



## Original Research Article

## A retrospective study on demographic profile and etiology of vitreous hemorrhage

Prakash D N<sup>1</sup>, Amulya Padmini H M<sup>2,\*</sup>, Deeptha Vasudevan<sup>1</sup><sup>1</sup>Dept. of Ophthalmology, Mysore Medical College Hospital and Research Institute, Mysore, Karnataka, India<sup>2</sup>Dept. of Ophthalmology, Sri Devaraj Urs Medical College Hospital and Research Institute, Kolar, Karnataka, India

## ARTICLE INFO

## Article history:

Received 28-11-2020

Accepted 11-02-2021

Available online 30-09-2021

## Keywords:

Vitreous hemorrhage

Demographic profile

Etiology

Globe injury

## ABSTRACT

**Background:** Vitreous haemorrhage(VH) is due to blood leak from ruptured vessels into the vitreous cavity. It results in painless loss of vision. Visual acuity depends on degree and location of haemorrhage.**Objectives:** To study the demographic profile and etiology of all patients with vitreous hemorrhage in tertiary care eye hospital.**Materials and Methods:** Medical records of patients who presented with VH between Jan 2017 to July 2018 were retrospectively reviewed. A detailed analysis of records will be noted.**Results:** Out of 47 patients, 35 were males and 12 were females. Common age group affected were more than 60 years with 22 cases followed by that among 40 to 60 years involving 15 eyes. 46 cases were unilateral and 1 was bilateral. Majority of cases was noted from the rural areas with low socioeconomic status. Among the etiological causes proliferative diabetic retinopathy was the major cause (41.6%), followed by retinal vein occlusion (14.5%), rhegmatogenous retinal detachment(RRD) (12.5%), blunt trauma (10.41%) which was major cause among children presenting with vitreous haemorrhage, hypertension (4.16%), Eales disease (4.16%), AMD (4.16%), open globe injury (4.16%), retinal artery microaneurysm (2.08%), and PVD with tear (2.08%).**Conclusion:** Most common age groups affected were greater than 60 years. Among the 47 cases majority were males. 46 were unilateral and 1 was bilateral. More cases were from the rural areas having lower socioeconomic status. Among the etiological causes proliferative diabetic retinopathy formed the major cause.This is an Open Access (OA) journal, and articles are distributed under the terms of the [Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License](https://creativecommons.org/licenses/by-nc-sa/4.0/), which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.For reprints contact: [reprint@ipinnovative.com](mailto:reprint@ipinnovative.com)

## 1. Introduction

Vitreous humour is a transparent colourless gel occupying 80% (4ml) of the volume of the eyeball.<sup>1</sup> Vitreous haemorrhage (VH) is defined as extravasated blood present within the space within the internal limiting membrane of retina laterally and posteriorly, the non-pigmented epithelium of ciliary body antero-laterally and lens zonules and posterior lens capsule anteriorly.<sup>2</sup>

VH is caused when blood leaks from ruptured vessels into the vitreous cavity. It occurs suddenly, without pain.<sup>3-5</sup>

\* Corresponding author.

E-mail address: [amulyap005@gmail.com](mailto:amulyap005@gmail.com) (A. Padmini H M).

Visual acuity usually depends on the degree and location of haemorrhage. VH usually happens in adult patients with proliferative diabetic retinopathy, retinal break, posterior vitreous detachment, retinal vein occlusion or ocular trauma. Furthermore, retinal arterial macroaneurysm, choroidal neovascularization, intraocular tumors, and other diseases may also lead to VH.<sup>2-4</sup>

In countries like India recurrent VH in adults is also linked to Eales disease. The most common cause of VH in children is ocular trauma.<sup>6-8</sup> The management is mainly aimed to find out the cause, associated retinal or choroidal pathology and to wait for spontaneous absorption. Treatment consist of vitrectomy with management of

associated complications.<sup>9</sup> Owing to the potentially severe impact of VH and its underlying diseases on vision, affected patients may be unable to return to work following treatment, which may affect the socioeconomic status of patients and their families. Also, studies based on demographic and etiological profile in India are scanty. Hence this study was done to know the demographic and etiological profile of vitreous hemorrhage.

