



Micro-pulse Diode Laser Transcleral Cyclophotocoagulation- A Rescue in Therapeutic Exhaustion

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Abstract

Essential iris atrophy (EIA) is one of the most common irido-corneal endothelial syndromes, predominantly characterised by progressive iris stromal atrophy leading to iris hole formation and secondary glaucoma. Predominantly unilateral in affection, glaucoma is refractory to both medical and surgical management. We hereby report a rare case of association of EIA with primary open angle glaucoma (POAG). Glaucoma progressed with the maximum medical treatment and surgical intervention. Micro-pulse diode laser transcleral cyclophotocoagulation (MP-TSCPC) proves effective in control of intra-ocular pressure (IOP) in refractory glaucomas, especially in eyes with good central vision.

Keywords: Essential Iris Atrophy; Irido-corneal Endothelial Syndrome; Primary Open Angle Glaucoma; Micro-pulse Diode Laser Transcleral Cyclophotocoagulation

Introduction

Progressive or Essential iris atrophy (EIA) is the most common irido-corneal endothelial syndrome (ICE) in Indian eyes [1]. The basic pathology lies in the corneal endothelium, which proliferates and migrates across the anterior chamber angle and on to the anterior surface of the iris. Contraction of this membrane leads to iris changes, peripheral anterior synechiae (PAS) and secondary glaucoma [2]. We hereby, report a rare case of EIA in association with POAG.

Case Report

A 43yr old gentleman presented to us in way back 2009 as a known case of primary open angle glaucoma in both his eyes since ten years and was on a single anti glaucoma medication (AGM) in both the eyes. He gave history of both the parents diagnosed and being treated for Glaucoma Best corrected visual acuity (BCVA)

was 20/20 in both the eyes. Slit lamp examination showed normal anterior segment in his right eye, while his left eye showed a clear cornea with PAS at six O'clock position. Gonioscopy revealed open angles (Shaffers grade 3) in all the quadrants in his right eye and all but inferior quadrant in his left eye, where there was evidence of PAS. However, there was no evidence of iris atrophy in any of his eyes. Fundus examination revealed cup-disc ratio of 0.7 with vertically oval cup in his right eye and 0.8 vertically oval cup with a notch superiorly in his left eye. Goldmann applanation tonometry (GAT) and Pachymetry measured 18 mm Hg and 461μ respectively in his right eye, while it was 16 mm Hg and 456μ in the left. Humphrey's visual field analysis (HFA) (24-2 SITA standard) was normal in his right eye, while in the left eye, there was early inferior arcuate scotoma. Patient was advised an add-on AGM in his left eye.

Patient was lost to follow-up for three years. In the subsequent visits, there was progressive iris atrophy and increase in PAS in his

left eye. Optic disc changes and field defects progressed in both his eyes (Figure 1), until maximum AGM controlled the disease in his right eye. The patient underwent trabeculectomy with Ologen implant in his left eye (Figure 2a and 2b). When failed to control the intra-ocular pressure (IOP) with maximum add on AGM, 18 months after the trabeculectomy, he underwent Glaucoma drainage device (GDD) implantation [Ahmed glaucoma valve FP7 implantation with tube inserted into pars plana] with pars-plana vitrectomy (Figure 2c and 2d) and subsequently, was operated for cataract in his left eye.

