



Case report

Detection of the progression of retinal nerve fiber layer loss by optical coherence tomography in a patient with glaucomatocyclitic crisis



Jen-Chia Tsai*

Department of Ophthalmology, Kaohsiung Chang Gung Memorial Hospital and Chang Gung University College of Medicine, Kaohsiung, Taiwan

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ABSTRACT

A 30-year-old man presented with glaucomatocyclitic crisis, also known as Posner–Schlossman syndrome, and acute intraocular pressure elevation. Changes in the longitudinal retinal nerve fiber layer (RNFL) and the cup-to-disc (C/D) ratio of the optic disc were detected by Stratus optical coherence tomography (OCT). The average RNFL thickness in the affected eye was greater than that in the unaffected eye on Day 3 (132.99 μm , C/D ratio: 0.24 vs. 105 μm , C/D ratio: 0.26). However, the RNFL thickness continued to decrease and the C/D ratio progressively increased in the affected eye over 12 months (60 μm , C/D ratio: 0.67), although the intraocular pressure was controlled at <21 mmHg during that period. Glaucomatous visual field defects were also found. A progressive decrease in the thickness of the RNFL was demonstrated by Stratus optical coherence tomography following an elevation in the acute intraocular pressure in the patient. Prompt treatment and longitudinal monitoring are necessary to prevent and detect glaucomatous damage.

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1. Introduction

Glaucomatocyclitic crisis, also known as Posner–Schlossman syndrome, is a unilateral, benign ocular disease that is characterized by a mild anterior chamber reaction accompanied by an increase in intraocular pressure (IOP) with open angles. It is often self-limiting and can be recurrent. However, the etiology is controversial.^{1,2} Some patients have been known to develop glaucoma-related visual field defects as a result of repeated episodes of glaucomatocyclitic crisis.^{3,4}

Using Stratus optical coherence tomography (OCT), we conducted a longitudinal evaluation of the thickness of the retinal nerve fiber layer (RNFL) and the cup-to-disc (C/D) area ratio of the optic disc in a patient with glaucomatocyclitic crisis. We examined the differences in these parameters at the acute and remission stages of the disease.

2. Case report

A 30-year-old man presented with decreased vision in his right eye (OD) for 2 days. He had no history of systemic disease but had experienced a similar episode (OD) 1 year previously. During the

first episode, the patient received treatment and had since been in a stable condition. Ocular examination of the OD revealed mild epithelial edema of the cornea, a few fine keratic precipitates, few aqueous cells, and little flare. The IOP was 46 mmHg with a hypopygmented open angle. The vitreous was clear, the retina was normal, and the optic disc exhibited mild hyperemia. The left eye (OS) had no abnormalities, and the IOP was 15 mmHg. The best-corrected visual acuity was 20/20 (OU) with myopia of -0.5 diopters (OU). Color sensation and pupil response were normal (OU).

All laboratory data were normal, including antinuclear antibodies, rheumatoid factor, venereal disease research laboratory test, HLA-B27, and chest radiograph. Therefore, the patient was diagnosed with glaucomatocyclitic crisis.^{1–3}

Following treatment with oral acetazolamide, topical 2% carteolol, and 1% prednisolone acetate solution, the IOP decreased to 12 mmHg (OD). The IOP was maintained at <15 mmHg (OU) with topical 2% carteolol solution (OD). Follow up was performed every month over a period of 12 months. The patient did not experience any repeat attacks during the 12-month follow-up period.

The thickness of the peripapillary RNFL and the C/D ratio were automatically calculated using the fast RNFL thickness protocol (3.4), and the optic disc parameters using a Stratus OCT 3000 (Version 4.0.2; Carl Zeiss Meditec, Inc., Dublin, CA, USA). High-quality images with a quality score of signal strength 10 (maximum 10) were obtained on Day 3, and at 2 months, 5 months, and 12 months after the episode of glaucomatocyclitic crisis.⁵

Conflicts of interest: The author has no conflicts of interest relevant to this article.
* Department of Ophthalmology, Kaohsiung Chang Gung Memorial Hospital and Chang Gung University College of Medicine, 123, Ta-Pei Road, Niao-Sung District, Kaohsiung 833, Taiwan.

E-mail address: tsai4118@ms26.hinet.net.

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The average RNFL thickness in the affected eye (132.99 μm , C/D ratio: 0.24) was greater than that in the unaffected eye (105 μm , C/D ratio: 0.26) on Day 3. However, the RNFL thickness progressively decreased and the C/D ratio progressively increased at 2 months (73 μm , C/D ratio: 0.61), 5 months (67 μm , C/D ratio: 0.63), and 12 months (60 μm , C/D ratio: 0.67) (Figs. 1 and 2). By contrast, there were no obvious changes in the unaffected eye after 12 months (102 μm , C/D ratio: 0.25).

An automated perimetry test was conducted using the Humphrey 30–2 threshold program. After an episode of glaucomatocyclitic crisis in the affected eye, a glaucomatous superior arcuate visual field defect was found at initial examination and at 1 year (mean deviation: -7.22 dB, pattern standard deviation: 5.23 dB, left, vs. mean deviation: -7.28 dB, pattern standard deviation: 8.02 dB, right; Fig. 3).

