

**TABLE.** Intravitreal Bevacizumab (IVB; Avastin) Used in the Treatment of Uncontrolled, Symptomatic Neovascular Glaucoma Cause by Retinal Vein Occlusion: A Series of Six Consecutive Cases: Clinical Parameters (*Continued*)

Remarks	Intraocular Pressure After IVB Treatment		Panretinal Photocoagulation		Best-corrected Visual Acuity		Anterior Segment and Symptoms at the End of Follow-up						
	IOP 2 Days After IVB	IOP End of Follow-up (Weeks After IVB)	Cyclophotocoagulation	Before IVB Treatment	After IVB Treatment	At Presentation	End of Follow-up	Neovascularization of Iris	Neovascularization of Angle	PAS	AC Cells and Flare	Pain/Discomfort	Follow-up (wk)
	35	21	Yes (1 week)	Yes		CF	20/200	No	No	Persisting	No	No	16
	26 <sup>†</sup>	15	Yes (7 weeks)	NF	Started at 12 weeks	HM	HM	No	No	Persisting	No	No	14
Resolved in 2 days	20	18	No	NF	Started at 10 weeks	HM	HM	No	No	No	No	No	10
	38	17	Yes (1 week)	Before referral <sup>‡</sup>		LP	LP	No	No	Persisting	No	No	10
Resolved in 4 weeks	24	19	No	NF	Started at 5 weeks	HM	20/400	No	No	No	No	No	6
	20	11	No	NF	Started at 4 weeks	20/200	20/100	No	No	No	No	No	4

because of intermittent pain that had lasted six weeks and an intractable IOP of 40 mm Hg under maximal medication. Corneal edema, massive neovascularization of the iris and angle, and almost circumferential peripheral anterior synechiae (PAS) were found. After IVB, neovascularization almost disappeared, but IOP remained 40 mm Hg, because PAS persisted. Cyclophotocoagulation was accomplished, then IOP normalized. At 10 weeks, pressure was 17 mm Hg, and neovessels could be found neither on the iris nor in the visible parts of the angle.

We are unaware of previous reports on case series that have involved NVG that was treated with an intravitreal anti-vascular endothelial growth factor drug and could find no reference to it in a computerized search in MEDLINE. Very recently, two separate cases of NVG with IVB treatment were published,<sup>5,6</sup> and the reported results are in full accordance with ours. Adjuvant bevacizumab for NVG may offer a more causal treatment of the neovascular trigger, might be able to prevent further PAS formation and secondary angle damage, and is likely to open a therapeutic window for PRP. Prospective studies are needed to determine its long-term benefits and its role in the complex management of this condition.

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## Assessment of Retinal Nerve Fiber Layer Using Optical Coherence Tomography and Scanning Laser Polarimetry in Progressive Glaucomatous Optic Neuropathy

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Accepted for publication Jul 18, 2006.

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**PURPOSE:** To describe a case of progressive glaucomatous optic neuropathy using scanning laser polarimetry with fixed (SLP-FCC) and variable corneal compensation (SLP-VCC) and optical coherence tomography (OCT).  
**DESIGN:** Observational case report.

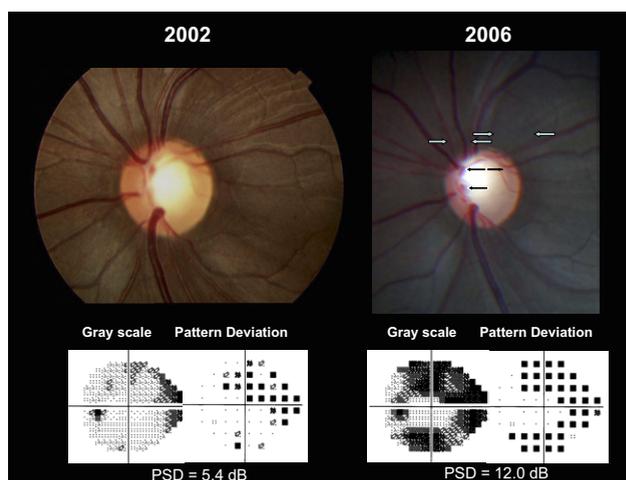
**METHODS:** A 21-year-old male with juvenile primary open-angle glaucoma developed progression because of noncompliance with therapy. The patient underwent dilated stereoscopic examination and photography of the optic disk, standard automated perimetry (SAP), OCT, and SLP imaging with FCC and VCC at the baseline examination and after four years of follow-up.

**RESULTS:** Optic disk, retinal nerve fiber layer (RNFL) atrophy, and SAP progression was observed. Reduction in mean RNFL thickness (average, superior, inferior) was 18, 18, and 27 microns (OCT); 22, 40, and 17 microns (SLP-FCC); and 6, 12, and 12 microns (SLP-VCC), respectively.

