

Efficacious Outcome of Peripheral Retinal Laser Photocoagulation to Severe Non-Proliferative Diabetic Retinopathy in Young-onset Type 1 Diabetic Mellitus: A Case Report

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Abstract

The rising prevalence of childhood type 1 diabetes and type 2 diabetes increases the number of children and adolescents at risk of visual loss due to the presence of diabetic retinopathy (DR). We report herein a case of a young adult who presented to the emergency department with sudden vision loss in both eyes. She had been diagnosed with type 1 diabetes mellitus (T1DM) five years ago. Patient with severe NPDR was monitored using OCT (optical coherence tomography) which revealed peripapillary cotton wool spots, intraretinal haemorrhages, and retinal microaneurysms (MA). The patient was urgently hospitalized and prescribed to be under insulin therapy. DR was developed and progressed to severe NPDR. The investigation continued through multiple OCTs. Finally, she was prescribed to be under laser therapy with multiple sessions of PRP (Peripheral Retinal laser Photocoagulation). Subsequently, the macular edema resolved and the patient was satisfied with her vision after six sessions of PRP. Literature collected from various countries stated that diabetic retinopathy can be successfully treated with laser therapy. We discuss the importance of recognizing and treating the patient with laser therapy. There is a need for further research on laser therapy in NPDR among young-onset diabetic mellitus.

Keywords: Diabetes Mellitus, Diabetic Retinopathy, Laser Photocoagulation, Laser Therapy, Non-Proliferative Diabetic Retinopathy, Young-onset.

Introduction

Diabetes mellitus (DM) is a progressive disease that leads to cataracts and diabetic retinopathy (DR) which has severe complications. The rising prevalence of childhood type 1 and type 2 diabetes increases the number of children and adolescents at risk of visual loss [1]. In 2014, 8.5% of adults aged 18 years and older had diabetes. In 2017, there were 9 million people with type 1 diabetes; the majority of them lived in high-income countries. In 2019, diabetes was the direct

cause of 1.5 million deaths and 48% of all deaths due to diabetes [2]. The major cause of visual impairment and blindness is due to the presence of proliferative diabetic retinopathy (PDR). Patients with severe non-proliferative diabetic retinopathy (NPDR) are monitored using both OCT and Fundus fluorescein angiography (FFA). These patients have intraretinal haemorrhages (> 20 in each quadrant), and venous bleeding in two or more quadrants [3]. Laser (Light Amplification by Stimulated Emission of Radiation) therapy is

utilized widely in all fields of medicine, particularly in the treatment of retinal vascular diseases. Laser photocoagulation remains the gold-standard therapy for the effective, definitive treatment of PDR [4]. However, the screening guidelines have remained poor, particularly concerning as adolescents diagnosed with T2DM have a higher risk compared to T1DM for developing earlier onset PDR [5]. Although many studies have evaluated the prevalence of DR, few have specifically characterized patients' disease severity and visual outcomes [6]. We report herein a case of efficacious outcome of clinical Laser therapy to severe non-proliferative diabetic retinopathy (NPDR) in a young-onset diabetic mellitus who presented with multiple diabetic complications.

Case Report

A 19-year-old young adult presented to the emergency department in a tertiary care hospital in Chennai, India, with the sudden onset of painless vision loss in both eyes associated with bilateral lower-extremity weakness, she had been diagnosed with type 1 diabetes mellitus (T1DM) five years ago. She did not have DR at the baseline. Oral hypoglycemic agents were prescribed for her to prevent the disease. In the 1st and 2nd monitoring before one year, the disease progression was under control. There was no history of trauma or family history of autoimmune, neurological, or ophthalmological conditions. The patient was urgently hospitalized and prescribed to be under insulin therapy. DR was developed and progressed to severe NPDR. The investigation continued through OCT. Fig. 1 shows the average thickening of the right eye (OD).

