

The role of day one post-operative review in modern vitrectomy surgery

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Context

In the last 20 years there has been a rapid development of vitreo-retinal (VR) surgical technology making surgery safer with improved post-operative outcomes. As a result, the majority of vitrectomy surgery in the UK is now carried out as day case surgery, under local anaesthesia and with transconjunctival narrow gauges systems.

Consequently, the need for a first day postoperative check after uncomplicated VR surgery has been questioned and numerous studies and surveys [1–3] have investigated this question.

- The rate of complications noted at postoperative day one (POD1) review requiring urgent intervention is typically low; in fact, a recent metanalysis estimated a 4.7% rate of intervention, both medical and/or surgical, at POD1, with the most frequent complication being raised intraocular pressure (IOP) [4].
- However, various studies have provided conflicting results due to differences in case mix, surgical techniques and IOP-lowering prophylaxis
- The possibility of other less frequent complications such as hypotony and IOL complications should be weighed up before considering the forfeit of POD1 review.
- The interpersonal aspects and educational value for patients of POD1 review should also be considered.
- In the UK, there is still a wide variation in practice regarding postoperative review after VR surgery, as documented by a recent British and Eire Association of Vitreoretinal Surgeons (BEAVRS) survey in 2023; in particular 63% of the UK VR surgeons who replied to the survey usually omit POD1 after uncomplicated VR procedures

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Objectives

- In these Concise Practice Points, we critically appraise the published literature to produce evidence-based recommendations for surgeons considering whether POD1 review after vitrectomy surgery is required specifically for documentation and treatment of significantly raised IOP.
- It is important to note however that other aspects of POD1 such as patient education and reassurance and the unquantified risk posed by failing to identify/treat other less frequent complications besides high IOP should be considered in any decision to omit POD1.

