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Etiology of Vitreous Hemorrhage in a Tertiary Eye Care Center in Jhansi

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Abstract
Purpose: *To find out the etiology of vitreous hemorrhage in cases of vitreous hemorrhage at a tertiary eye Centre in Jhansi.*
Place and Duration of Study: *This study was conducted at Maharani Laxmi Bai Medical College, Jhansi, Uttar Pradesh, India for one year from December 2019 to November 2020.*
Materials and methods: *This was a hospital-based cross-sectional study done over a period of one year. One hundred subjects with vitreous haemorrhage were evaluated in detail to establish the etiology.*
Statistics: *The mean value and standard deviation were calculated. The data were analyzed using Microsoft excel and SPSS 11.5 program.*
Results: *A total of 110 eyes of 100 patients were evaluated. The mean age was 43.35 (± 20.63) years with a range of 2 months to 70 years. Male were 67 %. Bilateral involvement was found in 19.6 %. Proliferative diabetic retinopathy, retinal vasculitis, branch retinal vein occlusion, rhegmatogenous retinal detachment together with ocular trauma constituted the etilogoy of vitreous hemorrhage in more than 73 % of patients.*
Conclusion: *Proliferative diabetic retinopathy, retinal vasculitis and branch retinal vein occlusion are the most common causes of vitreous hemorrhage in adults whereas in children trauma is the commonest cause.*
Keywords: *vasculitis, vitreous hemorrhage, diabetic retinopathy, Eales disease*

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I. Introduction

The vitreous humor is a transparent colorless gel occupying about 80 % (4.0 ml) of the volume of the eyeball (Sebaj J, 1989). Vitreous hemorrhage is defined as the presence of extra-vasated blood within the space outlined by the internal limiting membrane of the retina posteriorly and laterally, the nonpigmented epithelium of the ciliary body anterolaterally, and the lens zonules and the posterior lens capsule anteriorly (Spraul C et al 1997). Vitreous hemorrhage 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 vision (Kaykhosrov et al 2003). 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 detachment (Saxena S et al 2003). Blunt or penetrating ocular trauma, orbital trauma and systemic trauma may cause a variety of posterior segment abnormalities including vitreous hemorrhage. The vitreous hemorrhage has been highlighted as an important ophthalmological emergency of a serious ocular dysfunction of varying etiology that often has systemic association (Saxena S et al 2003).

II. Materials And Methods

A cross-sectional study was conducted among the patients presenting with ocular complaints to Maharani Laxmi Bai Medical College, Jhansi, Uttar Pradesh, India. If vitreous hemorrhage was detected on examination, the patient was considered suitable for enrolment in the study. An informed consent was taken from all the patients. The patients that had already received treatment for vitreous hemorrhage and had been reevaluated for a regular follow-up were excluded from the study.

The patient characteristics were collected on a predesigned pro forma. After taking a detailed history, ocular examination was done systematically. Blood pressure measurement was done in every patient. The intraocular pressure was measured in all patients with air-puff tonometer and confirmed by applanation tonometry if the readings were higher than 21 mm Hg. Blood sugar estimation was performed in all patients and

further tests were done depending upon the need of individual patients according to the age and clinical characteristics of the patient.

Statistics

All data collected were entered into computer software and analyzed according to Microsoft Excel and SPSS 11.5 program.

III. Results

A total of 110 eyes of 100 patients found to have vitreous hemorrhage were evaluated. The mean age was 43.35 (± 20.63) years with a range of 2 months to 70 years. The younger patients were mostly affected in age groups of 20-40 years (24.86 %) whereas older patients were almost evenly distributed in the age groups of > 40 years. Most of the patients were male (67 %). Male preponderance was seen in the age group of 10-40 years. The disease was bilateral in 19.6 % of patients.

