

Care of the Patient with Open Angle Glaucoma



American Optometric Association

A. DESCRIPTION AND CLASSIFICATION

Open angle glaucoma (OAG) is caused by a gradual blockage of aqueous outflow from the eye despite an apparently open anterior chamber angle.

1. Primary Open Angle Glaucoma (POAG)

- ❑ Usually results from decreased outflow of aqueous fluid due to an acceleration and exaggeration of normal aging changes in the anterior chamber angle, iris, and ciliary body tissues of the eye.
- ❑ Characteristic optic nerve (ON) cupping, nerve fiber layer (NFL) defects, and visual field (VF) loss.
- ❑ Generally occurs bilaterally but not always symmetrically.
- ❑ Usually associated with elevated intraocular pressure (IOP) above 21 mm Hg.

When IOP levels are below 21 mm Hg, it is classified as low or normal tension glaucoma (NTG). An abnormal level of IOP (>21 mm Hg) with no evidence of ON damage or loss of vision function is classified as ocular hypertension (OH).

2. Secondary Open Angle Glaucoma

- ❑ May result from a variety of substances that mechanically block the outflow of aqueous through the anterior chamber angle.
- ❑ Pigmentary dispersion syndrome (PDS) -- pigment released from the back surface of the iris and distributed onto structures in the anterior and posterior chambers of the eye can cause the development of pigmentary glaucoma (PG). PG may also be due to a congenital abnormality of the anterior chamber or exist as a variant of POAG.
- ❑ Pseudoexfoliation syndrome (PES) -- grayish-white material in the anterior and posterior chambers of the eye and in the conjunctiva and orbit. Persons with PES have a higher prevalence of OAG than those without PES.

B. RISK FACTORS

General Risk Factors

- ❑ Age (>40)
- ❑ Race (African American)
- ❑ Family history of glaucoma

NOTE: This [Quick Reference Guide](#) should be used in conjunction with the [Optometric Clinical Practice Guideline on Care of the Patient with Open Angle Glaucoma](#) (August, 2002). It provides summary information and is not intended to stand alone in assisting the clinician in making patient care decisions.

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Ocular Risk Factors

- ❑ Elevated or asymmetric levels of IOP
- ❑ Diffuse or focal enlargement of cup portion of optic nerve
- ❑ Diffuse or focal narrowing of neuroretinal rim
- ❑ Asymmetry of cup-to-disc ratio
- ❑ Myopia

Nonocular Risk Factors

- ❑ Diabetes mellitus
- ❑ Vasospasms
- ❑ Systemic hypertension

C. COMMON SIGNS, SYMPTOMS, AND COMPLICATIONS

Patients with mild or moderate POAG, pigmentary glaucoma, or pseudoexfoliation glaucoma seldom have any symptoms or complaints. Patients in the severe stage may present with symptoms or complaints related to restricted VF. Table 1 provides an overview of ON, NFL, and VF signs exhibited in the various clinical stages of POAG.

D. EARLY DETECTION AND PREVENTION

While certain ocular, systemic, and general factors increase the probability that a person may develop glaucoma, there is no absolute way to predict who will develop the disease, nor is there any method of prevention.

- ❑ Techniques to screen for glaucoma lack the sensitivity and specificity to be effective due to significant overlap in the results of key clinical tests of affected and unaffected people.
- ❑ Periodic comprehensive eye and vision examinations may be the most cost-effective way to detect glaucoma in a high-risk population.

E. EVALUATION

Baseline data need to be established for key clinical parameters during the initial glaucoma evaluation. Repeated evaluation for very subtle changes in the appearance of the ON, NFL, or VF may be needed for a definitive diagnosis of POAG. Persons at risk of developing POAG need to be evaluated more frequently. Less comprehensive followup examinations may be useful to assess specific clinical parameters in glaucoma suspects. The initial and followup glaucoma evaluations may include, but are not limited to the following areas:

1. Patient History

- ❑ Review of general, familial, ocular, and nonocular risk factors
- ❑ Medical history, including current medications and known allergies
- ❑ Follow-up evaluations should focus on changes in medical status, side effects or adverse reactions from medications, and compliance with prescribed therapy

2. Ocular Examination

- ❑ Visual acuity (corrected and uncorrected)
- ❑ Pupil assessment (relative afferent pupillary defect)
- ❑ Biomicroscopy (evaluation of anterior and posterior ocular segments)
- ❑ Tonometry (diurnal variability and symmetry)
- ❑ Gonioscopy (evaluation of anterior chamber angle)
- ❑ Optic nerve assessment (stereoscopic evaluation through a dilated pupil)
- ❑ Nerve fiber layer assessment (with red-free illumination)

- ❑ Fundus photography (stereophotography through a dilated pupil preferred)
- ❑ Visual fields (automated threshold perimetry)
- ❑ Blood pressure and pulse (measurement on followup evaluation to monitor potential adverse effects of prescribed medications)

3. Supplemental Testing

- ❑ Color vision, contrast sensitivity and short-wavelength automated perimetry may be performed on followup evaluation to detect progression of vision loss.