**CONCLUSIONS:** This case demonstrates that digital imaging of the peripapillary RNFL is capable of documentation and measurement of progressive glaucomatous RNFL atrophy. (*Am J Ophthalmol* 2006;142:1056–1059. © 2006 by Elsevier Inc. All rights reserved.)

**T**HE GLAUCOMAS REPRESENT A GROUP OF DISEASES that result in progressive retinal ganglion cell death, producing a specific pattern of retinal nerve fiber layer (RNFL) atrophy and optic nerve head and visual field (VF) damage. Optical coherence tomography (OCT) and scanning laser polarimetry (SLP) are posterior segment imaging technologies that provide reproducible, quantitative measurements of the RNFL. In contrast to earlier instruments that employed fixed corneal compensation (FCC), the latest commercial SLP has an integrated variable corneal compensator (VCC) that determines and neutralizes eye-specific corneal birefringence, providing greater discriminating power for glaucoma detection.<sup>1,2</sup> We describe a case of progressive glaucomatous optic neuropathy using SLP-FCC, SLP-VCC, and OCT.

A 21-year-old male of African ancestry presented with advanced progressive juvenile open-angle glaucoma in both eyes because of noncompliance with topical therapy four years after initial diagnosis. Informed consent was obtained by means of a consent form approved by the Institutional Review Board for Human Research of the University of Miami Miller School of Medicine in agreement with the provisions of the Declaration of Helsinki. Examination of the left eye demonstrated a visual acuity of 20/20 and the intraocular pressure measured 39 mm Hg. SAP revealed progressive visual field deterioration and optic disk examination demonstrated progressive atrophy of the neural rim and RNFL, particularly in the superior region (Figure 1). OCT, SLP-FCC, and SLP-VCC were performed at the time of diagnosis and follow-up (Figure 2). Reduction in mean RNFL thickness (OCT, SLP-FCC, and SLP-VCC, re-



**FIGURE 1.** A glaucomatous left eye optic disk with diffuse progressive thinning of the neuroretinal rim, particularly in the superior region (Top black arrows), and progressive superior retinal nerve fiber layer atrophy (RNFL, white arrows) as compared with the baseline photograph that demonstrates early slit defects in the superotemporal RNFL. Note also the development of increased visualization of the vascular root (Bottom black arrow) at the nasal portion of the disk coincident with progressive atrophy of the neural rim. Standard automated perimetry (SAP, Bottom) demonstrates progression of glaucomatous visual field defects and increase in the pattern standard deviation (PSD) from 5.4 to 12.0 dB (decibel).

spectively) was 18, 22, and 6 microns (average thickness); 18, 40, and 12 microns (superior thickness), and 27, 17, and 12 microns (inferior thickness). Trabeculectomy with antifibrosis therapy was subsequently performed.

Limited reports have described progressive glaucomatous RNFL atrophy using OCT<sup>3</sup> and SLP.<sup>4</sup> To our knowledge, this is the first comprehensive assessment of RNFL atrophy associated with documented progressive glaucomatous optic neuropathy with comparisons across several technologies. This case emphasizes several important points. As proposed by others,<sup>5</sup> the gold standard with which diagnostic imaging technologies should be compared is progressive optic disk cupping. Second, the anatomic and functional damage in glaucoma may not appear or evolve simultaneously. This patient developed marked superior neural rim atrophy with visual field progression noted in both superior and inferior hemifields. Unfortunately, sequential measurements were not available for this patient to better demonstrate the stages of progression. Third, structural changes measured with imaging devices may disagree, in part from differences in technologic principles, axial and lateral resolution, and measurement reproducibility. It is of particular interest to note the differences in progression detected using SLP-FCC and SLP-VCC. Differences in the corneal compensation strategies may affect the amount and localization of birefringence loss detected over time. Finally, it is difficult to differentiate instrument