Presenting complaints were of sudden (35.64 %) or slowly progressive loss of vision (19.32 %), and floaters (24.36 %). A history of low birth weight and preterm delivery was also obtained in 2.4 % of the patients. Systemic complaints were obtained in a minority of patients at the time of presentation. 7 % percent of the patients presented with a headache and 2 % had fever at presentation. Systemic illnesses were found in a significant number of patients (47 %), the most common ones being diabetes (23 %), hypertension (14 %) and both (8 %). 16 % of the patients gave a history of alcohol consumption and 24 % of them were smokers.

The mean systolic blood pressure was 120 ± 22.34 mm Hg (range 80-200 mm Hg) and mean diastolic blood pressure was 80 ± 17.34 mm Hg (range 60-120). According to the commonly used criteria to define hypertension (SBP >140 and DBP > 90 mmHg), 26 % of patients had systolic blood pressure more than 140 mm Hg and 11 % had diastolic blood pressure more than 90 mm Hg. Among all the patients with high blood pressure by those standards, the mean systolic blood pressure was 156 ± 21.46 (range 150- 200) mm Hg and the mean diastolic blood pressure was 100 ± 12.34 (range 98-120) mm Hg. The mean random blood sugar was 124.46 ± 31.47 mg/dl (Range= 70-350 mg/dl).

Etiology of vitreous hemorrhage

Diagnosis	Number of eyes of patients	Percentage of patients
Proliferative diabetic retinopathy	34	30.90%
Retinal vasculitis	19	17.27%
Branch retinal vein occlusion	13	11.81%
Closed globe injury	10	9.09%
Rhegmatogeneous retinal detachment	08	7.27%
Age related macular degeneration	07	6.36%
Open globe injury	04	3.63%
Posterior vitreous detachment	03	2.72%
Tractional retinal detachment	02	1.81%
Central retinal vein occlusion	02	1.81%
Complications of laser in diabetic retinopathy	02	1.81%
Terson' s syndrome	01	0.90%
Acute lymphoblastic leukemia	01	0.90%
Posterior uveitis	01	0.90%
Retinopathy of rematurity	02	1.81%
Not known	01	0.90%
Total	110	100%

The patients had a variable degree of visual impairment at presentation. Many eyes (54 %) were clinically blind at the time of presentation. A significant number of the others were visually impaired (15.3 %) or severely visually impaired (4.7 %). In 3.9 % of the eyes, there was no perception of light. About 22.1 % of eyes had normal or near normal vision at the time of presentation.

IV. Discussion

This study was conducted with the objective of determining the common causes of vitreous hemorrhage. Younger patients were mostly affected in age group of 20-40 years (24.86 %) whereas older patients were almost evenly distributed in the age groups of > 40 years. Like ours (67 %), Lean JS et al (1980) reported a slightly higher population (55 %) of male patients in their analysis of one hundred consecutive cases of vitreous hemorrhage. A slightly higher prevalence of any vitreo-retinal disorder was reported in favour of males (11.8 % vs 10.2 %) in the Aravind Comprehensive Eye Study (Nirmalan P K et al 2004) in a population-based prevalence study of vision and other eye diseases in a rural population of 40 years and older in South India. There was no significant difference in the age-adjusted prevalence of vitreo-retinal disorders between sexes. Wahab S et al (2008) also reported a slight male predominance (66.9 %) in their analysis of patients with diabetic retinopathy.

The majority of patients (80.4 %) had unilateral vitreous hemorrhage. Spirn MJ et al (2006) also reported unilateral involvement in 90.5 % of all eyes in an evaluation of vitreous hemorrhage in children. Similarly, Yeung L et al (2008) analyzed 32 patients with closed globe injury and severe vitreous hemorrhage of which 99 % had unilateral disease.

The mean age of presentation of common diseases in our study was 43.35± 20.63 years. Wahab S et al (2008) reported the mean age of 54.7 ± 12 years for diabetic retinopathy. Trauma contributed 11.34 % of vitreous hemorrhage in our study. Spirn M J et al (1997) reported trauma as a common cause for vitreous hemorrhage in children.

