Case Report
Nd: YAG laser puncture for spontaneous premacular hemorrhage

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Abstract: Herein we report a clinical case of premacular hemorrhage treated with neodymium-doped yttrium aluminum garnet (Nd: YAG laser puncture). A 34-year-old Chinese female was administrated to the clinics with complaints of sudden vision loss of left eye (LE) several days before. The best-corrected visual acuity (BCVA) was reduced to light perception. Fundoscopy showed a large and dense premacular hemorrhage. Nd: YAG laser puncture was performed to drain the hemorrhage into the vitreous. The premacular hemorrhage cleared in about 2 weeks and the BCVA recovered to 20/20. Nd: YAG laser puncture for treating premacular hemorrhage is safe and effective.

Keywords: Nd, YAG, laser puncture, premacular hemorrhage

Introduction

Premacular hemorrhage is relatively rare in clinical practices. If the amount of bleeding is not very high and the macular function is not affected, only clinical observation is needed. The causes of bleeding are mainly associated with Valsalva retinopathy, Terson syndrome, retinal vein occlusion, hemangioma, hemopathy, trauma, and diabetic retinopathy, especially Valsalva retinopathy [1, 2].

Preretinal hemorrhage includes subhyaloid hemorrhage and internal limiting membrane (ILM) hemorrhage. The location of the bleeding is between the posterior vitreous cortex (PVC) and ILM. The ocular fundus examination of the ILM hemorrhage shows a clear hemisphere or an oval-shaped hematoma, and the ILM at the surface of the bleeding is generally with light reflection. The optical coherence tomographic (OCT) scanning of the bleeding plane shows that the ILM is the high-reflection zone of the bleeding surface, while the reflectivity of the PVC is lower than that of the ILM [3].

The clinical presentations of most patients are acute sudden vision loss and visual shadow. The absorption of the sudden premacular hemorrhage is generally slow, the bleeding is generally dense, and the deposition of the blood gradually increases, breaking through the ILM into the vitreous body in most cases. Old hemorrhage causes irreversible damages to the retinal pigment epithelium and thus results in severe visual damages.

The currently used treatment methods for premacular hemorrhage mainly include clinical follow-up, pars plana vitrectomy [1], intravitreal gas injection [4], and argon laser or neodymium-doped yttrium aluminum garnet (Nd: YAG) laser [5, 6].

The present case underwent laser therapy at 2 weeks after the disease onset. Nd: YAG laser puncture was performed to drain the early premacular hemorrhage, and then the patient was followed up for 3 months. The treatment effectiveness was satisfactory, and the vision of the patient recovered.

Case report

A 34-year-old Chinese female patient was admitted to the emergency department with complaints of sudden loss of vision in her left eye (LE) 1 day earlier. The patient was usually in good health without hypertension and diabetic history. The best-corrected visual acuity (BCVA) in the LE was reduced to light perception, and it was 20/20 in the right eye. The fun-
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discoscopic examination of the LE and OCT (Figure 7) evidenced a large and dense hemorrhage (Figure 1). An Nd: YAG laser puncture was performed to drain the hemorrhage into the vitreous cavity after 2 weeks of observation (power: 3-5 mj, burst mode: single point). The blood instantaneously moved toward the bottom of the vitreous cavity (Figures 2 and 3). The intravitreal hemorrhage cleared in about 2 weeks (Figure 4). A fluorescein angiography (Figures 5, 6) was performed, which revealed no major alterations, but only OCT (Figure 8) showed a traction band before the retina. A systemic medical examination was performed to rule out other predisposing factors such as diabetes and coagulation disorders. After 3 months, the BCVA of the LE was 20/20, and the funduscopy examination did not reveal signs of hemorrhage.

This study was approved ethically by XXX Hospital. Written informed consent was obtained from the patient for publication of this Case report and any accompanying images.

Discussion

Spontaneous or idiopathic premacular hemorrhage with unknown causes has been rarely...
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reported in previous studies except for several case reports [7].

The patient reported in this study was with stable and regular life styles, and was without breath holding, cough, or sneeze that could increase the intrathoracic or intra-abdominal pressure. The physical examinations of this patient showed normal results. The blood routine, coagulation routine, liver function, and renal function tests were also found normal. However, physical exercise before the disease onset was reported, and the patient was still diagnosed with Valsalva retinopathy. Previous studies have reported that a small amount of preretinal hemorrhage could be absorbed spontaneously, and only clinical observation is required in this case. However, for patients with relatively large amount of bleeding as in the present case (about 5 PD and was not absorbed within 2 weeks), the stimulation from the deposition of the blood and the metabolites could induce glial cell proliferation and cause epiretinal membrane, traction, macular lesion [8], and vision loss. The present patient was treated with an Nd: YAG laser puncture to drain the hemorrhage into the PVC or ILM, and the vision of the patient increased immediately and reached to nearly 20/20 on the second day. The present case was young and with no underlying ocular disease or systemic disease; therefore, the outcome was very good in the follow-up.

However, ILM staining and pathological examinations during the operation are still needed to clarify the exact position of the bleeding. Previous studies have reported that the positions of bleeding in both Valsalva retinopathy and Terson syndrome are under the ILM [5]. However, the position of the bleeding, which is at the PVC or ILM, could not be exactly determined at an early stage. Therefore, using Nd: YAG laser treatment to treat retinopathy is with some risks. Thus, the Nd: YAG laser is suitable only for patients with early stage of bleeding and high compliance.

For patients with a large amount of prolonged bleeding in which the vision is severely affected, vitrectomy is still one of the treatment choices. Vitrectomy could accurately determine the bleeding site on the retina, and thus resect the bleeding lesion to increase the vision [9]. However, this treatment is still with some risks of developing retinal operation-related complications.

Causes of bleeding, emission energy of the laser, amount of bleeding, and possibility of blood absorption should also be considered in future treatments. The present patient is still followed up; the vision of the patient is stable, and no further treatment is required.

Disclosure of conflict of interest

None.

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Macular thickness: Macular cube 512x128

Figure 7. Optical coherence tomography (OCT) image of the patient before the laser treatment.

References


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Figure 8. Optical coherence tomography (OCT) image of the patient 1 week after the laser treatment.