Case Report

Vitreous hemorrhage: How important is role of radiological evaluation? A Case report

Rohit Sharma[1], Tanu Singh[2], Dhiraj Mishra[2], Natasha Nargotra[1], Shashi Sharma[4], Abhivind Bhutani[3], Dashrath Rao[3], Bharat Bhushan Sharma[4]

From [1]Senior Resident, [2]Assistant Professor, [3]PG Resident, [4]Professor, Department of of Radio-diagnosis, SGT Medical College Budhera, Gurugraam, India, [4]Professor, Department of Pediatrics, SGT Medical College Budhera, Gurugram, India

ABSTRACT

Vitreous hemorrhage (VH) is most commonly caused by ocular trauma and proliferative diabetic retinopathy. Ultrasound is a very useful and effective modality in the diagnosis of VH. Sonography also helps in diagnosing the pathology of surrounding structures around the posterior chamber. This also helps in delineating the retinal anatomy. The opaque posterior chamber can easily be assessed by this modality. We present the case of a 15-year-old boy who reported with the left eye trauma 3 months back. He had initial redness and discharge followed by gradual loss of vision. He underwent sonographic evaluation of the left eye and was found to be having VH. He was advised surgical intervention by vitrectomy because of the chronicity of the problem. Ultrasonography of the eye is a very useful and effective tool for quick and hassle-free diagnosis of VH. This helps in fast management and can be useful in the salvage of some parts of the eye and subsequently vision. Medical and surgical contemplation can be carried out as per the sonographic findings.

Key words: Ocular trauma, Posterior chamber, Retinopathy, Sonography, Vitreous hemorrhage

Vitreous hemorrhage (VH) denotes the bleeding in the vitreous body or the surrounding potential spaces. There could be multiple causative factors ranging from trauma to underlying pathologies due to diabetic retinopathy and malignant lesions. The hemorrhage could be from pre-existing normal internal blood vessels or due to some neovascularization. VH should be diagnosed as soon as possible and additional associated findings must also be known. Ultrasound by A and B scan can unveil the details. The underlying retinal detachment could be diagnosed fully as compared to retinal tear which was <50%. There was a false diagnosis in 18.5% of cases. Trauma is the most common cause in young individuals.[1,2]

CASE REPORT

A 15-year-old boy complained of redness and watery discharge from the left eye after the trauma that took place 3 months back while he was working in the field. This was followed by a gradual loss of vision. At presentation, the patient complained of a total loss of vision. There was no history of any diabetes or other like systemic illnesses.

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On examination, his vitals were stable and the left eye was found to be red with sticky discharge. There was no vision in the left eye. Systemic examination was non-contributory.

The patient was advised ultrasonography (USG) of the left eye. There was an undulating vitreous membrane seen behind the lens. Intracavitary high-frequency probe had shown an inhomogenous echogenic region suggestive of vitreous hemorrhage. There was no retinal detachment (Figure 1a-c). Color flow imaging (CFI) had shown that there was no abnormality seen at the entry of vessels at optic nerve entry (Figure 2a and b). The ophthalmoscopic examination revealed vitreous detachment with vitreous hemorrhage. There were mobile echo-reflective particles in the posterior part of the vitreous body. There was also detached vitreous which could be seen as floating echogenic lines. There was no retinal detachment as fovea was normal. All the vessels entering with optic nerve were well preserved.

The patient had been advised surgical intervention because of the chronic nature of the VH. The patient had postponed his surgery because of the present pandemic scenario.

DISCUSSION

Vitreous hemorrhage is bleed in either the vitreous body or several spaces around the body. This could be either from the unhealthy

Correspondence to: Bharat Bhushan Sharma, Department of Radio-diagnosis, SGT Medical College, Gurgaon (Haryana), A 6/7, First Floor, Vasant Vihar, New Delhi. E-mail: bbhushan986@gmail.com

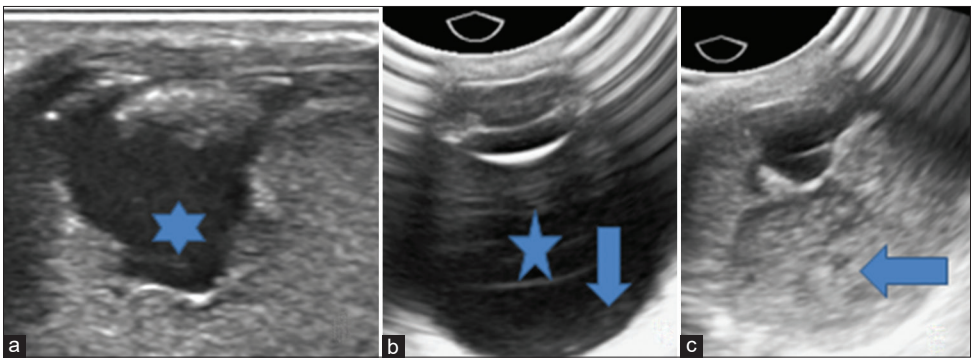

Figure 1: Ultrasound gray scale images. (a) High-frequency linear probe image shows anterior aspect of posterior chamber with undulating vitreous membrane behind the lens (star). (b) Transvaginal sector (TVS) high-frequency probe image shows normal fovea without any retinal detachment (inverted arrow). Vitreous is not showing echoes because of different gain setting (star). (c) TVS image shows the echogenic area within vitreous humor with detached margins (horizontal arrow)

