Case report

ND:YAG laser for preretinal hemorrhage in diabetic retinopathy

Dimitrios Karagiannis\textsuperscript{a,}, Georgios A. Kontadakis\textsuperscript{a,b,}\textsuperscript{*}, Declan Flanagan\textsuperscript{b}

\textsuperscript{a} Ophthalmic Eye Hospital of Athens, Athens, Greece
\textsuperscript{b} Moorfields Eye Hospital NHS Foundation Trust, London, United Kingdom

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\textbf{ABSTRACT}

\textbf{Purpose:} To present fundus images of a case with severe preretinal hemorrhage in diabetic retinopathy that was treated with posterior hyaloidotomy with an Nd:YAG laser.

\textbf{Observations:} A 35-year-old diabetic patient presented with sudden painless loss of vision due to severe preretinal hemorrhage over the macular area and high risk proliferative diabetic retinopathy. Her visual acuity was counting fingers. Posterior hyaloid face was treated with Nd:YAG laser (posterior hyaloidotomy). Panretinal laser photocoagulation was first performed to control the proliferative diabetic retinopathy. Blood drained inferioerly into the vitreous cavity with clearance of the premacular area.

\textbf{Conclusions and importance:} Prompt treatment with Panretinal laser photocoagulation followed by posterior hyaloidotomy with the YAG laser is a viable option in order to avoid further proliferative diabetic retinopathy complications and vision loss. The current image clearly depicts treatment efficacy.

1. Case report

A 35-year-old female patient presented with sudden painless loss of vision, since 24 hours, in her right eye. The patient had a long history of type 1 diabetes mellitus. The rest of her medical history was unremarkable. Her visual acuity was counting fingers in her right eye and 20/30 in her left eye. Slit lamp examination of the anterior segment was unremarkable in both eyes. Fundoscopy revealed an extensive preretinal hemorrhage in the right eye covering the macular area (Fig. 1A). In addition, there was high risk proliferative diabetic retinopathy in both eyes with neovascularization greater than half disk area. The preretinal hemorrhage was caused by a partial posterior vitreous detachment resulting in blood accumulation between the detaching vitreous and the retina.\textsuperscript{1} Panretinal laser photocoagulation (PRP) was first performed, in order to regress the new vessels (Fig. 1B, black arrows).\textsuperscript{2} Within a few minutes after PRP, a posterior hyaloidotomy was subsequently performed with an Nd:YAG laser to perforate the posterior hyaloid face, allowing the blood to drain inferioerly (Fig. 1B, white arrows and Fig. 1C, white arrows) and clear the visual axis, which lead to a rapid improvement in central vision (Fig. 1C).\textsuperscript{3,4} For the YAG laser hyaloidotomy the central lens of a 3-mirror Goldman lens was used focusing the inferior part of the hemorrhage with laser pulse energy of 4.5 mJ. The visual acuity improved within hours to 20/25 and fluctuated within the next weeks until the hemorrhage had been completely absorbed from the vitreous cavity.

2. Discussion

Preretinal hemorrhage is a known complication of diabetic retinopathy.\textsuperscript{1} Typically patients present with painless loss of vision due to the blood accumulation in the premacular area between the retina and posterior hyaloid face, or under the internal limiting membrane.\textsuperscript{1,3} Preretinal hemorrhage is typically caused by bleeding of the new vessels due to traction from the posterior hyaloid. Other causes of preretinal hemorrhage, which usually occur in young patients, include valsava retinopathy, vein occlusion, retinal macroaneurysm and others.\textsuperscript{1,3,4} Upon presentation of a patient with a preretinal hemorrhage, it is very important to identify the underlying cause in order to proceed to effective treatment.

If left untreated, preretinal hemorrhage may take months to be absorbed, and additionally, may leave permanent tissue damage such as retinal fibrosis. Consequently, if hemorrhage involves the premacular area it is essential to treat as soon as possible. YAG laser hyaloidotomy is an effective treatment for recent (within the first days) premacular subhyaloid hemorrhage and a safe alternative to pars plana vitrectomy. Blood is drained into the vitreous cavity, where it may be left to be absorbed within the next weeks without causing any other complications.

Albeit safe and effective, the procedure has some limitations. Most importantly, it has to be performed within the first week of the event of the hemorrhage. It is of great importance to be accurate and be performed in the lower part of the hemorrhage and as far as possible from
the fovea to avoid any damage in this particular area, and also away from major blood vessels. Additionally, drainage should be attempted from a location where there is significant hemorrhagic elevation. Complications have been described in the literature such as epiretinal membrane and macular hole formation and retinal detachment, but complications might have been related to the underlying cause of the hemorrhage. Pars plana vitrectomy has been employed for cases that did not resolve and cases with persistent intravitreal hemorrhage.4,5 ND:YAG laser hyaloidotomy has been used before for preretinal hemorrhage from other underlying causes apart from PDR. The efficacy of the procedure and the improvement of visual acuity largely depended on the underlying cause of the hemorrhage. Such conditions reported are leukemic retinopathy, Eales' disease, Valsalva Retinopathy, Terson’s Syndrome, Macroneurysm, High Altitude Retinopathy.4,5

3. Conclusion

In our case the underlying cause of the preretinal hemorrhage was high risk proliferative diabetic retinopathy (PDR). Such cases should be treated promptly with PRP in order to avoid further PDR complications and vision loss. Presence of hemorrhage in the vitreous cavity may obstruct visibility of the peripheral retina which is required to perform PRP. Consequently, as demonstrated in the current case, it is essential to perform the PRP before the Nd:YAG laser hyaloidotomy as the intravitreal hemorrhage may prevent effective photocoagulation.

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Conflicts of interest

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Authorship

All authors attest that they meet the current ICMJE criteria for Authorship.

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