# Anti-vascular endothelial growth factors for postoperative vitreous cavity haemorrhage – are they effective?

**Muhammad Adil Seelarbokus[1], David Steel[2,3], Maged Habib[2,3]**

[1]Sheffield Teaching Hospitals, UK. [2]Sunderland Eye Infirmary, UK. [3]Biosciences Institute, Newcastle university, UK

Study Site: Sunderland Eye Infirmary, UK

## Background

Postoperative vitreous cavity haemorrhage (POVCH) is a common complication following primary vitrectomy for diabetic vitreous haemorrhage (1). It can be classified as:

- Early – occurring within 4 weeks of primary vitrectomy
- Late – occurring after 4 weeks from primary vitrectomy (1)

Most cases resolve spontaneously, with the remainder requiring intervention. The current standard treatment for the latter cases is a revision vitrectomy (1).

Pre-operative anti-vascular endothelial growth factor (anti-VEGF) injections have been shown to be effective in preventing POVCH (1,2). However, there is a need to evaluate their use in treating established POVCH.

## Methods

Retrospective data collection from electronic medical records and clinical notes for diabetic patients (types 1 and 2) having undergone primary vitrectomy for high-risk proliferative diabetic retinopathy (PDR) and its complications between January 2016 and December 2020.

Inclusion criteria were:

- Proliferative diabetic retinopathy and its complications as indication for primary vitrectomy
- Complicated by POVCH within 12 months of initial surgery

## Results

22 patients met the inclusion criteria, with 10 being classified as early POVCH and 12 as late POVCH (Fig. 1), with a mean time to POVCH of 2.4 weeks in the early group and 16.7 weeks in the late group. All patients were initially observed, with a mean period of observation of 3.6 weeks in the early group and 6.0 weeks in the late group (p=0.371).

Patient demographics and baseline data at the time of the primary vitrectomy are shown in Tables 1 and 2. p values were calculated at the 0.05 significance level.

In the early POVCH group, 3 were given anti-VEGF injections as the primary intervention. 1 was successfully treated and 2 eventually required revision vitrectomy (Fig. 2).

In the late POVCH group, 7 late POVCH cases were initially treated with anti-VEGF injections. All were initially successfully treated (Fig. 3).

## Discussion

The results of this study are particularly encouraging for the treatment of late POVCH with anti-VEGF agents in diabetic patients, with all 7 cases included in this study having been successfully treated with only 1 further recurrence.

One possible explanation for this lies in the aetiology of POVCH. POVCH may result directly from operative procedures or in the immediate postoperative period due to clot lysis. It may also occur due to the process of entry-site neovascularisation (1). The latter may be more predominant in late POVCH and may be more amenable to treatment with anti-VEGF agents.

However, this study only included a small number of participants, which is a major limitation. Furthermore there were occasional missing data points in the patient notes which further limited data collection.

## Conclusions

The results of this study are particularly encouraging for the treatment of late POVCH with anti-VEGF agents in diabetic patients, however the results need to be interpreted with caution due to the small number of cases included in this retrospective study.

A randomised controlled prospective trial with a larger study population is needed to establish the role of anti-VEGF in treating early and late POVCH.

## References

1. Smith J, Steel D. Anti-vascular endothelial growth factor for prevention of postoperative vitreous cavity haemorrhage after vitrectomy for proliferative diabetic retinopathy. Cochrane Database of Systematic Reviews. 2015;.
2. Cheema R, Mushtaq J, Al-Khars W, Al-Askar E, Cheema M. Role of intravitreal bevacizumab (Avastin) injected at the end of diabetic vitrectomy in preventing postoperative recurrent vitreous haemorrhage. Retina. 2010;30(10):1646-1650.