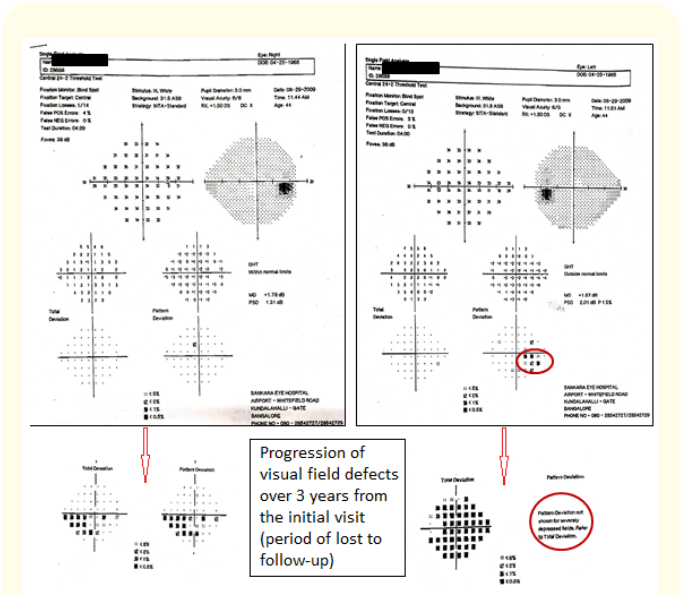


Figure 1: Visual field report suggestive of progression of field defects in both the eyes.

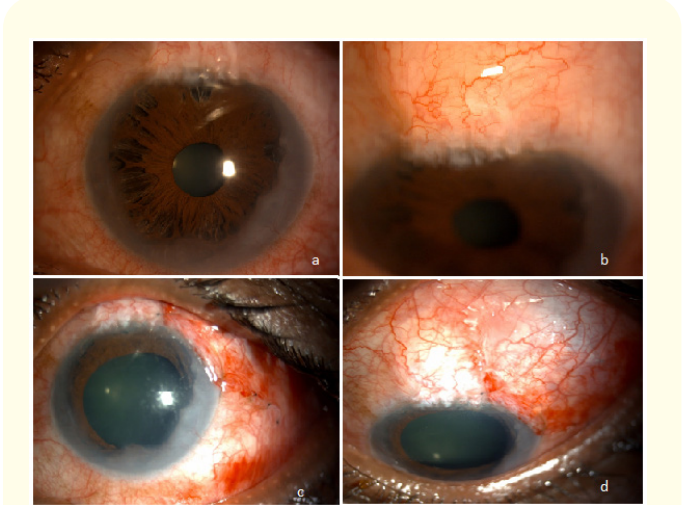


Figure 2: a, b Slit-lamp photographs of patient's left eye showing trabeculectomy bleb. Iris atrophic patches with PAS is evident in the picture. c, d Slit-lamp photographs of patient's left eye following AGV implantation with tube in pars-plana.

Twenty seven visits, three surgeries, ten years down the line, his BCVA was 20/20 and 20/30 in his right and left eye eyes respectively. IOP was maintained at low teens with stable visual fields in his right eye, while in his left eye, glaucoma worsened with uncontrolled IOP. IOP in his left eye was around 23 mm Hg in spite of three add-on AGM. Patient underwent MP-TSCPC [New CYCLO G6™ Glaucoma Laser System, IRIDEX] with MP3 probe in his left eye (Figure 3) for controlling IOP. Under peribulbar block, with a sweeping motion, laser was delivered in the inferior and nasal quadrants. 2W power was delivered for 90 seconds, with a duty cycle of 31.3%. All the three AGM were continued post MP-CPC. Over a period of next three months, the patient's IOP gradually decreased, and so did the number of AGM. It's been eight months since the patient underwent MP-CPC, and his IOP has been maintained at 10mmHg with a single AGM (Figure 4). Patient is doing well with a BCVA of 20/30 and a stable visual field.

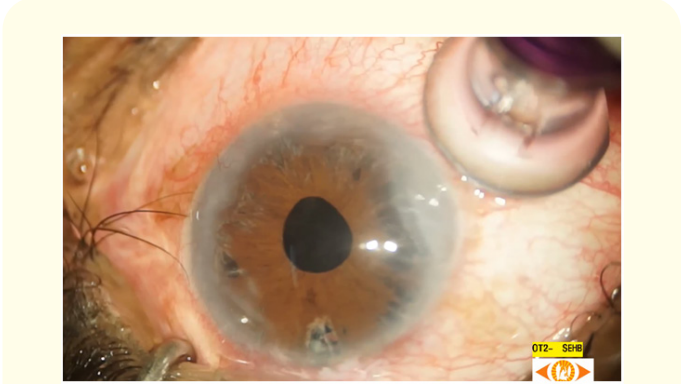


Figure 3: Colour photograph showing micro-pulse laser delivery in patient's left eye.