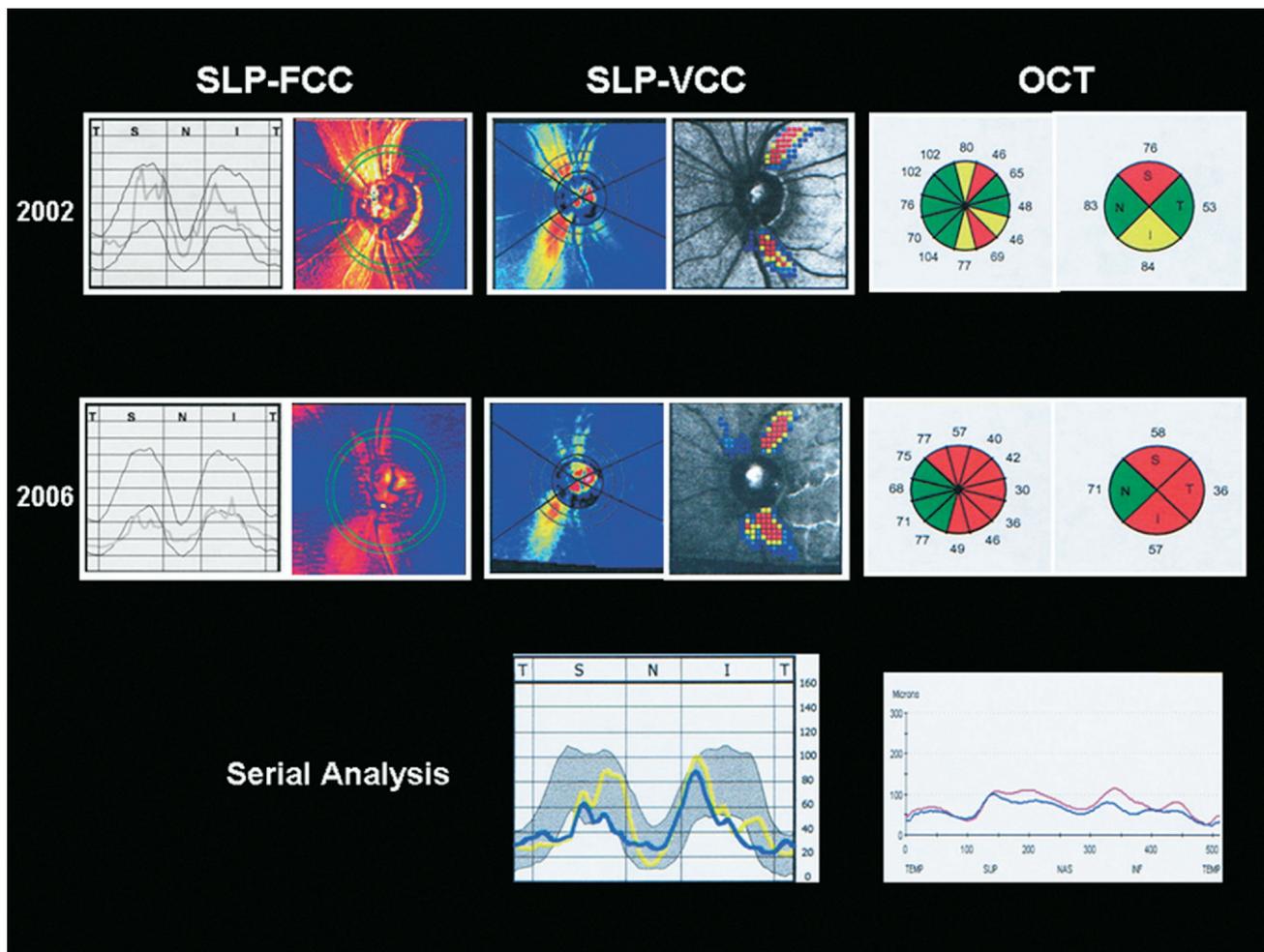


FIGURE 2. Progressive glaucomatous optic neuropathy demonstrated by imaging technologies. Scanning laser polarimetry with fixed corneal compensation (SLP-FCC, Left), variable corneal compensation (SLP-VCC, Middle), and optical coherence tomography (OCT, right) were performed at the time of diagnosis (2002, Top row) and follow-up (2006, Middle row). Reduction in mean RNFL thickness (average, superior, inferior) was 18, 18, and 27 microns (OCT); 22, 40, and 17 microns (SLP-FCC); and 6, 12, and 12 microns (SLP-VCC), respectively. Serial analysis plots (Bottom row) demonstrate the reduction in RNFL thickness (blue) compared with baseline measurements (yellow SLP-VCC, red OCT).

variability from progression. Wollstein<sup>3</sup> defined OCT progression using a prototype device as a decline of at least 20 microns in average RNFL thickness, similar to that observed in our patient (18 microns). This case demonstrates that digital imaging of the peripapillary RNFL is capable of documentation and measurement of progressive glaucomatous RNFL atrophy.

THIS STUDY WAS SUPPORTED IN PART BY NIH GRANTS RO1-EY013516, R01-EY08684, Bethesda, Maryland; the Maltz Family Endowment for Glaucoma Research, Cleveland, Ohio; a Grant from Mr Barney Donnelly, Palm Beach, Florida; The Kessel Foundation, Bergenfield, New Jersey; and an unrestricted grant from Research to Prevent Blindness, Inc, New York, New York. Dr Greenfield has received research support and has served as a consultant for Carl Zeiss Meditec. The authors indicate no financial conflict of interest. Involved in design and conduct of the study (M.S., D.S.G.); Involved in collection, management, analysis, and interpretation of the data (M.S., D.S.G.); and involved in preparation, review, or approval of the manuscript (M.S., D.S.G.).