## 2. Objectives

To study demographic profile of patients with vitreous hemorrhage in tertiary eye care hospital.

To study the etiology of vitreous hemorrhage in tertiary care eye hospital.

## 3. Materials and Methods

This was a retrospective study conducted in the department of ophthalmology from January 2017 to July 2018 in K R hospital attached to Mysore medical college and research centre. Total of 48 eyes of 47 patients were included in the study. Approval from institutional ethics committee was taken.

The medical records of all patients with vitreous hemorrhage were retrospectively reviewed. A computerized search of medical record database was done to identify all patients with VH during study period. Newly diagnosed VH of all causes were included. A detailed analysis of records, including demographic data, history, presenting symptoms, etiology, objects causing injury and setting of trauma, clinical findings, associated ocular and systemic conditions, investigation reports, B-scan ultrasound findings, management details, complications, and best-corrected visual acuity at presentation and at final visit was noted. Final visual acuity was noted at the end of 12 weeks. The visual outcome was labeled as “improved” if there was improvement of best-corrected visual acuity by 2 or more lines (Snellen chart) and “worse” if it deteriorated by 2 or more lines, and “stable” if the change was within 2 lines as compared to visual acuity on presentation.

### 3.1. Inclusion criteria

Newly diagnosed patients with vitreous hemorrhage, who sought medical care in K.R hospital between Jan 2017 to July 2018 were included.

### 3.2. Exclusion criteria

The patients who had received treatment for vitreous haemorrhage elsewhere earlier, for those whom the cause could not be as furnished and those who are on follow-up were not included in our study.

## 4. Results

Total of 47 patients were studied, out of which 35 were males and 12 were females. 3 patients (6.38%) were <20 years of age, 7 patients (14.89%) were 20-40 years and 15 patients (31.91%) were 40-60 years and 25 patients (46.80%) were more than 60 years. Thus males and patients above 60 years showed greater frequency. 68.08% of the study population were mainly from rural locality. Bilateral vitreous haemorrhage was noted only in one male patient and 46 cases were unilateral.

**Table 1:** Age distribution of cases of vitreous haemorrhage

Age group (years)	No of patients
< 20	3 (6.38%)
20-40	7 (14.89%)
40-60	15 (31.91%)
>60	22(46.80%)

Various etiology of vitreous haemorrhage was noted and shown in Table 2. Proliferative diabetic retinopathy was the major causative factor (41.6%).

**Table 2:** Aetiology of vitreous haemorrhage

Aetiology	Number of eyes
Proliferative Diabetic Retinopathy	20 (41.6%)
Eales disease	2(4.16%)
Retinal vein occlusion	7 (14.5%)
Hypertensive retinopathy	2 (4.16%)
Rhegmatogenous retinal detachment	6 (12.5%)
PVD with tear	1 (2.08%)
AMD	2 (4.16%)
Retinal artery macroaneurysm	1 (2.08%)
Blunt trauma	5 (10.41%)
Open globe injury	2 (4.16%)

## 5. Discussion

The study was done with the objective of determining the common aetiologies and demographic profile of vitreous haemorrhage in patients attending OPD at K.R. Hospital, Mysore.

In our study patients less than 20 years, 3 of them had vitreous haemorrhage and among patients older than 40 years, 15 of them were affected. This was in accordance with study conducted by Sharma et al. wherein younger patients were mostly affected in age group of 20-30 years (22.8%) whereas in older patients it was evenly distributed in the age groups of >40 years.<sup>10</sup>

The mean age of common diseases in our current study was variable. Wahab S et al reported the mean age of 55 years for diabetic retinopathy.<sup>11</sup> Gadkari SS et al reported the mean age with Eales’ disease as 20 to 35 years.<sup>12</sup>

Results from our current study had prevalence among males as 74.46% and among females as 25.53%. This was similar to Lean JS et al. study who reported a slight higher population (55%) of males in their analysis of 100 consecutive cases of VH.<sup>13</sup> Our study was also similar to Aravind Comprehensive Eye Study having slight higher prevalence of any vitreo-retinal diseases in males compared to females (11.8% vs 10.2%) in rural population of more than 40 years in South India.<sup>14</sup> But as a whole there was no statistical significance in the age-adjusted prevalence of vitreo-retinal disorders among both genders. Wahab S et al.<sup>11</sup> also reported a minimal male predominance in their analysis of patients with DR which was corresponding with our study results.