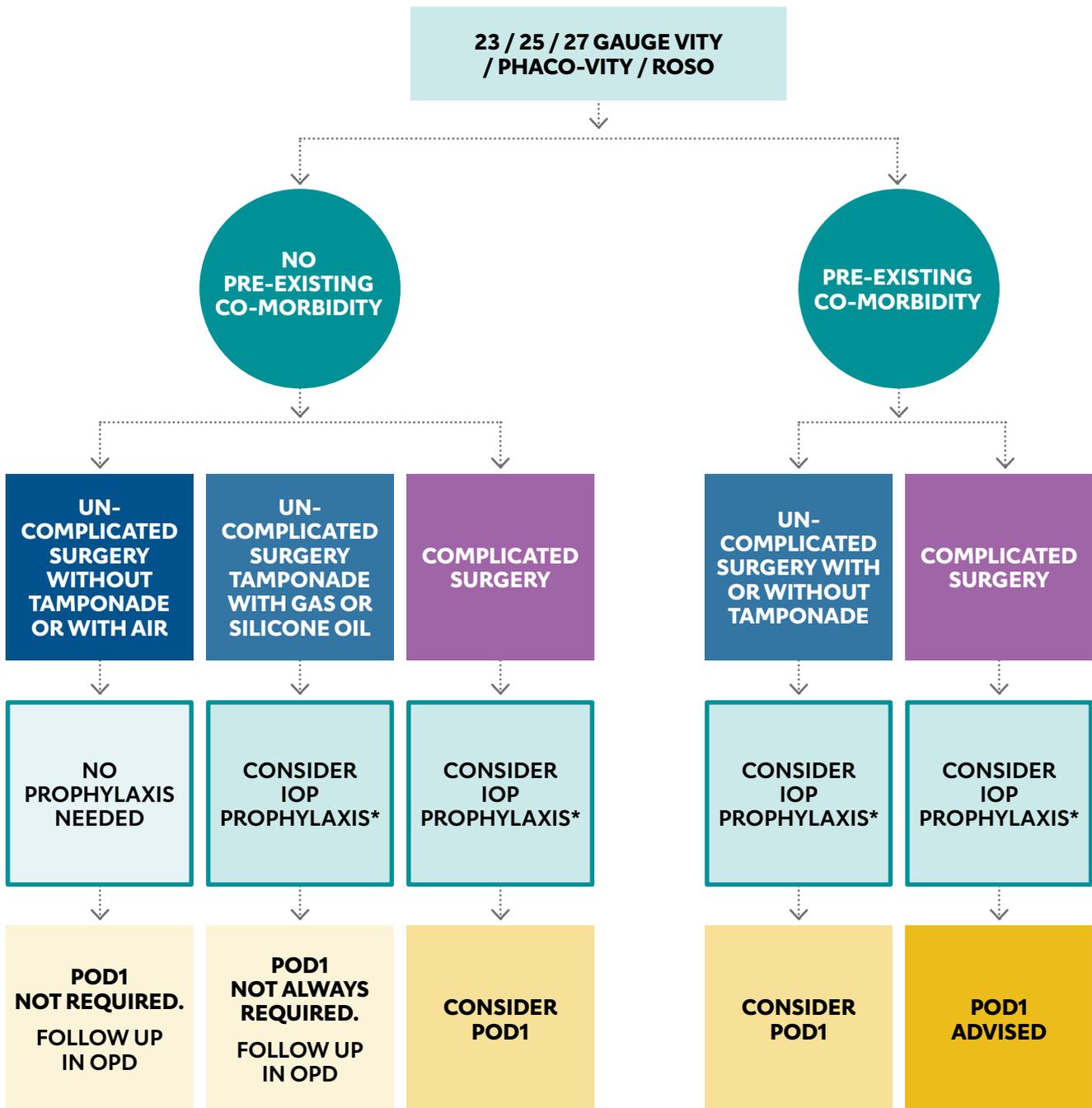
Methods

A literature search was conducted using PUBMED, for all publications in English language for the past 10 years using the following search terms: "vitreoretinal surgery", "retina surgery", "vitrectomy", "day one review", "postoperative review", "first postoperative review", "next day review". References of cited publications were examined to identify further relevant articles.

Results and recommendations

- We assessed 13 studies [1–13] (appendix 1): no randomised control trials (RCTs) were found, there was 1 meta-analysis, 2 prospective case series and 10 retrospective case note reviews. The meta-analysis assessed 14 studies but no RCTs were included. These studies illustrated that the rate of raised IOP (≥ 30 mm Hg) following VR surgery on POD1 ranged from 1 - 17%. (For comparison, the rate of raised IOP (≥ 28 mm Hg) following cataract surgery on POD1 has been reported as ranging from 18 - 45%, although the time course and consequences of these pressure spikes may be different [14].)
- There was significant heterogeneity of data, case-mix and a wide variety of post-operative IOP-lowering prophylaxis was used. The certainty of evidence in the literature is very low.
- Several studies have tried to identify risk factors for IOP elevation: the current body of evidence suggests that gas tamponade, ocular hypertension/glaucoma, and endolaser performed during surgery are the main risk factors for IOP elevation.
- For the majority of patients undergoing uncomplicated routine vitrectomy with no pre-existing ocular co-morbidity, a low rate of adverse events is found (i.e. Rahman et al. reported a 6% rate of IOP spike at day 1 following vitrectomy, including gas or air tamponade in their series) [7].
- Potential long-term adverse effects from presumed transient IOP spikes have yet to be demonstrated.
- In patients who lack risk factors for a postoperative IOP spike, specifically pre-existing ocular hypertension/glaucoma and/or gas tamponade used, POD1 review could be conditionally omitted and they may be reviewed later in the outpatient clinic only.
- For patients with complicated surgery or risk factors for raised IOP, prophylactic IOP-lowering treatment and/or POD1 should be advised. In cases when gas tamponade is used, prescription of prophylactic IOP-lowering treatments to avoid the necessity for POD1 review, may prevent some patients needing to travel long distances, allowing them to better adhere to the post-operative posturing instructions if required.
- When POD1 is omitted, patients should be appropriately and clearly educated on post-operative instructions, on expected symptoms (e.g., from those due to tamponade agents), on red flag symptoms (e.g., severe or increasing eye pain and loss of vision) and given details on who to contact at any time should these occur.

POD1 review for VR patients



1. Pre-existing co-morbidity (including but not limited to): pre-existing ocular hypertension or glaucoma; iris rubeosis; uveitis; pigment dispersion syndrome; ocular trauma
2. Complicated surgery (including but not limited to) [14]:
 - Phacoemulsification complications such as posterior capsule rupture, iris prolapse, secondary IOL; aphakia for combined cases
 - Hyphaema; suprachoroidal haemorrhage; dislocated or subluxed IOL (pre- or intra-operatively); oil in anterior chamber at the end of procedure; incomplete removal of viscoelastics at end of procedure

*Prophylaxis: g. Iopidine 1%; g. Dorzolamide + Timolol combination; oral or IV Acetazolamide – either on its own or a combination of the 3 as a stat dose