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## Prevention of Dermatologic Side Effects of Bimatoprost 0.03% Topical Therapy

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**PURPOSE:** To investigate the efficacy of reducing the drop-skin contact to prevent dermatologic side effects of bimatoprost 0.03% topical therapy.

**DESIGN:** Prospective, randomized, single-blinded, internally controlled study.

**METHODS:** Enrolled subjects started bimatoprost 0.03% therapy once at night in both eyes and were instructed to wipe selectively only one eye (eye 1) with an adsorbent pad during and after drops administration for four months. The fellow eye acted as the internal control. Eyelash growth, regional skin hypertrichosis, and pigmentation on the periocular skin were assessed at baseline and during the four months of follow-up.

**RESULTS:** A lower incidence of eyelash growth and skin pigmentation in the inferonasal pericanthal region were observed in eye 1. The incidence of pigmentation in the inferotemporal skin region and skin hypertrichosis were similar in the two eyes.

**CONCLUSION:** The reduction of the drop-skin contact affects the regional incidence and the extent of dermatologic skin changes that are related to bimatoprost 0.03% topical therapy. (*Am J Ophthalmol* 2006; 142:1059–1060. © 2006 by Elsevier Inc. All rights reserved.)

PROSTAGLANDINS AND PROSTAMIDES ANALOGS ARE widely recognized to be the most effective intraocular pressure-lowering agents; however, despite the systemic safety, the clinical use of these drugs is often limited by the occurrence of dermatologic side effects, such as changes of length and density of eyelashes,<sup>1</sup> changes of length and density of vellus hairs of the malar and external canthal

skin regions,<sup>2</sup> and changes in periocular skin pigmentation.<sup>3</sup> The occurrence of these changes is likely to be related to the drop-skin contact; the purpose of this study was to investigate the efficacy of reducing the drop-skin contact to prevent topical dermatologic side effects of bimatoprost 0.03% topical therapy.

This prospective, parallel, randomized, single-blinded, internally controlled clinical study was approved by the Institutional Ethics Committee, and each subject signed a written informed consent form. Inclusion criteria were the diagnosis of glaucoma or ocular hypertension in both eyes. Exclusion criteria were the past or current use of topical prostaglandins or prostamides, the need for more than one drug to control intraocular pressure, concomitant active ocular or dermatologic diseases, the use of sunless tanning products, or tanning booths in the past six months.

After washout, subjects started bimatoprost 0.03% topical therapy once at night in both eyes and were trained to blot adequately only one randomly selected eye (eye 1) with a provided disposable adsorbent pad (TNT 7.5 × 7.5 cm, 4 layers; Ploing SRL Merchandising, Pomezia, Rome, Italy) every day during and after drop administration. Eye 2 acted as an internal control (control). Eyelash length was quantified (at baseline and at months 1, 3, and 4) by the removal and measurement under a microscope of the longest eyelash of the upper eyelid of both eyes.<sup>1</sup> Skin hypertrichosis and pigmentation were assessed by three investigators (who were blinded to the data) by means of digital contact dermatoscopy<sup>4</sup> (Dermaphot; Heine Optotechnik, Herrsching, Germany). The study took place during the winter, and the patients were asked not to use any make-up products the visit days and any sunless tanning product or tanning booths throughout the study period.

An electronic web-based randomization plan generator was used for randomization. One-way analysis of variance test, paired *t* test,  $\chi^2$  test, and Fisher exact test were used to analyze the data. *Eyelash growth* was defined as a change of eyelash length of >1.5 mm from baseline. Twenty eyes from 10 patients were included in the statistical analysis (seven women, three men; mean age, 56.2 ± 16.6 years; range, 31 to 79 years). Baseline variables were similar between eyes. A trend of growth was observed in both eyes during the study (Table), although changes from baseline were significantly greater in the control eye at month 3 and at month 4 (Figure 1).

The incidence of eyelash growth (number of eyes with induced eyelash growth/number of eyes examined) was higher in the control eye at month 4 compared with eye 1 (Figure 2). A lower incidence of skin hyperpigmentation from baseline was observed in the inferonasal pericanthal skin region in eye 1, compared with the control eye at month 4 (10% vs 60%; *P* = .029). The incidence of hyperpigmentation in the inferotemporal pericanthal skin

Accepted for publication Jul 4, 2006.

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