Our study had unilateral cases in 46 eyes and only 1 case it was bilateral. Similarly, Spirn MJ et al (2006) showed unilateral disease in 90.5% of all eyes examined for VH among children.<sup>8</sup> Also, Yeung L et al studied 32 patients had closed globe injury and severe VH of which 99% were unilateral.<sup>10</sup> The involvement of the right eye more than the left cannot be explained in any literature and we do not have an explanation for the same in the current study.

Vitreous hemorrhage etiology in the present study was variable. Proliferative diabetic retinopathy(41.6%), retinal vasculitis(4.16%), globe injuries(14.5%), retinal vein occlusion (14.5%), rhegmatogenous retinal detachment(12.5%), age-related macular degeneration (4.16%) were among the common etiologies in our study. The results of this study showed few similarities and few important differences to other studies. Butner and McPherson (1982) also reported in their study that the four commonest etiologies of spontaneous vitreous haemorrhage were diabetic retinopathy(34.1%), retinal break without RD (22.4%), rhegmatogenous retinal detachment(14.9%), and retinal vein occlusion(13.0%).<sup>3</sup> Dana MR et al showed PDR (35.2%), trauma (18.3%), retinal vein occlusion (7.4%) retinal tear without a detachment (7.0%) to be the four most common causes.<sup>4</sup> Morse et al showed PDR (54%), retinal tear(27%) and vitreous detachment(7.5%) as the most common etiologies of spontaneous vitreous haemorrhage.<sup>6</sup> Winslow RL et al analysed VH patients and found PDR (39.2%), retinal tear(12.1%), posterior vitreous detachment (12%) and vein occlusion(10.4%) as the common causes.<sup>15</sup> Dana et al reported that the patients presenting with VH had sustained ocular trauma in 12% and 18% respectively.<sup>4,13</sup>

In our study population the major etiology of vitreous hemorrhage was diabetes (41.6%). Lean J et al reported hypertension in 5% and diabetes in 6% of patients presenting with VH. Major prevalence of these medical conditions in the current study is probably reflective of higher population prevalence of these problems and late presentation with absence of screening of retinopathy in these medical conditions.<sup>13</sup>

Trauma contributed 14.57% of VH in our study comparable to Spirn M J et al study which reported trauma as a major cause for VH in children<sup>8</sup>.

Eales disease (4.16%) was identified as the only cause of retinal vasculitis in the present study which was similar to other studies. Biswas J et al showed 3 patients with Eales' disease with neurological manifestations, among which 2 of them had migrainous headaches. 40% of patients had systemic illness association. There were diabetics (20%), hypertensives (16%) and both (4%).<sup>12</sup>

BRVO contributed 10.66% in the our study which was similar to Lean JS et al study,<sup>13</sup> Winslow & Taylor<sup>15</sup> Dana et al<sup>4</sup> and Butner & McPherson.<sup>3</sup>

RVD was seen in 12.5% of patients in our study. This is lower than the incidence of retinal tear reported by Lean JS et al (40%) in 1980,<sup>13</sup> Morse et al (27%) in 1974<sup>6</sup> and Winslow R et al (12%) in 1980.<sup>15</sup>

In the present study posterior vitreous detachment was the cause of VH in 2.08%. It was correlating with the study by Sharma et al. having 2.45%.<sup>10</sup> VH due to ARMD was 4.16% in the current study and Sharma et al also found that 4.10% had vitreous hemorrhage due to choroidal new vessels in ARMD.<sup>10</sup> Diedler JL study also reported that VH in patients with ARMD had a poor outcome.<sup>16</sup> All were in concordance with our study.