Most patients in our study presented with sudden (35.64 %) or slowly progressive loss of vision (19.32 %), floaters (24.36 %). Lean J et al (1980), however, reported that a higher percentage (66 %) of patients complained of floaters only, or floaters with photopsia (15 %). Spirn M J et al (2006) reported slightly different features in childhood vitreous hemorrhage. Decreased vision (72.5 %) was the most frequent complaint and less common presentations included strabismus (12.5 %), abnormal pupillary reflex (10.0 %), pain (10.0 %), behavioral change (8.8 %), nystagmus (7.5 %) and floaters (6.3 %).

Systemic symptoms were not commonly seen in the present study. 7% percent of the patients presented with headache and 2 % had fever at presentation. 47% of the patients had associated systemic illness. They were diabetics (23 %), hypertensives (14 %) and both (8 %). Lean J (1980) reported hypertension in 5 % and diabetes in 6 % of patients presenting with vitreous hemorrhage. Dana et al (1993) reported that proliferative diabetic retinopathy accounts for 64 % of vitreous hemorrhage in patients with type 2 diabetes and 89 % of vitreous hemorrhage in patients with type I diabetes. Proliferative diabetic retinopathy (30.90 %), retinal vasculitis (17.27 %), globe injuries (12.72 %), branch retinal vein occlusion (11.81 %), rhegmatogenous retinal detachment (7.27 %), age-related macular degeneration (6.36 %) were among the most common diagnoses in our study. Butner and McPherson (1982) also reported in their study that the four most common causes of spontaneous vitreous hemorrhage were diabetic retinopathy (34.1 %), retinal break without retinal detachment (22.4 %), rhegmatogenous retinal detachment (14.9 %), and retinal vein occlusion (13.0 %). Dana MR et al (1993) in their analysis found proliferative diabetic retinopathy (35.2 %), and trauma (18.3 %), retinal vein occlusion (7.4 %) retinal tear without a detachment (7.0 %) to be the most common causes. Morse et al (1974) studied documented proliferative diabetic retinopathy (54 %), retinal tear (27 %) and vitreous detachment (7.5 %) as the most common causes of spontaneous vitreous hemorrhage.

Dana et al (1993) and Lean J (1980) reported that the patients presenting with vitreous hemorrhage had sustained ocular trauma in 12.3% and 18% respectively. BRVO contributed 11.81 % in the present study which was similar to that reported by Lean JS et al (1980), Winslow & Taylor (1980) Dana et al (1983) and Butner & McPherson (1982). Abraham C et al (1977) and Das T et al (1994) reported male predominance (up to 97.6%) in a majority of the series. Gadkari SS et al (1992) reported the predominant age of onset of symptoms as between 20 and 30 years. Das T et al (1994) highlighted the disease to be very common in the Indian sub-continent.

Rhegmatogeneous retinal detachment was seen in 7.27 % of patients in our series. This is lower than the incidence of retinal tear reported by Lean JS et al (40%) in 1980, Morse et al (27%) in 1974 and Winslow R et al (12%) in 1980. Posterior vitreous detachment represented 2.72% in our result.

We found 1.81 % (2 eyes) of cases of tractional retinal detachment causing vitreous hemorrhage. We also found that 6.36 % had vitreous hemorrhage in ARMD. Diedler JL et al (1989) reported that vitreous hemorrhage in patients with ARMD had a poor outcome. Among the less common causes, we found acute lymphoblastic leukemia, posterior uveitis, Tersons syndrome, and complication of laser therapy in diabetic retinopathy. These entities are reported as uncommon causes of vitreous hemorrhage in the literature.

V. Conclusion

The commonest age of presentation of vitreous hemorrhage is 20-40 years with male preponderance. Unilateral involvement is more common than bilateral. Sudden or slowly progressive loss of vision and floaters

are the most common presenting symptoms. Diabetes and hypertension are the most commonly associated systemic illnesses. The most common etiology of vitreous hemorrhage is proliferative diabetic retinopathy followed by retinal vasculitis and branch retinal vein occlusion.

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