



AN ETIOLOGICAL EVALUATION OF VITREOUS HAEMORRHAGE IN EASTERN INDIA

Ophthalmology

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ABSTRACT

Aim- To evaluate the etiology (mean age, sex & most common cause) of vitreous haemorrhage (VH) in first 100 cases of vitreous haemorrhage that presented in a tertiary eye hospital of Eastern India. **Materials & Method-** A cross sectional observation study of newly diagnosed vitreous haemorrhage cases was conducted in a tertiary eye hospital of Eastern India from January 2019- June 2020. Detailed clinical ophthalmic evaluation, systemic examination along with diagnostics test like USG B-Scan were done. All data were collected on an MS-Excel 2007 spreadsheet. The demographic variables and outcome were shown using bar and pie charts. Patients having history of previous intraocular surgery and laser procedure were excluded from the study. **Results-** Among the 100 cases evaluated, Proliferative Diabetic Retinopathy (PDR) (34%) was the most common cause followed by Ocular trauma (27%) including Penetrating trauma and Blunt trauma and the other causes being Eales disease (10%), Posterior vitreous detachment (PVD) (8%), Retinal vein occlusion (RVO) (5%), Vasculitis (2%), Age Related Macular Degeneration (3%), Anti-VEGF (2%), Sickle cell retinopathy (1%), Capillary Haemangioma (1%), Choroidal Melanoma (1%) and unknown causes (8%). 61% were male & 39% were female. Mean age of the study population being 46.71 years. **Conclusion-** Vitreous haemorrhage is one of the leading cause of sudden painless loss of vision. In our study conducted in a tertiary eye hospital in Eastern India, the most common etiology of vitreous haemorrhage was found to be Proliferative Diabetic Retinopathy (PDR).

KEYWORDS

Vitreous haemorrhage (VH), Proliferative Diabetic Retinopathy (PDR)

INTRODUCTION

The vitreous humor is a transparent colorless gel occupying about 80 percent (4.0ml) of the volume of the eyeball. Vitreous humor is made up of 99 percent water and is stabilized by collagen fibrils that extend into the superficial (internal) layers of the retina. The remaining 1 percent is made up of collagen and hyaluronic acid, giving it a gelatinous consistency and optical clarity. Vitreous haemorrhage is an important event as it is secondary to a disease condition in the posterior segment of the eye. Vitreous haemorrhage has an incidence of seven cases per 100,000¹. Vitreous hemorrhage is defined as the presence of extravasated blood within the space outlined by the internal limiting membrane of the retina posteriorly and laterally, the non-pigmented epithelium of the ciliary body anterolaterally, and the lens zonules and the posterior lens capsule anteriorly². It may be localised to the preretinal space, intravitreally located or more often may be present in both.

Vitreous haemorrhage leads to a sudden appearance of floaters, visual haze, smoke signals, perception of red or more commonly, black shadows and cobwebs. In more dense vitreous hemorrhage there is a sudden loss of vision³.

The causes of spontaneous vitreous hemorrhage can be better understood by four main patho-physiological mechanisms: retinal vascular disorders that cause retinal ischemia, retinal vascular abnormality not associated with retinal ischemia, normal retinal vessel rupture and breakthrough of sub-retinal hemorrhage dissecting through the retina without an associated retinal detachment⁴. The causes of vitreous haemorrhage include acute posterior detachment associated either with retinal tear or avulsion of a periphery vessel, proliferative retinopathy (Diabetic, Retinal vein occlusion, Sickle cell disease, Eales disease, Vasculitis), Miscellaneous retinal disorders (Macroaneurysm, Telangiectasia, Capillary haemangioma), Systemic (Bleeding disorders, Terson syndrome)⁵ Blunt or penetrating ocular trauma, orbital trauma and systemic trauma may cause a variety of posterior segment abnormalities including vitreous hemorrhage.