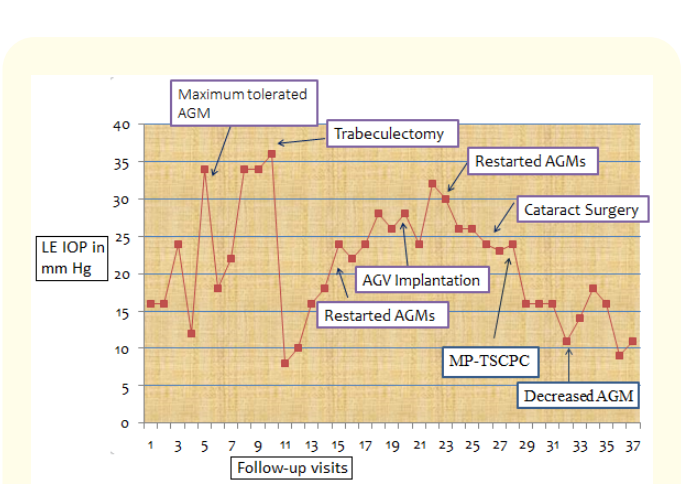


Figure 4: Line diagram depicting IOP fluctuations in patient's left eye during the course of treatment.

Discussion

The first clear description of progressive or essential iris atrophy (EIA) is generally credited to Harms in 1903 [3]. The term EIA is used when there is predominant iris involvement in the form of extensive iris stromal atrophy and hole formation [4]. Though our patient presented to us with bilateral POAG, over the years developed features of EIA and secondary angle closure component in his left eye. Chandran P, *et al.* showed that 52% of their patients with ICE syndrome had EIA, and 90% of them had uniocular disease [1]. It has been reported that 46% - 82% of patients of ICE syndrome develop secondary glaucoma [5,6]. Though familial cases are rare in EIA [5,6], our patient had both his parents on medical treatment for glaucoma. However, we could not get to examine them to ascertain the type of glaucoma.

Though right eye responded to the medical management, IOP in left eye could not be controlled with maximum tolerable AGM, owing to progressive iris atrophy with PAS formation. Glaucoma in ICE syndrome responds poorly to medical management (50%) [7] more so, if associated with EIA [1]. Filtering surgery and GDD failed to control IOP in our patient. IOP in his left eye was around 23mmHg even with maximum add-on AGM. It has been shown that trabeculectomy yields 3- and 5-year survival rates of only 44% and 29% respectively and it is 71% and 53% with GDD in ICE syndrome [8]. Chandran P, *et al.* documented in their study that 27% required a second, 7% a third, 4% a fourth and 1% required a fifth surgical procedure to control the IOP in patients with EIA [1].

It was a situation of therapeutic exhaustion, where all possible anti-glaucoma methods failed to control IOP in this young gentleman. Cyclodestructive therapy was the last available option. But maintenance of the central vision and anatomical integrity of his eye was of concern. Studies have shown a significant decrease in BCVA in up to 33% of the patients following transcleral diode laser cyclophotocoagulation [9]. In contrast, researchers have shown MP-TSCPC as an effective and safe treatment option in patients with refractory glaucoma, especially with good visual potential [10]. Micro-pulse technology finely controls the thermal elevation by chopping a continuous wave laser beam into a train of repetitive short pulses allowing tissue to cool between pulses and reduce thermal buildup preventing visible tissue damage. The procedure has also been said to be potentially repeatable with no evidence of anatomical tissue destruction [11]. The patient underwent MP-TSCPC as a desperate remedy to control IOP in his left eye. With the

maintenance of IOP, the number of AGM were also decreased from three to one. IOP in his left eye has been maintained around 10 mmHg, with a single AGM, the value which was never seen during the entire course of his treatment.

Conclusion

EIA can rarely be associated with the primary open angle glaucoma, apart from the well-known secondary glaucomas. Many a time these glaucomas are refractory to the medical management and multiple surgical interventions may be required to maintain the IOP. MP-TSCPC proves effective in control of IOP in such cases of refractory glaucoma, maintaining the anatomical integrity and visual potential.

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