

Pars plana vitrectomy outcomes for rhegmatogenous retinal detachment in patients over 80 years of age



Philip Kurochkin, MD, Natalie Huang, MD, Redion Petrela, BS, Kevin I. Rosenberg, MD, Jamin S. Brown, MD, Patrick Oellers, MD

Introduction

Pars plana vitrectomy (PPV) is a cardinal surgical procedure of the repertoire of retinal surgeons. One of the primary uses of PPV is for repair of a rhegmatogenous retinal detachment (RRD). An RRD is described as a separation of the neurosensory retina from the retinal pigment epithelium, which is maintained open due to vitreoretinal traction of liquefied vitreous accumulation.¹ The incidence of RRD has been reported to be between 8-20 per 100,000 with a peak incidence between 55 to 65 years of age.²⁻⁷ RRD in the elderly population is more rare and not well characterized in the literature. In this study we aim to address the lack of knowledge of PPV utilization for RRD in elderly patients greater than age 80 and identify the contributing factors associated with single surgical anatomical success (SSAS) and single surgical anatomical failure (SSAF).

Methods

This study was a focused retrospective case-series of patients presenting with primary RRD between the years 2010-2018 at the Retina-Vitreous Surgeons of Central New York, Liverpool, NY. Inclusion criteria included patients with a primary ipsilateral RRD a subset of analysis was done on patients over 80 years old. Exclusion criteria were prior RRD in the ipsilateral eye and incomplete postoperative data. Data were collected on the following parameters: best-corrected visual acuity (BCVA) (pre-/postoperative), lens status (pre-/postoperative), clock hours localizing RRD, number of retinal tears, macular attachment status, proliferative vitreoretinopathy (PVR) (pre-/postoperative), macular hole (MH), (pre-/postoperative), preoperative retinoschisis, preoperative retinal dialysis, foveal splitting RRD, and presence of a giant retinal tear. Surgical variables recorded included size of gauge used for PPV, if a SB was used with the primary PPV, and type of gas or oil administered during surgery. Postoperative variables recorded were presence of macular edema, vitreous hemorrhage, increased intraocular pressure (defined as pressure above 25 mmHg, within 30 days of surgery), hypotony (defined as pressure below 7 within one day of surgery), postoperative epiretinal membrane, postoperative corneal failure.

Primary outcomes were SSAS; defined as retinal attachment achieved at final follow up with a single surgery and final anatomical success (FAS); defined as retinal attachment achieved at final follow up irrespective of number of surgeries. Secondary outcomes were BCVA at final follow up. Follow up period was determined to be the patient's last clinical visit before December 2018.

Table 1. Preoperative Characteristics

Variable	Patients under 80 (n=1532)	Patients 80 and over (n=75)	P
Age, Mean (SD)	61.6 (8.8)	84.2 (3.2)	<0.001
Male (%)	1015 (66.2)	43 (57.3)	0.112
Preoperative Findings			
Macular status (%)			0.255
On	818 (54.7)	36 (48.0)	
Off	677 (45.3)	39 (52.0)	
Lens Status (%)			<0.001
Phakic	859 (56.4)	9 (12.0)	
Pseudophakic	656 (43.1)	65 (86.7)	
Aphakic	8 (0.5)	1 (1.3)	
Number of Breaks (%)			0.306
None found	102 (6.6)	4 (5.3)	
1 Break	943 (61.6)	51 (68.0)	
>1 Break	487 (31.8)	20 (26.7)	

Table 3. Postoperative Characteristics

Variable	Patients under 80 (n=1532)	Patients 80 and over (n=75)	P
Postoperative Findings			
SSAS (%)	1389 (90.7)	60 (80.0)	0.002
FAS (%)	1529 (99.8)	74 (98.7)	0.174
Cystic Macular Edema (%)	143 (9.3)	5 (6.7)	0.435
Vitreous Hemorrhage (%)	33 (2.2)	3 (4.0)	0.234
IOP Elevation (>25) (%)	237 (15.5)	20 (26.7)	0.010
Hypotony (%)	50 (3.3)	1 (1.3)	0.512
PVR (%)	89 (5.8)	11 (14.7)	0.002
ERM (%)	262 (17.1)	10 (13.3)	0.395
Macular Hole (%)	17 (1.1)	1 (1.3)	0.579
Corneal Failure (%)	32 (2.1)	2 (2.7)	0.671

Table 5. Preoperative Characteristics in patients over 80

Variable	Single Surgery Anatomical Success (n=60)	Single Surgery Anatomical Failure (n=15)	P
Age, Mean (SD)	84.4 (3.3)	81.1 (2.5)	0.305
Male (%)	34 (56.7)	9 (60.0)	0.763
Preoperative Findings			
Macular status (%)			0.204
On	31 (51.7)	5 (33.3)	
Off	29 (48.3)	10 (66.7)	
Lens Status (%)			3.00
Phakic	7 (11.7)	2 (13.3)	
Pseudophakic	52 (86.7)	13 (86.7)	
Aphakic	1 (1.7)	0 (0.0)	
Number of Breaks (%)			0.131
None found	4 (6.7)	0 (0.0)	
1 Break	43 (71.7)	8 (53.3)	
>1 Break	13 (21.7)	7 (46.7)	