F. MANAGEMENT

1. Basis for Treatment

The objective is to lower IOP to prevent additional damage to the ON or the loss of vision function in the safest and most effective manner. To achieve this goal, a "target pressure" (30-50% below the pretreatment level) must be established for each individual, routinely evaluated, and further reduced over time.

2. Available Treatment Options

- ❑ Stepwise medical therapy may include the use of adrenergic antagonists (beta-blockers); cholinergic agonists (miotics); adrenergic agonists (epinephrine compounds, apraclonidine); and carbonic anhydrase inhibitors (CAIs). Suggestions for the medical management of POAG are given in Table 2.
- ❑ Laser therapy may consist of laser trabeculoplasty with argon (ALT), krypton, neodymium:YAG, or diode lasers. Guidelines for postoperative followup of ALT patients are given in Table 3.
- ❑ Surgical treatment may consist of filtering procedures (thermal sclerostomy, posterior or anterior lip sclerectomy, trephination, and

trabeculectomy) and cyclodestructive procedures which are reserved for the most advanced stages of the disease.

- ❑ Randomized clinical trials are currently evaluating the benefits of utilizing ALT and filter surgery as initial (primary) treatments for POAG.
- ❑ Long-term management involves patient education, continuity of care, compliance with therapy, communication with patient's physicians, and possibly comanagement with a glaucoma specialist.
- ❑ Low vision rehabilitation, that includes the use of specialized optical devices and training, may benefit patients with severe, irreversible vision loss.

3. Patient Education

- ❑ Counseling regarding the benefit/risk of the treatment and proper use of medications is critical to maximal compliance.
- ❑ Continual reinforcement of the seriousness of the disease and the importance of following the therapy regimen is essential.
- ❑ Patient participation in developing a treatment plan can help overcome the social and psychological barriers that often arise.

4. Prognosis

- ❑ Approximately 75% of eyes under medical therapy show progression when followed for up to 10 years.
- ❑ Success rate in controlling OAG with ALT is about 80% the first year, with a 5-15% decline each subsequent year. Repeated ALT has a lower success rate and a high risk. Drug therapy must continue in the majority of glaucomas following ALT.
- ❑ Surgically treated eyes are twice as likely to have no further progression of the disease than those treated medically. Filtering surgery has a

success rate of about 75-95% in controlling glaucoma and postoperative medical therapy is necessary in 15-50% of these patients. Second filtering procedures have a much lower (36%) success rate. The use of antimetabolites (5-fluorouracil or mitomycin) has improved the success rate for initial and repeated filtering surgery.

- ❑ About 50% of persons with PG eventually require laser or surgical treatment.
- ❑ Initial results of ALT and filtration surgery with supplemental medical therapy for PEG are equal to or better than for POAG. However, closer postoperative surveillance is required after ALT for PEG than for POAG as patients with PEG may fail at a faster rate.

5. Follow-up

Table 4 provides an overview of the evaluation and management of patients suspected of or diagnosed with POAG.

- ❑ Followup examinations are required to monitor the stability of the IOP, ON, and VF; patient compliance with the therapy; the presence or absence of side effects or adverse reactions to the treatment; and the effectiveness of patient education.
- ❑ Frequency of followup evaluations depends on the level of IOP and the stability and severity of the disease.
- ❑ Frequency of followup care after laser trabeculoplasty involves monitoring IOP immediately (within several hours) and monitoring both IOP and signs of ocular inflammation at 1 week and 4-8 weeks postoperatively.

