124(66):667-673.
- Ahmad B, Shah G, Blinder K. Trends & Approaches to Repairing Detachment. *Review of Ophthalmology*. 2013.
- Goldman D, Shah C, Heier J. Expanded criteria for pneumatic retinopexy and potential cost savings. *Ophthalmology*. 2014;121(1):318-326.
- Zaidi A, Alvarado R, Irvine A. Pneumatic retinopexy: success rate and complications. *Br J Ophthalmol*. 2006;90(4):427-428.
- Muni R, Felfeli T, Boghosian K, et al. Randomized Trial Comparing Pneumatic Retinopexy vs. Vitrectomy in the Management of Primary Rhegmatogenous Retinal Detachment (PIVOT): 1-Year Results. *ASRS annual meeting, Boston, MA*. 2017.
- Chan C, Lin S, Nuthi A, Salib D. Pneumatic retinopexy for the repair of retinal detachments: a comprehensive review. *Surv Ophthalmol*. 2008;53(443-78).
- Tornambe P. Pneumatic retinopexy: the evolution of case selection and surgical technique. A twelve-year study of 302 eyes. *Trans Am Ophthalmol Soc*. 1997;95:551-578.
- Kulkarni K, Roth D, Prenner J. Current visual and anatomic outcomes of pneumatic retinopexy. *Retina*. 2007;27(8):1065-1070.
- Kwan J, Crampton R, Mogensen L, Weaver R, Van der Vleuten C, Hu W. Bridging the gap: a five stage approach for developing specialty-specific entrustable professional activities. *BMC Med Educ*. 2016;16:117.