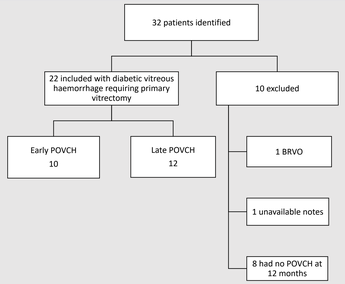



*Fig. 1 – Participant inclusion and exclusion*

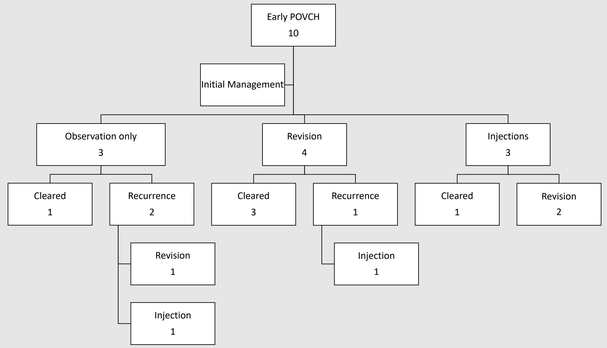



*Fig. 2 – Management of early POVCH*

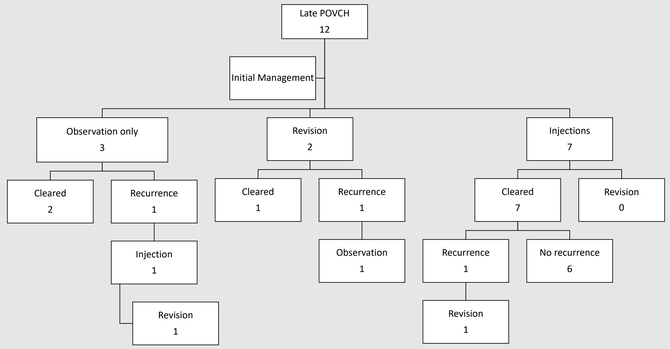



*Fig. 3 – Management of late POVCH*

| | Early POVCH Group | Late POVCH Group | p-value |
|---|---|---|---|
| Male (n=) | 5 | 5 | |
| Female (n=) | 5 | 7 | |
| Mean age (years) | 47.3 | 17.1 | 0.058 |
| Mean duration of DM (years) | 20.1 | 17.8 | 0.490 |
| Mean HbA1c | 68.5 | 83.1 | 0.147 |
| Mean visual acuity (letters) | 40 | 33 | |

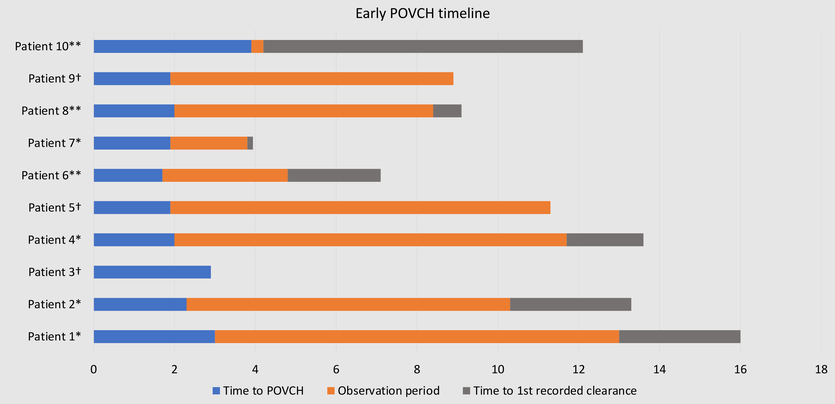
*Table 1 – Comparison of patient demographics and baseline data in early and late POVCH groups*

| Indication for primary vitrectomy | Early POVCH Group | Late POVCH Group |
|---|---|---|
| Diabetic vitreous haemorrhage (n=) | 6 | 3 |
| Tractional retinal detachment (n=) | 4 | 9 |

*Table 2 – Indication for primary vitrectomy*

| | Early POVCH Group | Late POVCH Group | p-value |
|---|---|---|---|
| Mean time to POVCH (weeks) | 2.4 | 16.7 | |
| Mean observation time after POVCH (weeks) | 3.6 | 6.0 | 0.371 |

*Table 3– Comparison of timelines in early and late POVCH*




| Key | |
|---|---|
| * | Revision vitrectomy as first line following initial POVCH |
| ** | Injections as first line following initial POVCH |
| † | Observation only following initial POVCH |