Table 1*

Clinical Stages of Primary Open Angle Glaucoma

Clinical Stage	Optic Nerve	Nerve Fiber Layer	Visual Field
Mild	Concentric enlargement of cup, vertical elongation of cup, disc hemorrhage, cup-to-disc ratio >0.5 but <0.7 , asymmetry, notching of the neuroretinal rim.	Less bright reflex, fine striations to texture, large retinal blood vessels clear, medium retinal blood vessels less blurred, small retinal blood vessels blurred	Isolated paracentral scotomas, nasal depression or step, diffuse depression
Moderate	Cup-to-disc ratio of 0.7, increase in the area of central disc pallor, narrowing of neuroretinal rim, focal notching of neuroretinal rim, undermining of vessels	Minimal brightness to reflex, no texture, large, medium, and small retinal blood vessels clear	Complete arcuate scotoma in at least one hemifield
Severe	Cup to disc ration ≥ 0.8 , very narrow neuroretinal rim, bayoneting of vessels, markedly increased area of central disc pallor	Reflex dark, no texture, large, medium, and small retinal blood vessels clear	Complete arcuate scotoma in both hemifields, 5° to 10° central island of vision

*Adapted from Table 3 in Optometric Clinical Practice Guideline on Care of the Patient with Open Angle Glaucoma.

Table 2*

Suggestions For The Medical Management Of Primary Open Angle Glaucoma

1. Set target pressure and readjust when necessary.
2. Use the fewest medications in the lowest concentrations necessary to achieve the target pressure.
3. When the treatment is ineffective, initially substitute rather than add medication.
4. Initiate or change therapy with a unioocular trial.
5. Stop treatment periodically to assess its continuing efficacy.
6. Continually stress compliance with the patient.
7. Make the treatment regimen as convenient for the patient as possible.
8. Teach the patient the correct method for instilling eyedrops.
9. Write down the treatment regimen for the patient, including time of day, number of drops, and color of bottle cap.
10. Communicate with the patient's family doctor.
11. Always ask the patient about changes in medical history and any side effects or adverse reactions to medications.
12. Continually educate the patient about the risks and prognosis of the disease and the side effects and adverse reactions of medications.

* Modified from Hoskins HD, Kass M. Becker-Shaffer's diagnosis and therapy of the glaucomas, 6th ed. St. Louis: CV Mosby, 1989:411.

Table 3*

General Guidelines for Postoperative Management of Patients Following Argon Laser Trabeculoplasty

One Hour Postoperative

- Measure IOP and check for corneal abrasions. If normal, re-evaluate patient 1-2 weeks later. If IOP is elevated or corneal abrasion is present, provide treatment.

One to Two Weeks Postoperative

- Measure IOP (full effect of treatment may not be apparent for 6-8 weeks).
- Check for ocular inflammation.
- Check for compliance with use of medication.

Six to Eight Weeks Postoperative

- Measure IOP (measurement should be below pretreatment level if procedure has been successful).

* Adapted from Table 6 in the Optometric Clinical Practice Guideline on Care of the Patient with Open Angle Glaucoma.

** Followup schedule will be modified if complications occur or if the glaucoma is severe.

Table 4*

Frequency and Composition of Evaluation and Management Visits for Open Angle Glaucoma

Type of Patient	Frequency of Evaluation	Composition of Followup Evaluations					Management Plan
		Tonometry	Gonioscopy	ON/NFL Assessment	Stereoscopic ON and NFL Photography	Perimetry**	
New glaucoma patient or new glaucoma suspect	Weekly or biweekly to achieve target pressure	Multiple readings may be necessary to establish baseline	Standard classification and drawing at initial visit	Dilate; optic nerve drawing at initial visit	As part of initial glaucoma evaluation	Repeat to establish baseline	Prepare problem list with treatment plan
Glaucoma suspect	6-12 months, depending on level of risk	Multiple readings may be necessary to establish baseline	Annual	Dilate every other visit	Every 2 years	Annual	Review
Stable – mild stage	4-6 months	Every visit	Annual	Dilate every other visit	Annual	Annual	Review
Stable – moderate stage	2-4 months	Every visit	Annual	Dilate every other visit	Annual	6 months	Review
Stable – severe stage	1-3 months	Every visit	6 months	Dilate every other visit	Annual	3-4 months	Review
Unstable – IOP poorly controlled; ON or VF progressing	Weekly or biweekly until stability is established	Every visit	Initial visit and each time other clinical findings warrant a reassessment	Dilate at initial visit and each time other clinical findings warrant reassessment	Annual or each time ON or NFL changes	4-6 weeks or as needed to establish new baseline	Formulate new plan until stable
Recently established stability	1-3 months	Every visit; re-establish baseline	Depends on severity of the glaucoma	Dilate every interim visit	Annual or each time ON or NFL changes	Depends on severity of disease	Review

*Adapted from Figure 3 in the Optometric Clinical Practice Guideline on Care of the Patient with Open Angle Glaucoma.

**Threshold automated perimetry is recommended.