Original research article

A Study of the Etiology of Vitreous Hemorrhage in a Tertiary Care Eye Hospital

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Abstract

Background: The incidence of vitreous hemorrhage is approximately 7 per one lakh population. It is considered the most frequent cause of temporary or permanently reduced eyesight. Even though vitreous hemorrhage diagnosis is frequently simple, therapy is determined by determining the underlying cause. The current study aimed to determine the etiology of vitreous hemorrhage in cases reported to our tertiary care hospital in south India.

Methods: A thorough history was taken before a methodical eye examination was performed. The relative afferent pupillary defect, best corrected visual acuity, neovascularization of the iris, and neovascularization of the angle were recorded. To rule out secondary glaucoma, intraocular pressure was measured using a Goldman's Applanation Tonometer. Both eyes underwent thorough fundus examinations. For posterior segment examination in hazy media, a USG B scan was performed to check for retinal tumors, or retinal detachments.

Results: The most common presenting complaint in cases of vitreous hemorrhage in our study was sudden loss of vision in n=48(50.52%) cases, slowly progressive loss of vision in n=26 (27.36) and floaters in n=21(22.10%) cases. The most common etiology of VH was proliferative diabetic retinopathy in 27.36% of cases followed by retinal vasculitis in 18.94%. The third most common etiology was closed globe injuries in 11.57% of cases.

Conclusion: The common reason for an unexpected, painless loss of vision is vitreous hemorrhage. Bilateral involvement is less typical than unilateral involvement. In younger age groups, retinal vasculitis (Eales' disease) and ocular trauma are the most frequent causes of vitreous hemorrhage, whereas, in older populations, proliferative diabetic retinopathy, retinal vein blockage, posterior vitreous detachment, and retinal tear are the most frequent causes.

Keywords: Vitreous Hemorrhage (VH), Etiology, Proliferative diabetic retinopathy, Retinal vasculitis **(Eales' disease)**

Introduction

A translucent, color less gel called vitreous humor makes up around 80% (4ml) of the volume of the eye. The extravasation of blood into the vitreous body, which is bordered posteriorly by the posterior lens capsule, laterally by the non-pigmented epithelium of the ciliary body, and anteriorly by the internal limiting membrane of the retina, is known as a vitreous hemorrhage. A common cause of an unexpected, painless loss of vision is a vitreous hemorrhage, which typically manifests with the abrupt appearance of floaters, smoke signals, the perception of red or black shadows, and cobwebs. When these symptoms are preceded by light flashes, posterior vitreous detachment, retinal detachment, or retinal break should be taken into account. [1]

Even 10 microliters of blood can restrict vision to hand movement in cases of vitreous hemorrhage, depending on the density of the hemorrhage. [1] Retinal vascular problems, which result in retinal ischemia and release angiogenic substances like endothelial growth factor, which encourage the creation of new blood vessels from the disc and retina, are the primary cause of vitreous hemorrhage. [2] Due to mild vitreous tension, these freshly created blood vessels are extremely delicate and easily bleed. Proliferative diabetic retinopathy, ischemic retinal vein occlusion, Eales' disease, sickle cell retinopathy, and familial exudative vitreoretinopathy are the retinal diseases that lead to neovascularization related to retinal ischemia (FEVR). Vitreous hemorrhage (VH) can be brought on by congenital peripapillary arterial loops, retinal angiomas, systemic hypertension-induced retinal arteriole macroaneurysm rupture, and retinal angioma hemorrhage. When traction is applied to a normal retinal artery during posterior vitreous detachment (PVD), it may burst. PVD may develop on its own or as a result of traumatic ocular trauma. Retinoschisis, Terson's syndrome, Valsalva retinopathy, and vitreous hemorrhage secondary to retinal tears are all caused by the same process. Subretinal hemorrhage, which penetrates the retina without any accompanying retinal detachment, can also break through and cause a vitreous hemorrhage. Wet ARMD is the most frequent cause of subretinal hemorrhage; choroidal malignant melanoma and idiopathic polypoidal choroidal vasculopathy (IPCV) are uncommon causes. [3, 4] The vitreous hemorrhage may go away on its own or continue over time. [5] Vitreous hemorrhage resolves on its own over time and only in circumstances when there is no risk of recurrent bleeding. [6] Haemosiderosis bulbi, retinal degeneration, glial and fibrovascular growth, ochre membrane development, and glaucoma are all consequences of long-term vitreous hemorrhage. A common side effect of a non-healing, long-lasting vitreous hemorrhage is glaucoma, which can be ghost cell, hemolytic, or hemosiderotic in nature.