Vitreous hemorrhage has been highlighted as an important ophthalmological emergency of a serious ocular dysfunction of varying etiology that often has systemic association. The treatment of vitreous hemorrhage depends on the underlying cause. In symptomatic

retinal tears with vitreous hemorrhage, laser or cryotherapy is generally indicated. In retinal detachment, pars plana vitrectomy or scleral buckling surgery is indicated. With underlying medical diseases, treat the patient conservatively with upright positioning for sleep to enhance settling of the hemorrhage. With the exception of trauma and retinal detachment, close observation for 1-2 weeks allows time for spontaneous clearing of some hemorrhage, but it may take several months for vision to return, depending on the specific case and the underlying disease process. Surgical intervention with hemorrhage removal by pars plana vitrectomy can restore vision (if the macula is healthy) when spontaneous clearing does not occur over a period of months.⁶

Aim-

To evaluate the etiology of vitreous haemorrhage in first 100 cases that presented in a tertiary eye hospital of Eastern India.

Objective-

- To analyse the mean age of the incidence of VH.
- To analyse the most common cause of VH in the study population.
- To analyse the incidence of VH in each gender of the study population

Procedure

After obtaining approval of institutional ethical committee and proper informed consent from patients, 100 patients with vitreous haemorrhage between the age of 20- 85 years attending retina clinic of the tertiary care hospital, were enrolled for the study from January 2019 to June 2020. Patients who attended in the tertiary eye hospital outpatient department with complaint of sudden onset floaters and fall in vision were subjected to complete ophthalmological examination including best corrected visual acuity (BCVA), intra ocular pressure measurement with goldman's applanation tonometry, detailed anterior segment evaluation including relative afferent papillary defect (RAPD) and gonioscopy; direct ophthalmoscopy and indirect ophthalmoscopy with +20D lens with scleral depression for diagnosis of Vitreous Haemorrhage. Dilatation of the patient eye was done before the whole procedure with combined drop of Tropicamide (0.8%) and Phenylephrine (5%). Ultrasonography B scan was done to rule out any retinal tumour, retinal detachments etc in cases of media haziness. Fundus fluorescein angiography (FFA) was done in indicated

patients with clear media to look for leaky vessels and underlying causes. The baseline investigations done included fasting and post-prandial blood sugar (FBS & PPBS).

HbA1c, complete haemogram (CBC), erythrocyte sedimentation rate (ESR), C-reactive protein (CRP), peripheral blood smear (abnormal cells, Sick cells), Mantoux test and a chest X-Ray, bleeding time (BT) and clotting time (CT), blood pressure check-up, electrocardiogram, lipid profile and cardiological check-up.

The patients already receiving treatment for vitreous haemorrhage, with history of previous intraocular surgery, laser procedure to the eye

and under re-evaluation for VH were excluded from the study. Exclusion criteria will be used to minimize statistical bias. Only one eye from each subject was included for analysis.

All data were collected on an MS-Excel 2007 spreadsheet. The demographic variables and outcome were showed using bar and pie charts.

RESULTS

The total incidence of various etiologies with respect to age, sex, involvement of the eye and associated ocular and systemic pathology were studied and recorded as follows:

CAUSE	MEAN AGE (years)	SEX		LATERALITY		WITHOUT PVD	WITH PVD	RT	RD	TOTAL
		M	F	RE	LE					
PDR	50.05	20	14	23	11	16	18	0	8	34
OCULAR TRAUMA	46.18	16	11	9	18	17	10	5	6	27
EAL'S DISEASE	39.70	8	2	5	5	7	3	0	0	10
PVD	59.12	6	2	6	2	0	8	4	1	8
RVO	50.80	4	1	3	2	4	1	0	0	5
VASCULITIS	48.50	0	2	1	1	2	0	0	0	2
ARMD	51.33	2	1	2	1	1	2	0	0	3
SICKLE CELL RETINOPATHY	25.00	1	0	1	0	1	0	0	0	1
CAPILLARY HAEMANGIOMA	23.00	1	0	1	0	1	0	0	0	1
CHOROIDAL MELANOMA	59.00	0	1	0	1	1	0	0	0	1
INTRAVITREAL Anti-VEGF	66.50	1	1	1	1	2	0	0	0	2
UNKNOWN	41.33	2	4	4	2	4	2	0	0	6

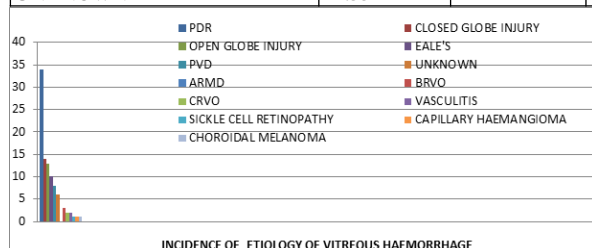


Figure 1 shows the Incidence of various etiology of vitreous haemorrhage.

