Case Report

Valsalva retinopathy with double ring sign: Laser membranotomy for twin bleeds

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Abstract

This report describes the case of a 27-year-old lady who presented with sudden decrease in vision in the right eye for one week. She was suffering from constipation and had a history of straining while passing stools. She was found to have two large sub-internal limiting membrane haemorrhages with the classical double ring sign, which were drained using laser membranotomy, following which her vision rapidly improved. This case of two sub-internal limiting membrane haemorrhages is reported for its rarity and also highlights the usefulness of laser hyaloidotomy or membranotomy in large haemorrhages of recent onset. The literature was also reviewed to discuss the other treatment options in brief.

Keywords: Valsalva retinopathy, Nd:YAG laser membranotomy, Nd:YAG laser hyaloidotomy, Double ring sign

Introduction

Valsalva retinopathy usually occurs as a result of increased venous pressure secondary to performing a Valsalva manoeuvre. It results when retinal capillaries rupture, most commonly at the perifoveal area. A Valsalva manoeuvre can result in the rupture of capillaries in extra macular areas too. The presentation is usually marked with a sudden drop in vision, floaters or even total loss of vision. Treatment modalities range from observation, laser membranotomy or hyaloidotomy to vitrectomy to remove clotted blood. We report a case of Valsalva retinopathy manifesting with two separate sub-internal limiting membrane (ILM) haemorrhages in one eye, which was successfully treated with Neodymium:Yttrium Aluminium Garnet (Nd:YAG) laser membranotomy. Valsalva retinopathy can manifest as a premacular haemorrhage alone or it can be coupled with blot or flame shaped haemorrhages elsewhere or even vitreous haemorrhage. In short, there can be more than one focus of involvement. However, this is the first case report of two large sub-ILM bleeds in one eye to the best of our knowledge.

Case report

A 27-year-old lady presented with sudden decrease in vision in the right eye for one week. She was suffering from constipation and had a history of straining while passing stools. There was no history of trauma, vascular diseases, blood dyscrasias or family history of the same.

The vision was counting fingers at two feet and 20/20 in the right and left eye respectively. Anterior segment examination was within normal limits in both eyes. On fundus examination, two localized haemorrhages were seen on the right (Fig. 1). There was a clear blood level seen in sitting position in both the localized haemorrhages. There was no yellowish discolouration suggestive of clotting and dehaemoglobinization in long standing haemorrhages. The macular haemorrhage was located one disc diameter (DD) temporal to the optic disc. The width and height were five DD and six DD approximately. The second haemorrhage was located one DD nasal to the optic disc with a width and height of 3.5 DD each approximately. Both the haemorrhages had the classical double ring sign. Left eye fundus did...
not have any haemorrhage. Fluorescein angiography did not reveal any pathology other than the haemorrhage (Fig. 2).

After establishing that she did not have any systemic diseases or blood dyscrasias, she underwent Nd:YAG laser membranotomy (Fig. 3) aimed at the lower part of the collection with an Ocular® (2255 116th Ave NE, Bellevue, WA 98004) Mainster 165 laser lens. Two laser shots were given to each bleed, with a single burst energy setting of 5 mJ. After the membranotomy, blood was seen trickling inferiorly from the localized collection into the vitreous. The resulting mild vitreous haemorrhage cleared up rapidly. Her visual acuity improved to 20/30 after ten days which stabilized thereafter. She was cautioned not to strain while passing stools and was advised stool softeners and adequate fibre containing foods. She remains asymptomatic for the last 9 months.

Discussion

Valsalva haemorrhagic retinopathy was described first by Duane as a pre-retinal haemorrhage secondary to raised intra-thoracic pressure. Increase in intrathoracic pressure results in decreased venous return. This leads to build up of pressure in the peripheral blood vessels. Rupture of retinal capillaries due to such increase in vascular pressure is thought to cause the bleeding in Valsalva retinopathy. It can be bilateral but unilateral presentation is more common. Individuals with diabetes, hypertension, idiopathic thrombocytopenic purpura, history of ocular venous occlusions and bleeding diathesis are at a higher risk of developing this condition.

The blood is usually localized to the sub-ILM space and/or the sub-hyaloid space. If blood is trapped in both spaces, it presents a “double-ring sign”. The outer and inner rings represent subhyaloid and sub-ILM bleed respectively. Patients should be advised to avoid straining and stop anticoagulant use if possible. Stool softeners can also be advocated if constipation is an issue.

There are multiple treatment modalities for Valsalva haemorrhagic retinopathy. Smaller bleeds are more likely to resolve spontaneously over time. Though there are reports of larger bleeds resolving spontaneously over time, some persist without resolution leading to clotting and likely photoreceptor toxicity. If the patient is one-eyed or if there is a need to resume work soon, laser membranotomy/hyaloidotomy is a good choice, especially in case of larger bleeds of less than 3 weeks duration. However, it can be tried successfully in bleeds that were 6 weeks old, provided there are no signs of clotting and dehaemoglobinization. This modality of treatment can also avoid a vitrectomy in case of the blood clots and does not resolve spontaneously. Another danger of prolonged observation is toxicity to photoreceptors which can cause irreversible damage.

Nd:YAG photodisruptive laser was used in this case. After placing a fundus contact laser lens, the laser beam is aimed at the lower dependent part of the collection, away from the fovea, keeping in mind that the image seen through the lens may be inverted, depending on the lens used. Single burst mode is preferred, starting with an energy setting of 2–2.5 mJ. Presence of cataract, vitreous haemorrhage or other media opacities will require higher energy settings. Up to 50 mJ has been used safely. That being said, higher energy settings have a higher probability of causing retinal or choroidal trauma, inflammation and lens or implant trauma. It is safer to consider bleeds of at least 3 disc diameters for Nd:YAG laser as these will provide a cushioning effect preventing retinal damage due to the photodisruptive laser.

Frequency doubled Nd:YAG laser has also been used widely for hyaloidotomy or membranotomy utilizing the property of photoacoagulation. Good results are observed

Figure 1. Two localized bleeds with the classical double ring sign: the outer ring represents subhyaloid bleed (black arrows) and the inner one sub-internal limiting membrane (ILM) bleed (white arrows).

Figure 2. (A) Fluorescein angiography showing no evidence of other pathology. The blocked fluorescence is due to haemorrhage. (B) The haze is due to the vitreous haemorrhage which resulted after the laser membranotomy.
with the stretch technique described by Puthalath et al. in which two stretch burns are placed initially followed by a penetration burn between the initial burns. There is a higher chance of penetration as the intervening membrane is made taut by the stretch burns.¹¹

After Nd:YAG membranotomy, there is a small risk of epiretinal membrane formation and pre-macular cavity formation which can cause metamorphopsia.⁵ However, epiretinal membrane can be caused as a long-term complication of preretinal haemorrhage itself. Another report stated that laser membranotomy was safe as it caused only localized ILM thickening which did not result in any adverse symptoms.⁷

Surgical treatment may be required if blood clots in case of non-resolving haemorrhages.

In summary, we report a case of Valsalva retinopathy which manifested as two large sub-ILM haemorrhages which were treated by Nd:YAG laser membranotomy. Nd:YAG laser is a safe modality of treatment in such large haemorrhages of recent onset as it can lead to rapid improvement vision which is gratifying to the patient and the ophthalmologist.

Conflict of interest

The authors declared that there is no conflict of interest.

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Figure 3. Fundus photograph after YAG membranotomy; the macular bleed has almost cleared up. The haemorrhage nasal to the disc is emanating from the membranotomy. Note that the subhyaloid haemorrhage (the outer ring of hemorrhage) has not cleared up.