Material and Methods

A cross-sectional study was conducted among the patients presenting with ocular complaints presenting to Regional Eye Hospital Warangal, Telangana State. Institutional Ethical approval was obtained for the study. Written consent was taken from all the patients in the study. A thorough history was taken before a methodical eye examination was performed. The relative afferent pupillary defect, best corrected visual acuity, neovascularization of the iris, and neovascularization of the angle were recorded. To rule out secondary glaucoma, intraocular pressure was measured using a Goldman's Applanation Tonometer. Both eyes underwent thorough fundus examinations. For posterior segment examination in hazy media, a USG B scan was performed to check for retinal tumors or retinal detachments. To search for leaky vessels and underlying etiology, FFA was performed in clear media. Every patient had their blood pressure recorded with a standard mercury sphygmomanometer. The laboratory tests performed were blood sugar, including HbAIc, lipid profile, hemoglobin, bleeding time (BT), clotting time (CT), ESR, and ECG if required.

Statistical analysis: Data collection and analysis were carried out using an MS Excel spreadsheet and SPSS version 22. (Chicago, IL, USA). While qualitative factors were expressed in proportions and percentages, quantitative data were expressed using means and standard deviations. To determine the difference between the two proportions, Fisher's exact test was performed.

Results

In the current study a total of n=95 cases were included out of the n=95 case n=60(63.15%) were males and n=35(36.84%) were females. The male-to-female ratio was 1.8: 1. The youngest patient was a male aged 21 years and the oldest case was a female of 78 years. The age range of the study was from 20 – 80 years. The mean age of the cohort was 48.56 ± 11.25 years. The most common presenting complaint in cases of vitreous hemorrhage in our study was sudden loss of vision in n=48(50.52%) cases, slowly progressive loss of vision in n=26 (27.36) and floaters in n=21(22.10%) cases depicted in figure 1. Systemic complaints were observed in 7.3% of cases out of which 6.3% had a headache and 2.1% of patients had a fever.

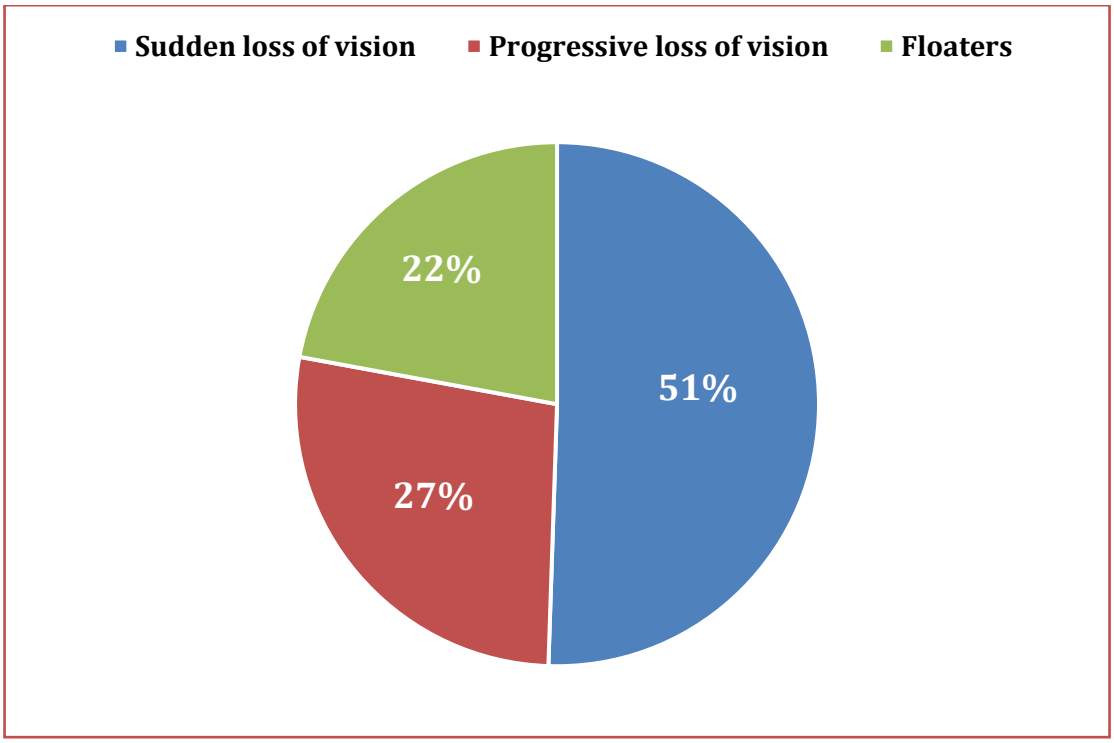

Figure 1: Showing the percentage of the common complaints in the cases

In our study, n=60(63.15%) patients had associated systemic illness and out of the cases of systemic illnesses the most common systemic illness associated was found to be hypertension 35%, diabetes mellitus in (25%) and dyslipidemia (26.67%) 13.33% patients had both diabetes and hypertension while 18% patients had no associated systemic disease. The mean systolic blood pressure was 128.09 ± 25.5 mm Hg (range 80-200 mm Hg) the diastolic blood pressure was 85.5 ± 11.12 mm Hg and the patients were classified as hypertensive based on JNC 8 norms. [7] History of smoking was present in 20% of patients the details of systemic illnesses associated with vitreous humor are given in figure 2.