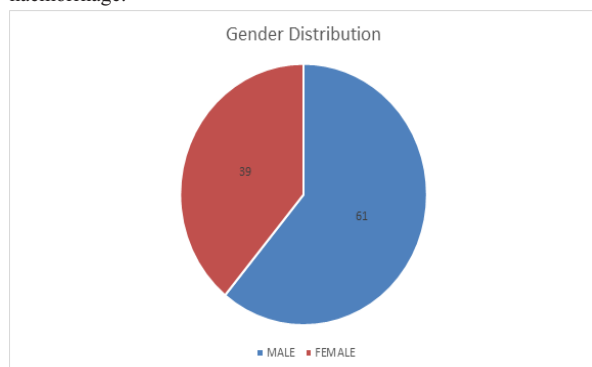


Figure 2 shows that 61% patients were male and 39% were female.

DISCUSSION

- Vitreous hemorrhage is defined as the presence of extravasated blood within the space outlined by the internal limiting membrane of the retina posteriorly and laterally, the non-pigmented epithelium of the ciliary body anterolaterally, and the lens zonules and the posterior lens capsule anteriorly.
- The study conducted at a tertiary care eye hospital in Eastern India during the period from Jan 2019 to June 2020 revealed proliferative diabetic retinopathy, ocular trauma & Eales disease 71% (71 out of 100) as the three most common causes of vitreous haemorrhage, the other causes were spontaneous posterior vitreous detachment with or without retinal tear, vasculitis, age related macular degeneration, Sickle cell retinopathy, capillary haemangioma, choroidal melanoma, post operative complication and unknown causes, which accounts for 29% (29 out of 100) of all cases. In our study 61% were males and 39% were females. A higher incidence of VH in male population in our study can be because of susceptibility of male population to ocular trauma due to more outdoor activities and prevalence of eales disease.

In this study, PDR was the most common cause of vitreous haemorrhage 34% (34 out of 100). The age varies between 35-70 years mean age of incidence being 50.05 years. The gender incidence being male 58.8% (20 out of 34) and female 41.1% (14 out of 34). Among them were type 1 diabetic 17.6% (6 out of 34) and were type 2 82.3% (28 out of 34) diabetics. Proliferative diabetic retinopathy was the most common cause of vitreous hemorrhage in the six retrospective epidemiologic studies namely Morse et al in the year 1974 at Philadelphia (200 study cases), Winslow and Taylor in the year 1980 at Dallas (100 study cases), Lean and Gregor in the year 1980 at London (317 study cases), Butner and Mecpherson in the year 1982 at Las Vegas, (653 study cases), Dana et al in the year 1993 at Illinois (198 study cases), Lingrend et al in the year 1995 at Sweden (94 study cases). In this study, the second most common cause of vitreous haemorrhage is the ocular trauma which is 27% of the study population (27 out of 100) in the age range of 20-70 years. The gender incidence was male 59.2% (16 out of 27) and female 40.7% (11 out of 27). Out of the 27 cases, closed globe injury associated with 48.1% (13 out of 27) and open globe injury associated with 51.8% (14 out of 27). Ocular trauma was associated with PVD in 37.03% (10 out of 27), Retinal Tear in 18.51% (5 out of 27) and Retinal Detachment in 22.22% (6 out of 27). The incidence of ocular trauma in vitreous hemorrhage was included in two series Lean and Gregor in the year 1980 at London (12% of 317 cases) and Dana et al in the year 1993 at Illinois (18.8% of 198 cases) of six retrospective studies mentioned above and represented the second most common cause of vitreous hemorrhage.