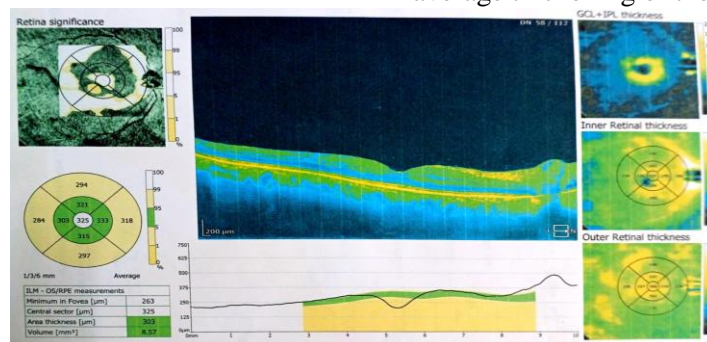


Figure 1. OCT Shows the Average Thickening in the Right Eye and Macular View of the Right Eye

The thickening of the left eye (OS) has been increased, and the macular oedema, retinal haemorrhage and retinal inflammation can be seen in Fig 2. It also shows the start of vision loss in the young adult. OCT revealed peri-

papillary cotton wool spots, intraretinal haemorrhages, and retinal microaneurysms (MA). Finally, she was prescribed to be under laser therapy PRP.

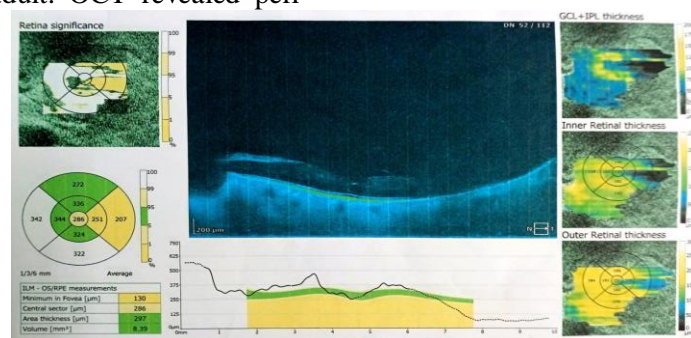


Figure 2. OCT- The Average Thickening in the Left Eye and Macular View in the Left Eye

Laser therapy is utilized widely in all fields of medicine, particularly in DR. PRP was highly effective and reduced the risk of severe visual loss by 60% at many treatment sessions. It is usually carried out in areas of hypoxia, areas that are supplied with less oxygen in the periphery of the retina. Data regarding the patient's age, gender, duration of diabetes mellitus, age at onset of diabetes mellitus, presence or absence of hypertension, use of insulin or oral hypoglycemic agents, presence of other systemic diabetic complications, and other general illnesses were collected before laser therapy. The condition was explained to

the patient and informed consent was obtained for PRP.

An initial laser treatment followed by multiple sessions of PRP was performed in both eyes for three months at equal intervals. Subsequently, the macular oedema resolved (Fig. 3 & 4). The patient was satisfied with her vision after six sessions of PRP. OCT images showed the gradual disappearance of DME. After four laser therapy, the areas of retinal capillary non-perfusion appeared to have stabilized. The foveal avascular zone became more visible in Fig 3. Moreover, fig 4 revealed the disappearance of numerous microaneurysms in the eye.