Appendix 1

Summary table of studies investigating POD1 IOP after VR surgery

Author and year	Methodology	No. of surgeries	Cases included by diagnosis	Glaucoma /OHT n (%)	Gauge	Gas n (%)	Retinopathy n (%)	Scleral buck-les n (%)	Phacovitrectomy / secondary IOL n (%)	No. of surgeons	IOP prophylaxis used?	Raised IOP on day 1 - n (%)	Intervention rate on day 1 - n (%)	Risk factors identified for raised IOP	Evidence grade
Wong et al. 2011	Non-randomised prospective case series	235	RRD 143 Dropped lens 11 Diabetic disease 40 ERM 13 Floater 4 ROSO 12 MH 22	Data not given	20G	134 (57.0%)	143 (60.9%)	5 (2.1%)	Data not given	Tertiary referral centre, data not given	Nil	>30mmHg – 34 (14.5%)	Medical – 34 (14.5%) Surgical – 1 (0.4%, 1 peripheral iridotomy Total 35 (14.9%)	Gas tamponade (p=0.000001) Preoperative raised IOP (p=0.001)	2+
Ahn et al. 2012	Retrospective case notes review	814	VH 201 ERM 124 TRD 141 MH 97 RRD 102 MO 40 Other 109	14 (1.7%)	223G – 338 (41.5%) 20G – 476 (58.5%)	242 (29.7%)	Data not given	19 (2.3%)	253 (31.1%)	1	Nil	>24mmHg – 20G – 103 (21.6%) 23G – 6 (1.8%)	Data not given	20G (p<0.001)	2-
Hasegawa et al. 2014	Retrospective case notes review	228	PDR 111 RRD 34 DMO 33 MH 19 ERM 17 PVR 4 Other 9	Patients with OHT and glaucoma excluded	20G – 188 (82.5%) 25G – 40 (27.5%)	77 (33.8%)	Data not given	0	150 (65.8%)	1	Nil	>25mmHg – 52 (22.8%)	Data not given	Combined laser (p=0.004) Preoperative IOP (p=0.001) 20G (p=0.004) Combined phacovitrectomy (p=0.032) Gas tamponade (p=0.002)	2-

Appendix 1 (continued)

Summary table of studies investigating POD1 IOP after VR surgery

Author and year	Methodology	No. of surgeries	Cases included by diagnosis	Glaucoma /OHT n (%)	Gauge	Gas n (%)	Retinopexy n (%)	Scleral buckle n (%)	Phacovitrectomy / secondary IOL n (%)	No. of surgeons	IOP prophylaxis used?	Raised IOP on day 1 - n (%)	Intervention rate on day 1 - n (%)	Risk factors identified for raised IOP	Evidence grade
Alexander et al. 2016	Retrospective case notes review	273	RD 137 MH 33 ERM 32 VH 28 Floaters 11 Diabetic disease 7 Dropped nucleus 5 IOL in vitreous cavity 5 Submacular haemorrhage 3 Surgical capsulotomy 2 Heavy liquid in situ 2 Vitritis 2	13 (4.8%)	20G - 124 (45.4%) 23G - 149 (54.6%)	138 (58.2%)	Data not given	0	Data not given	1	Oral acetazolamide 500mg post-procedure and 7 day course of 250mg BD G. timolol 0.25% BD	>30mmHg - 2 (0.7%)	Medical - 6 (2.2%) Surgical - 4 (1.5%), 1 flat anterior chamber, 1 hyphaema, 1 retained nuclear fragment, 1 intraocular foreign body Total 10 (3.7%)	Combined phacovitrectomy with 20G (p=0.029)	2-
Brennan et al. 2017	Retrospective case notes review	176	Data not given for day 1	Patients with any type of glaucoma excluded	23G	Data not given for day 1	Data not given for day 1	0	Data not given for day 1	Tertiary referral centre, data not given	Data not given but part of normal care	>30mmHg - 18 (10.2%)	Medical - Data not given for day 1 Surgical - 2 (1.0%), ROSO 1 and resuture 1	Combined laser (p=0.016)	2+
Rahman et al. 2017	Prospective consecutive case series	161	Data not given	Patients with OHT and glaucoma excluded	23G - 76 (47%) 25G - 29 (18%) 27G - 56 (35%)	124 (77.0%)	Laser retinopexy (29.8%)	0	Data not given	1	Nil	>=30mmHg - 10 (6.2%)	Data not given	SF6 (p=0.067)	2-

Appendix 1 (continued)