Table 2. Intraoperative Characteristics

Variable	Patients under 80 (n=1532)	Patients 80 and over (n=75)	P
Intraoperative Findings			
Gas/Oil Used (%)			0.132
Air	37 (2.4)	0 (0.0)	
SF ₆	1044 (68.9)	46 (61.3)	
C.F.	422 (27.9)	27 (36.0)	
Silicone Oil	12 (0.8)	2 (2.7)	
Primary PPV and SB	83 (5.4)	2 (2.7)	0.429

Table 4. Visual Acuity

Variable	Patients under 80 (n=1532)	Patients 80 and over (n=75)	P
Preoperative LogMAR	0.910	1.226	0.008
Postoperative LogMAR	0.358	0.748	<0.001
LogMAR Improvement	0.552	0.478	0.538
P of Preoperative LogMAR vs Postoperative LogMAR	<0.001	<0.001	
Final BCVA			<0.001
20/40 or better (%)	3224 (67.0)	40 (53.3)	
20/50-20/200 (%)	361 (23.6)	13 (17.3)	
Worse than 20/200 (%)	3430 (9.4)	22 (29.3)	

Table 6. Intraoperative Characteristics in patients over 80

Variable	Single Surgery Anatomical Success (n=60)	Single Surgery Anatomical Failure (n=15)	P
Intraoperative Findings			
Gas/Oil Used (%)			0.021
Air	0 (0.0)	0 (0.0)	
SF ₆	41 (68.3)	5 (33.3)	
C.F.	17 (28.3)	10 (66.7)	
Silicone Oil	2 (3.3)	0 (0.0)	
Primary PPV and SB	1 (1.7)	1 (6.7)	0.362

Table 7. Postoperative Characteristics in patients over 80

Variable	Single Surgery Anatomical Success (n=60)	Single Surgery Anatomical Failure (n=15)	P
Postoperative Findings			
Cystic Macular Edema (%)	4 (6.7)	1 (6.7)	1.00
Vitreous Hemorrhage (%)	1 (1.7)	2 (13.3)	0.100
IOP Elevation (>25) (%)	12 (20.0)	8 (53.3)	0.009
Hypotony (%)	1 (1.7)	0 (0.0)	1.00
PVR (%)	1 (1.7)	10 (66.7)	<0.001
ERM (%)	8 (13.3)	2 (13.3)	1.00
Macular Hole (%)	0 (0.0)	1 (6.7)	0.200
Corneal Failure (%)	2 (3.3)	0 (0.0)	1.00

SD: Standard deviation, SF₆: Sulfur hexafluoride gas, C.F.: Octafluoropropane gas, PPV: Pars plana vitrectomy, SB: Scleral buckle, SSAS: Single surgery anatomical success, FAS: Final anatomical success, IOP: Intraocular Pressure, ERM: Epiretinal Membrane, PVR: Proliferative vitreoretinopathy.

Results

A total of 1607 eyes (age, 63.0 ± 9.5 years; 65.8% were male) met inclusion criteria, 1532 (age, 61.6 ± 8.8 years; 66.3% were male) were younger than 80 and 75 (4.6%; age, 84.2 ± 3.2 years; 57.3% were male) were older (P<0.001). Single surgery anatomical success (SSAS) was 90.7% in patients younger than 80 and 80.0% in patients over 80 (P= 0.002), final anatomical success showed no difference between groups and was 99.8% and 98.7% in patients under the age of 80 and over the age of 80 respectively (P= 0.174). Patients over 80, compared to younger patients had higher rates of PVR (P=0.002) and postoperative elevated intraocular pressure (P=0.010). Older patients had worse preoperative and postoperative LogMAR (P=0.008, P<0.001 respectively), with a final LogMAR of 0.748 in older patients and 0.358 in younger patients.

Discussion

RRD in patients over 80 is overall rare. Elderly patients in this study presented with worse baseline vision and were more often pseudophakic compared to younger patients. Visual outcomes, primary success rates of PPV and proportion of postoperative PVR were significantly worse. Given the aging demographics and expected concomitant increase in elderly patients with RRD, future work should be aimed at improving outcomes for this age group.

Bibliography

- Ghazi, N. G. & Green, W. R. Pathology and pathogenesis of retinal detachment. *Eye* 16, 411–421 (2002).
- Li, X. Incidence and Epidemiological Characteristics of Rhegmatogenous Retinal Detachment in Beijing, China. *Ophthalmology* 110, 2413–2417 (2003).
- Hajari, J. N. et al. A nationwide study on the incidence of rhegmatogenous retinal detachment in denmark, with emphasis on the risk of the fellow eye. *Retina* 34, 1658–1665 (2014).
- Mitry, D. et al. The epidemiology and socioeconomic associations of retinal detachment in Scotland: A two-year prospective population-based study. *Investig. Ophthalmol. Vis. Sci.* 51, 4963–4968 (2010).
- Van De Put, M. A. J., Hooymans, J. M. M. & Los, L. I. The incidence of rhegmatogenous retinal detachment in the Netherlands. *Ophthalmology* 120, 616–622 (2013).
- Wilkes, S. R., Beard, C. M., Kurland, L. T., Robertson, D. M. & O'Fallon, W. M. The incidence of retinal detachment in Rochester, Minnesota, 1970-1978. *Am. J. Ophthalmol.* 94, 670–673 (1982).
- Wong, T. Y., Tielisch, J. M. & Schein, O. D. Racial difference in the incidence of retinal detachment in Singapore. *Arch. Ophthalmol.* 117, 379–383 (1999).