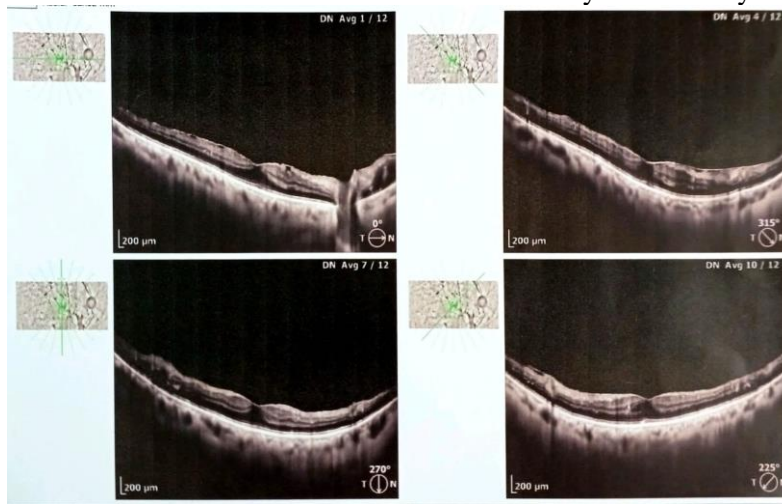


Figure 3. OCT Photographs of Right Eye in a 19-year-old Diabetic Female with Non-proliferative Diabetic Retinopathy. These images 2 Months After Presentation Showed Resolution of Macular Edema in the Right Eye

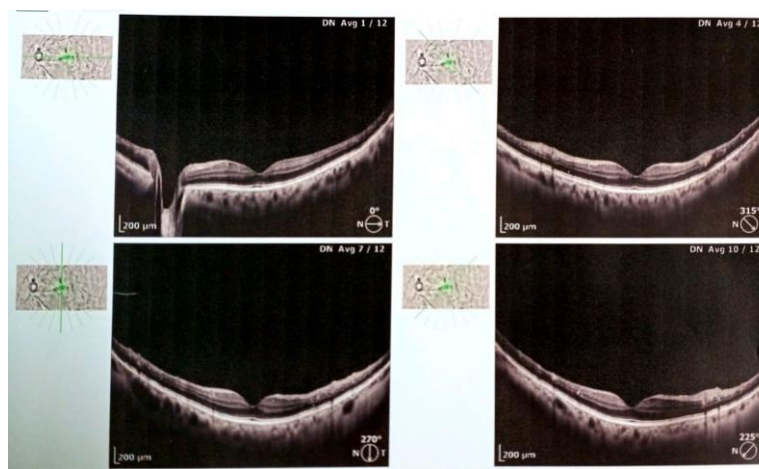


Figure 4. OCT Photographs of Left Eye in a 19-year-old Diabetic Female with Non-proliferative Diabetic Retinopathy. These images 2 Months After Presentation Showed Resolution of Macular Edema in the Left Eye

Discussion

Angela et al analysed a 19-year-old diabetic Hispanic male with a history of cataracts and toe amputations presented with a sudden onset of painless bilateral vision loss for 1 week [7]. He received a single intravitreal anti-vascular endothelial growth factor injection in the left eye for persistent macular oedema. Although his retinal oedema improved, his visual acuity remained poor [7]. A report stated in Iran about 52 years 52-year-old male driver who had been diagnosed with type 2 diabetes mellitus (T2DM) five years ago without diabetic retinopathy at the baseline. He was diagnosed with proliferative retinopathy; and lost his vision in the left eye within a year. In this case, occupational stress resulting from the type of profession has played an important role in the progression of proliferative retinopathy [8]. Florid diabetic retinopathy (FDR) is characterized by proliferative diabetic retinopathy in a young patient, with predilection for females, bilateral affliction and a rapid course which may lead to blindness in a short time [9]. The condition is usually exacerbated by poor metabolic control, as stated by many studies [10].

In a nutshell, this case report demonstrates the efficacious laser therapy in a patient who experienced severe NPDR [11]. Many recent studies also stated that different types of laser

therapy are greatly effective in NPDR among young adults. Pathological diagnosis shows that further studies and more data are required on combination laser therapy treatment procedures of DR in younger adults [12]. In summary, severe NPDR is an aggressive presentation of diabetic retinopathy; therefore, all young diabetics should be screened as soon as possible [13]. These patients need to be closely monitored to identify the condition at its inception [14]. Once NPDR develops, the patient needs to be treated aggressively with laser photocoagulation and possibly vitrectomy.

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Conflicts of Interest

The authors declare no conflict of interest or otherwise.

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