Eales disease is the third most common cause of vitreous haemorrhage in this study 10% (10 out of 100) out of which 80% were male (8 out of 10) and 20% were females (2 out of 10) with a mean age of 39.70 years. The previous six retrospective studies (Morse et al in the year 1974 at Philadelphia, Winslow and Taylor in the year 1980 at Dallas, Lean and Gregor in the year 1980 at London, Butner and Mecpherson in the year 1982 at Las Vegas, Dana et al in the year 1993 at Illinois, Lingrend et al in the year 1995 at Sweden) of incidence of vitreous hemorrhage showed no incidence of Eales' disease as a cause of vitreous hemorrhage. The previous six studies were conducted in western countries where the incidence of Eales' disease is very low.

Eales' disease (Eales' disease by Tara Prasad Das, Jyothirmay Biswas, Atul Kumar, P.N. Nagpal, P.A. Namperumal samy, Bijayanandha Patnaik and H.K. Tewari, I J O volume 42 no.1 March 1994) has been reported from the United Kingdom, the United States, and Canada in later half of 19th and early 20th century. But for unknown reasons, it is now rare in more developed countries and is more commonly reported from the Indian subcontinent. The reported incidence in India is 1 in 200 to 250 ophthalmic patients. Eventually between the peak age of incidence between 20 to 30 years, between 70 to 80 percent of patients develop bilateral involvement though the extent of retinal involvement may not be to the same extent. Duke Elder noted 90% bilateral

involvement and others have noted only 50% of involvement.

The few other causes of VH in this study were retinal vein occlusion with mean age of 50.80 years where 4 were male and 1 was female with 3 occurring in right eye and 2 in left eye, vasculitis in two female patients with mean age of 48.50 years, ARMD was noted in 2 female and 1 male patient, with the mean age of 51.33 years and PVD was associated in 2 patients, Intravitreal anti-VEGF associated VH was seen in 2 patients with the mean age of incidence was 66.50 years, out of which one case was male and the other female. One case each of sickle cell retinopathy, capillary haemangioma, and choroidal melanoma with the mean age of 25 years, 23 years and 59 years respectively was noted in this study.

Unknown causes of total 8 cases whose cause could not be elicited in 4 female and 2 male patients were also found in this study with the mean age being 41.33 years.

Causes Of Vitreous Hemorrhage In Different Studies

AUTHOR AND REFERENCE	Winslow and Taylor	Butner and Mecpherson	Dana et al	Lindgren et al
Year	1980	1982	1993	1995
Mean age(years)	N.A	49	48	65
Region	DALLAS	LAS VEGAS	ILLINOIS	SWEDEN
Patients	100	653	198	94
DIAGNOSIS				
PDR	31.5%	34.1%	34.7%	19.1%
TRAUMA	-	-	18.8%	-
EALES DISEASE	-	-	-	-
RVO	12%	13.0%	7.9%	16.0%
OTHERS	6.9%	7.2%	8.9%	6.4%
UNKNOWN	7.6%	2.1%	2.0%	4.3%

The above previous studies showed proliferative diabetic retinopathy (PDR), spontaneous posterior vitreous detachment(PVD) with or without retinal tear, with retinal detachment or without retinal detachment and ocular trauma are the three most common causes of vitreous hemorrhage and accounts for 59.8% to 88.9% of all causes.

CONCLUSION

Vitreous haemorrhage is one of the leading cause of sudden painless loss of vision. In our study conducted in a tertiary eye hospital in Eastern India from the period of January 2019 to June 2020 the etiology of vitreous haemorrhage were found to be Proliferative Diabetic Retinopathy(PDR) (34%), Ocular trauma (27%) including Penetrating(51.8%) and Blunt(48.1%) trauma, Eales disease (10%), Posterior vitreous detachment(PVD) (8%), Retinal vein occlusion(RVO) (5%), Vasculitis(2%), Age Related Macular Degeneration (3%), Anti-VEGF(2%), Sickle cell retinopathy(1%), Capillary Haemangioma(1%), Choroidal Melanoma(1%) and unknown causes (8%).

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