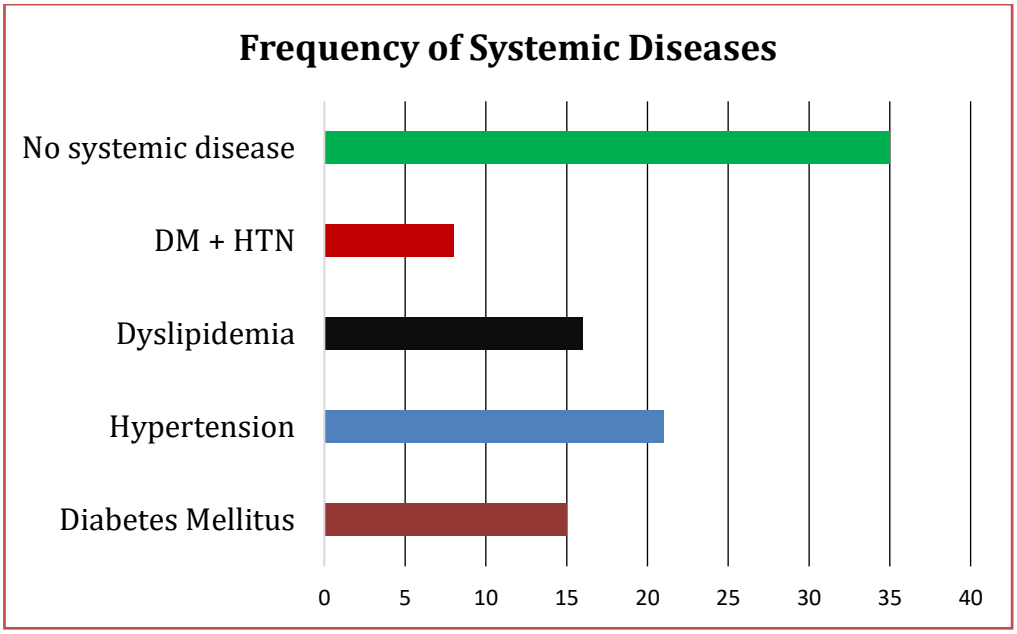

Figure 2: Association of VH with various systemic diseases

The range of the mean random blood sugar was 90-320 mg/dl or 121.37 48.32 mg/dl. There was no statistically significant difference between the random blood sugar of patients with proliferative diabetic retinopathy (195.8 mg/dl), branch retinal vein occlusion (106.11 mg/dl), and retinal vasculitis (101.7 mg/dl) when different patient groups were compared for their random blood sugar based on the etiology of vitreous hemorrhage (ANOVA, p= 0.812). Only 20% of patients showed a modest decline or near normal visual acuity at the time of presentation, whereas the majority of patients (48%) were clinically blind. Of those, 32% had significant visual impairment. The most common etiology of VH was proliferative diabetic retinopathy in 27.36% of cases followed by retinal vasculitis in 18.94%. The third most common etiology was closed globe injuries in 11.57% of cases and other details have been given in table 1.

Table 1: Showing the etiology of vitreous hemorrhage cases in the study

Diagnosis	*Frequency (N)*	*Percentage*
Proliferative diabetic retinopathy	26	27.36
Retinal vasculitis **(Eales' disease)**	18	18.94
Branch retinal vein occlusion	10	10.52
Closed globe injury	11	11.57
Rhegmatogenous retinal detachment	07	7.37
Age-related macular degeneration	05	5.26
Open globe injury	03	3.16
Terson' s syndrome	02	2.10
Central retinal vein occlusion	03	3.15
Posterior uveitis	01	1.05
Posterior vitreous detachment	02	2.11
Tractional retinal detachment	01	1.05
Retinopathy of Prematurity	01	1.05
Complications of laser in diabetic retinopathy	02	2.10
Not known	03	2.10
Total	95	100%

