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PREDICTORS OF PRIMARY ANATOMIC REATTACHMENT WITH PNEUMATIC RETINOPEXY FOR RHEGMATOGENOUS RETINAL DETACHMENT

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This study aims to assess factors associated with primary anatomic reattachment (PAR) following pneumatic retinopexy (PnR) for rhegmatogenous retinal detachment (RRD)

This is a post hoc analysis of a real-world pneumatic retinopexy dataset that included a retrospective review of patients with primary RRD who presented to St. Michael's Hospital, Toronto, Canada, from November 2009 to September 2017, underwent PnR, and had a minimum of 3 months of follow-up. Subsequent gas injection within 2 weeks after the operative procedure to achieve a larger gas bubble, and consequently, greater retinal contact or additional laser retinopexy were permissible at the surgeon's discretion and were not considered a primary treatment failure. The primary objective was to assess predictors of primary anatomic reattachment (PAR) at 3 months postoperatively.

A total of 554 patients were included. The mean age was 59.7 (SD 11.9) years, with 70% (388/554) female and 60.5% (335/554) phakic. Retinal detachment characteristics were 56.3 % (312/554) fovea-off RRD, with the mean extent of detachment 2.2 (SD 0.84) quadrants.

There were 49.8% (276/554) patients meeting pneumatic retinopexy trial criteria, 20.2% (112 /554) PIVOT trial, and 20.9% (116/554) PIVOT extent.

The proportion of males was 67.5% (277/410) in the PAR group vs 77.1% (111/144) in the failure group, $p = 0.03$. When comparing both groups based on the lens status, the proportion of pseudophakic patients was 35.2% (140/398) in the PAR group and 45.3% (64/141) in the failure group, $p = 0.03$.

Patients with fovea-off RRD were 54.9% (224/408) in the PAR group vs 59.7% (86/144) in the failure group, $p = 0.3$. The mean extent of RRD was 1.94 (SD 0.8) quadrants in the PAR group vs. 2.15 (SD 0.9) quadrants in the failure group, $p = 0.01$. Interestingly, the PAR was reduced for each quadrant increase in retinal detachment: 82.9% (121/146), 74.7% (192/257), 67% (59/88), and 52.9% (18/34) for 1, 2, 3, and 4 quadrants RRD respectively ($P < 0.001$)

In the PAR group 75.1% (308/410) of patients met either the PnR trial (221/410) or PIVOT criteria (87/410) vs 55.5% (80/144) in the failure group (55/144 and 25/144 for PnR and PIVOT trial respectively), $p < 0.001$. The primary anatomic reattachment rate (PARR) among patients meeting PnR and/or PIVOT trial criteria was 79.7% (308/388) vs 61.4% (102/166) in those with extended criteria. However, PARR did not differ significantly when comparing patients who met the PnR trial vs PIVOT criteria with 80.1 % (221/276) vs 77.7% (87/112) success rate in each group, respectively. $P = 0.6$

Cryotherapy was used in 18.6% (76/407) of PAR cases vs 29.1% (41/141) failure cases, $p = 0.009$.

There were 15% (86/554) of patients requiring sequential gas injection in 10.7% (44/408) of PAR cases vs 29.2 (42/144) of failure cases ($P < 0.01$). The PARR among patients who had a second PnR was 51.2% (44/86).

Worse baseline LogMAR BCVA and total breaks in the detached retina were associated with reduced PAR ($P = 0.005$, $\beta = -0.28$, and $P = 0.008$ and $\beta = -0.21$ for each variable respectively) while the clock-hour distance between breaks did not differ between PAR and failure group in patients with extended criteria $P = 0.7$, $\beta = 0.03$.

Multivariable regression analysis identified RD extent and PIVOT criteria as the only statistically significant predictors of PAR (both, $p < 0.001$), with $\beta = 0.8$ and 0.2 , respectively.

Meeting PIVOT criteria and the extent of RRD are important predictors of PAR following PnR for primary RRD. In addition, sequential gas injection could be a salvage procedure in specific cases.