Summary table of studies investigating POD1 IOP after VR surgery

Author and year	Methodology	No. of surgeries	Cases included by diagnosis	Glaucoma /OHT n (%)	Gauge	Gas n (%)	Retino-pexy n (%)	Scleral buck-le n (%)	Phaco-vitrectomy / secondary IOL n (%)	No. of surgeons	IOP prophylaxis used?	Raised IOP on day 1 - n (%)	Intervention rate on day 1 - n (%)	Risk factors identified for raised IOP	Evidence grade
Zick et al. 2017	Retrospective case notes review	134	Data not given	12 (9.0%)	20G – 2 (1.5%) 23G – 108 (80.6%) 25G – 21 (15.7%) 27G – 3 (2.2%)	63 (47.0%)	Endolaser 70 (52.2%)	8 (6.0%)	Data not given	1	Data not given	1 (0.07%)	Surgical – 1 (0.07%), 1 vitreous tap	-	2-
Ringeisen et al. 2018	Retrospective case notes review	428	RRD 171 ERM/VMT 104 MH 39 TRD 48 VH 20 Secondary IOL 19 PVR RD 14 Other 13	76 (17.8%)	25G	Data not given	Data not given	27 (6.3%)	No combined cases	1	1 drop of G. timolol 0.5% / dorzolamide 2.0% at the end of surgery	>=30mmHg – 17 (4.0%)	Data not given	None	2-
Shields et al. 2019	Retrospective case notes review	310	RRD 91 ERM 65 VH 53	47 (15.2%)	23G – (2.9%) 25G – 264 (85.2%) 27G – 37 (11.9%)	92 (29.7%)	152 (49.0%)	30 (9.7%)	26 (8.4%)	Data not given	Data not given	>=30mmHg – 12 (3.9%)	Medical – 11 (3.5%) Surgical – 3 (0.10%), 1 AC tap, 2 injection of sterile air	Lower adverse events in isolated macular hole surgery (p<0.001)	2-
Wilde et al. 2020	Retrospective case notes review	66	RRD 66	3 (4.5%)	23G	43 (65.2%)	66 (100%)	66 (100%)	No combined cases	1	IV acetazolamide 500mg at end of surgery and G. brinzolamide / timolol BD or other after day 1 review	>=30mmHg – 11 (16.7%)	Medical – 4 (6.1%) Surgical – 1 (1.5%), 1 gas exchange	None	2-

Appendix 1 (continued)

Summary table of studies investigating POD1 IOP after VR surgery

Author and year	Methodology	No. of surgeries	Cases included by diagnosis	Glaucoma /OHT n (%)	Gauge	Gas n (%)	Retinopathy n (%)	Scleral buck-le n (%)	Phaco-vitrectomy /secondary IOL n (%)	No. of surgeons	IOP prophylaxis used?	Raised IOP on day 1 - n (%)	Intervention rate on day 1 - n (%)	Risk factors identified for raised IOP	Evidence grade
Patel et al. 2020	Retrospective case notes review	418	RRD 144 TRD 143 Recurrent RD 131	54 (12.9%)	23G -338 (80.9%) 25G - 76 (18.2%) 27G - 4 (1.0%)	245 (58.6%)	Data not given	54 (12.9%)	No combined cases	Data not given	Data not given	>=30mmHg - 11 (2.6%)	Medical - 30 (7.2%) Surgical - 1 (0.2%), 1 vitreous tap	Silicone oil (p=0.06)	2-
Rahman et al. 2021	Retrospective case notes review	93	ERM 48 MH 22 ROSO 5 Floaters 14 VMT 4	Data not given	Data not given	36 (38.7%)	Data not given	0	Data not given	1	Data not given	Data not given	Medical - 2 (2.1%)	Data not given	2-
Bheemidi et al. 2021	Meta-analysis of 14 studies	2262	Not available for all studies	Not available for all studies	-	Not available for all studies	Not available for all studies	-	Not available for all studies	-	Heterogeneous between studies	Heterogeneous between studies - 198 (8.8%)	Medical - 4.1% Surgical - 0.7%	-	1-

Abbreviations

DMO Diabetic macular oedema

ERM Epiretinal membrane

G Gauge

IOL Intraocular lens

MH Macular hole

MO Macular oedema

PVR Proliferative vitreoretinopathy

PDR Proliferative diabetic retinopathy

RD Retinal detachment

ROSO Removal of silicone oil

RRD Rhegmatogenous retinal detachment

TRD Tractional retinal detachment

VH Vitreous haemorrhage

VMT Vitreomacular traction

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