Discussion

The purpose of this study was to identify the prevalent causes of vitreous hemorrhage in patients who visited Regional Eye Hospital Warangal, Telangana State. When compared to older patients, who were nearly evenly distributed in the age categories > 40 years, younger patients were more affected in the 20–30-year age group (22.1 percent). In a related study, Lean JS et al., [8] analyzed n=100 consecutive occurrences of vitreous hemorrhage and found that a somewhat higher percentage (55%) of patients were male. Nirmalan PK et al., [9] in a population-based prevalence study of vision and other eye illnesses in a rural population aged 40 years and older in South India, males were shown to have a slightly higher prevalence of any vitreoretinal problems (11.8% vs. 10.2%). The age-adjusted prevalence of vitreoretinal diseases did not differ significantly between the sexes. A relatively higher incidence of Eales' disease and increased risk of ocular trauma due to more outdoor activities in males is probably responsible for the very high male predominance of vitreous hemorrhage in our analysis. In comparison to western countries, India has a higher prevalence of retinal vasculitis, (Eales' disease), as well as a higher incidence of tuberculosis. Thompson JT et al., [10] and Nagpal PN et al., [11] have noted that healthy young male people are more frequently affected by Eales' disease (up to 97.6%). Wahab S et al., [12] however, also noted a modest male prevalence (66.9%) in their examination of diabetic retinopathy patients. The majority of patients (81.05%) had a unilateral vitreous hemorrhage. Similar observations of unilateral vitreous hemorrhage have been reported by Sharma R et al., [13] Jitender Phogat et al., [14] J Kumar et al., [15] in their studies. The mean age of the cohort in this study was 48.56 ± 11.25 years. The mean age reported by J Kumar et al., [15] in their study was 43.35± 20.63 years. The mean age of diabetic retinopathy was 54.7 12 years, according to Wahab S et al., [12] In our study, trauma caused 11.57% of vitreous hemorrhages. Trauma has been identified by Spirn MJ et al., [16] as a prevalent factor in pediatric vitreous hemorrhage. The most frequent presenting complaint in cases of vitreous hemorrhage in our study was sudden loss of vision in n=48(50.52%) cases, slowly progressive loss of vision in n=26 (27.36), and floaters in n=21(22.10%) cases. Childhood vitreous hemorrhage was described with slightly distinct characteristics by Spirn MJ et al., [16]. The most prevalent complaint was decreased vision (72.5%), while strabismus (12.5%), irregular pupillary reflex (10.0%), discomfort (10.0%), behavioral change (8.8%), nystagmus (7.5%), and floaters were less frequent presentations (6.3%). The frequency of reported systemic symptoms was relatively very less. We observed symptoms in 7.3% of cases out of which 6.3% had a headache and 2.1% of patients had a fever. Two of the three Eales disease patients with neurological symptoms who were reported by Biswas J et al., [17] had migrainous headaches. 40% of the patients had underlying systemic diseases. Twenty percent of them had diabetes, sixteen percent had hypertension, and both (4%). Only 16 percent of the patients had recognized hypertension, although 22 percent had systolic blood pressure that was higher than the reference norms. According to Dana et al., [18] proliferative diabetic retinopathy causes 89 percent of vitreous hemorrhage in type I diabetic patients and 64 percent of it in type 2 diabetic patients. The most frequent diagnoses in our analysis included proliferative diabetic retinopathy (27.36%), retinal vasculitis (18.94%), globe injuries (11.57%), branch retinal vein blockage (10.52%), rhegmatogenous retinal detachment (7.37%), and age-related macular degeneration (5.26%). Retinal vein occlusion, retinal break without retinal detachment, rhegmatogenous retinal detachment, and diabetic retinopathy were the four most common causes of spontaneous vitreous hemorrhage, according to Butner et al., [19] study was (13.0%). According to Dana et al., [18] and Lean J et al., [8] 12.3 percent and 18 percent, respectively, of patients who presented with vitreous hemorrhage, had had ocular trauma. Male predominance (up to 97.6%) was noted in the bulk of the series by Winslow et al., [20] and Das T et al., [21] according to their reports. According to Gadkari SS et al., [22] people often have symptoms between the ages of 20 and 30. According to Das T et al., [21] the disease is quite prevalent

throughout the Indian subcontinent. rhegmatogenous retinal detachment was seen in (7.37%) of cases in this study. This is less frequent than the incidence of retinal tear described by Lean JS et al., [8] in (40%) and by Morse et al., [23] in (27%) and Winslow R et al., [24] (12%). In our results, posterior vitreous detachment accounted for 2.11%. We identified posterior uveitis, Tersons syndrome, and a side effect of laser treatment for diabetic retinopathy as the less frequent causes (table 1). In the literature, these things are listed as unusual causes of vitreous hemorrhage.

Conclusion

Within the limitations of the current study, it can be concluded that the common reason for an unexpected, painless loss of vision is a vitreous hemorrhage. Bilateral involvement is less typical than unilateral involvement. In younger age groups, retinal vasculitis (Eales' disease) and ocular trauma are the most frequent causes of vitreous hemorrhage, whereas, in older populations, proliferative diabetic retinopathy, retinal vein blockage, posterior vitreous detachment, and retinal tear are the most frequent causes. Males are more likely to present when they are between the ages of 20-30 years on average. The two systemic diseases that were discovered to be most frequently linked to vitreous hemorrhage were determined to be diabetes and hypertension.

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