3. Discussion

Investigations into the “normal” RNFL thickness, using Stratus OCT, revealed that between the ages of 18 years and 85 years, Caucasians have an average RNFL thickness of $98.1 \pm 10.9 \mu\text{m}$,

Hispanics $103.7 \pm 11.6 \mu\text{m}$, and Asians $105.8 \pm 9.2 \mu\text{m}$. The mean RNFL thickness of the inferior quadrant is $126.1 \pm 17.8 \mu\text{m}$, superior quadrant $124.2 \pm 17.9 \mu\text{m}$, nasal quadrant $80.9 \pm 18.1 \mu\text{m}$, and temporal quadrant $69.0 \pm 12.7 \mu\text{m}$. The inferior and superior quadrants are thicker than the nasal and temporal quadrants.⁶ Decreases in the RNFL thickness of the inferior and superior quadrants are more sensitive for the detection of glaucoma.⁷

A previous study demonstrated that after a single episode of acute primary angle closure with a high IOP (>50 mmHg), there was an initial increase, followed by a decrease, in the diffuse RNFL thickness. The average decrease in the RNFL thickness correlated with the interval of follow-up, and gradually stabilized at 3 months. The overall reduction in RNFL thickness correlated with the duration of acute IOP elevation.⁸

In this case, most reduction in the thickness of the RNFL occurred within the first 2 months, with only a small reduction occurring after 2 months. This result is consistent with the findings of previous reports.^{8,9} A possible explanation for this occurrence has been proposed by Yoles and Schwart.¹⁰ These authors proposed a mechanism, termed secondary degeneration, whereby glaucomatous neuropathy continues to progress even after the reduction of

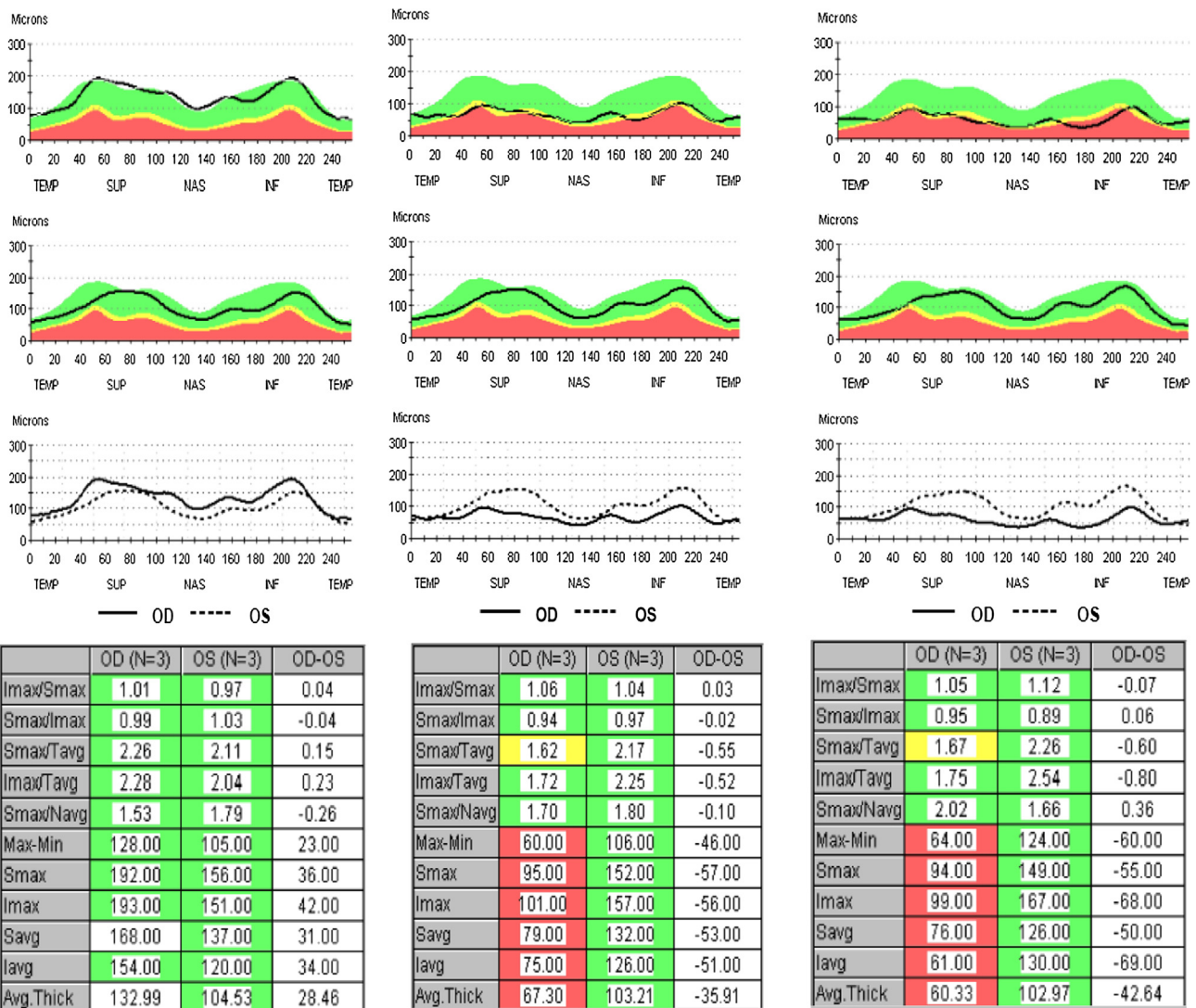


Fig. 1. RNFL thickness, measured using Stratus optical coherence tomography, after an episode of glaucomatocyclitic crisis. The Avg.Thick, Savg, and lavg were, respectively, 132.99 μm , 168 μm , and 154 μm in the affected eye (OD) on Day 3 (left); 67.3 μm , 79 μm , and 75 μm (OD) at 5 months (middle); and 60.33 μm , 76 μm , and 61 μm at 12 months (right). Avg.Thick = average retinal nerve fiber layer thickness; lavg = retinal nerve fiber layer thickness of the inferior quadrant; INF = inferior quadrant; NAS = nasal quadrant; RNFL = retinal nerve fiber layer; Savg = retinal nerve fiber layer thickness of the superior quadrant; SUP = superior quadrant; TEMP = temporal quadrant.

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