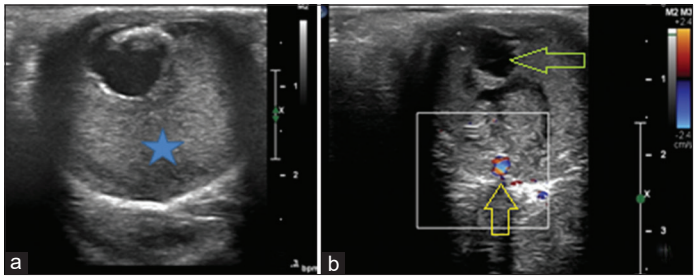

Figure 2: Ultrasonography images. (a) Gray scale image with high-frequency linear probe shows vitreous humor as echogenic region with coarse echoes suggestive of vitreous hemorrhage (star). (b) Custom factory integration image shows echolucent area next to lens (green arrow) and the normal vessels seen at the entry of optic nerve (yellow arrow)

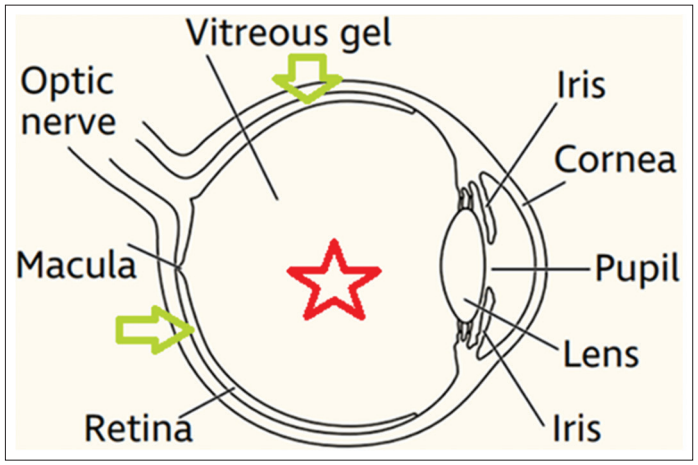

Figure 3: Diagrammatic presentation of vitreous body (red star) and the potential spaces around that (green arrows)

retina, trauma, and some other intraocular causes. Vitreous has got three strong attachments with the retina. The most important two are, one anterior at ora serrata and the other around the optic nerve (Figure 3). The hemorrhage can be caused by pulling or straining of surrounding retinal layer. Trauma remains the most common cause of vitreous hemorrhage as was in our case. The volume of the vitreous body is 4 cc and it forms 80% of the eye globe. Vitreous humor had 99% water and 1% of hyaluronic acid and collagen fibers. The avascular vitreous is inelastic in nature. It is important to understand the anatomical details of the vitreous body within the ocular globe before going into the depth of pathophysiology of vitreous hemorrhage.

VH can take place either in vitreous humor itself or in the spaces adjoining to that. The bleeding could be related to retinal detachment or tear or direct related to the vessels which bleed because of different etiologies. The vitreous body has got a different relationship to the surrounding areas: Posterolaterally, internal limiting membrane of the retina, anterolaterally, non-pigmented epithelium of the ciliary body, and anteriorly, lens zonular fibers with posterior lens capsule. The retrolental space of Erggelet, the canal of Petit, the canal of Cloquet, bursa premacularis, and the canal of Hannover are the most potential spaces for VH.

The common complications of VH are photoreceptor toxicity, floaters, glaucoma, and myopia in pediatric cases. Sometimes, retinal and vitreous hemorrhages are related to subarachnoid hemorrhage when this present as Terson syndrome named after a French ophthalmologist.[3] When the retina is still attached to the fovea, the VH is due to pre-retinal factors. The pure vitreous hemorrhage has got no definite borders except some papillary reaction is noticed. In case, if the eye can be examined, then the B-scan ultrasonography is required to be done to rule out retinal detachment. A fluorescent angiogram can also be performed to confirm it.[4-6]

Eales disease also shows a similar type of vitreous hemorrhage, but few other findings related to idiopathic obliterative vasculopathy.[7] Sometimes, the point-of-care ultrasound in the emergency department (ED) can show similar images of VH in the form of the echogenic area without distal acoustics. This happened in one case where a person had a 3-day history of worsening floaters in the left eye. In the case of eye movements, there is an increase in after movements giving classical "washing machine" appearance as seen in VH. After surgery, it was found to be a case of asteroid hyalosis without VH. This appearance is because of calcium phosphate and lipid deposits that could cause misdiagnosis [8]. CT and MRI are required to see the perforation, optic nerve avulsion, foreign body, tumors, and intraocular lens materials.[7]

Management depends on treating the causative factor. The patients can be monitored and managed as an outpatient in case

of isolated simple VH. The patient bed is slightly elevated to 30–45° toward the head side to counter the gravitational factors. Aspirin and anticoagulants are avoided. Surgical management is warranted when VH is associated with retinal detachment. Vitrectomy is also indicated for isolated VH cases for more than 3 months as was in our case. The surgery is also indicated when associated with hemolytic or ghost cell glaucoma. Mechemer performed the first pars plana vitrectomy for non-resolving VH and before this, it used to be open sky vitrectomy by Kesner.[9,10] In a few cases, VH can be prevented by the use of antivascular endothelial growth factors as preoperatively as shown in the study by Smith and Steel.[11]

CONCLUSION

Ocular ultrasound is a very useful tool for the diagnosis of VH and associated complications. This becomes still more important as direct ophthalmoscopy is not able to find out abnormality because of opaque passage. Sonography can also find out additional abnormalities as of retinal tear or detachment. The route map for the management becomes easier after the detection of VH by B-scan ultrasound. This is also helpful in the follow-up of post-management cases either by the medical or surgical maneuvers.

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