## 6. Conclusion

The present study was performed with an aim to study the demographic profile and the etiology of VH among the patients attending tertiary care hospital. It was found that over a period of 18 months, about 47 cases of VH was diagnosed involving 48 eyes. Among which 46 were unilateral and 1 was bilateral. Among the 47 cases, 35 were that of males (74.46%) and 12 were that of females (25.53%). The most common age group affected were greater than 60 years with 22 cases (46.80%) followed by that among 40 to 60 years involving 15 eyes (31.91%). More cases were noted from the rural areas (68.08%) having lower socioeconomic status.

Among the etiological causes proliferative diabetic retinopathy formed the major cause (41.6%) followed by retinal vein occlusion (14.5%) followed by RVD (12.5%) further followed by other causes like blunt trauma (10.41%), which was the major cause among children presenting with vitreous haemorrhage, hypertension (4.16%), Eales disease (4.16%), AMD (4.16%), open globe injury (4.16%), retinal artery microaneurysm(2.08%), and PVD with tear (2.08%).

## 7. Source of Funding

None.

## 8. Conflict of Interest


The authors declare no conflict of interest.

## References

- Sebag J. The Vitreous; Structure, Function, and Pathobiology. New York: Springer; 1989. p. 35–58.
- Spraul CW, Grossniklaus HE. Vitreous Hemorrhage. *Surv Ophthalmol.* 1997;42:3–39. doi:10.1016/s0039-6257(97)84041-6.
- Butner RW, Mcpherson AR. Spontaneous vitreous hemorrhage. *Ann Ophthalmol.* 1982;14:268–70.
- Dana MR, Werner MS, Viana MA, Shapiro MJ. Spontaneous and traumatic vitreous hemorrhage. *Ophthalmology.* 1993;100:1377–83.
- Lindgren G, Sjedell L, Lindblom B. A prospective study of dense spontaneous vitreous hemorrhage. *Am J Ophthalmol.* 1995;119:458–65.
- Morse PH, Aminlari A, Scheie HG. Spontaneous vitreous hemorrhage. *Arch Ophthalmol.* 1974;92:297–8.
- Cekic O, Totan Y, Batman C. Traumatic vitreous hemorrhage from a persistent hyaloid artery. *J Pediatr Ophthalmol Strabismus.* 2000;37:117–8.
- Spirn MJ, Lynn MJ, Hubbard GB. Vitreous hemorrhage in children. *Ophthalmology.* 2006;113:848–52.
- Dhingra N, Pearce I, Wong D. Early vitrectomy for fundus-obscuring dense vitreous haemorrhage from presumptive retinal tears. *Graefes Arch Clin Exp Ophthalmol.* 2007;245:301–4.
- Sharma R, Joshi SN, Shrestha JK. Etiology of vitreous hemorrhage in a tertiary eye care center in Nepal. *Nep J Oph.* 2010;2:121–6.
- Wahab S, Mahmood N, Shaikh Z, Kazmi WH. Frequency of retinopathy in newly diagnosed type 2 diabetes patients. *J Pak Med Assoc.* 2008;58:557–61.
- Gadkari SS, Kamdar PA, Jehangir RP, Shah NA, Adrianwala SD. Pars plana vitrectomy in vitreous haemorrhage due to Eales' disease. *Indian J Ophthalmol.* 1992;40:35–7.
- Lean J, Gregor Z. The acute vitreous haemorrhage. *Br J Ophthalmol.* 1980;64:469–71.
- Nirmalan PK, Katz J, Robin A. Prevalence of vitreoretinal disorders in a rural population of southern India. *Arch Ophthalmol.* 2004;122:581–6.
- Winslow RL, Taylor BC. Spontaneous vitreous hemorrhage: Etiology and management. *South Med.* 1980;73:1450–1452.
- Diedler JL, Soubrane G, Coscas G. Vitreous hemorrhage complicating age-related macular degeneration. Apropos of 18 cases. *J Fr.* 1989;12:343–52.

## Author biography

**Prakash D N**, Professor

**Amulya Padmini H M**, Senior Resident  <https://orcid.org/0000-0003-2542-4232>

**Deeptha Vasudevan**, Junior Resident

**Cite this article:** Prakash D N, Padmini H M A, Vasudevan D. A retrospective study on demographic profile and etiology of vitreous hemorrhage. *Indian J Clin Exp Ophthalmol* 2021;7(3):583-586.