

7.2 PATIENTS WITH GLAUCOMA

Description

Glaucoma* is a clinical term referring to a spectrum of conditions resulting in damage to the optic nerve and progressive reduction in sensitivity within the field of vision. Patients with glaucoma or patients with significant risks of having glaucoma (hereafter referred to as “glaucoma suspects” for consistency with current professional literature) are commonly encountered in optometric practice. Early diagnosis and therapy may reduce the rate of progression of this disease.

When glaucoma develops without an identifiable cause, it is termed primary.¹ Primary open angle glaucoma is the most common form of this disease and may be managed by optometrists with therapeutic qualifications. Glaucoma with an identifiable cause is termed secondary.

Regulatory Standard

The *Optometry Act, 1991* states that in the course of engaging in the practice of optometry optometrists are authorized, subject to terms, conditions and limitations imposed on his or her certificate of registration, to perform the following controlled act:

2.1 Prescribing drugs designated in the regulations.

The Designated Drugs and Standards of Practice Regulation, O.Reg. 112/11 (made under the *Optometry Act, 1991*) describes the following conditions under which an optometrist may prescribe drugs for the treatment of glaucoma:

PART II STANDARDS OF PRACTICE — GLAUCOMA

Prescribing of antiglaucoma agents

6. It is a standard of practice of the profession that in treating glaucoma a member may only prescribe a drug set out under the category of “Antiglaucoma Agents” in Schedule 1.

*Glaucoma is a clinical term referring to a variety of conditions with the common feature of an optic neuropathy (i.e. glaucomatous optic neuropathy [GON]) characterized by a distinctive loss of retinal nerve fibres and optic nerve changes. GON can develop under a number of circumstances with varying contributions by several known and as yet unidentified risk factors. The clinical term glaucoma is sometimes used when 1 risk factor, intraocular pressure (IOP) is very extreme and GON is impending but not yet present (i.e. acute glaucoma). Glaucoma is often pluralized to reflect the variety of clinical presentations of this optic neuropathy. (Canadian Ophthalmological Society)².

Open-angle glaucoma

7. (1) Subject to subsection (2) and to section 8, it is a standard of practice of the profession that a member may only treat a patient with glaucoma where the patient has primary open-angle glaucoma the treatment of which is not complicated by either a concurrent medical condition or a potentially interacting pharmacological treatment.

(2) It is a standard of practice of the profession that a member may only treat a patient having open-angle glaucoma, the treatment of which is complicated by either a concurrent medical condition or a potentially interacting pharmacological treatment, in collaboration with a physician with whom the member has established a co-management model of care for that patient and who is,

- (a) certified by the Royal College of Physicians and Surgeons of Canada as a specialist in ophthalmology; or
- (b) formally recognized in writing by the College of Physicians and Surgeons of Ontario as a specialist in ophthalmology.

Referral to physician or hospital

8. (1) Subject to subsections (2) and (3), it is a standard of practice of the profession that a member shall immediately refer a patient having a form of glaucoma other than primary open angle glaucoma to a physician or to a hospital.

(2) It is a standard of practice of the profession that a member may initiate treatment for a patient having angle-closure glaucoma only in an emergency and where no physician is available to treat the patient.

(3) It is a standard of practice of the profession that a member shall immediately refer any patient being treated in accordance with subsection (2) to a physician or hospital once the emergency no longer exists or once a physician becomes available, whichever comes first.

(4) In this section, "hospital" means a hospital within the meaning of the Public Hospitals Act.

The Professional Misconduct Regulation (Regulation 859/93 under the *Optometry Act*) includes the following acts of professional misconduct:

- 3. Doing anything to a patient for a therapeutic, preventative, palliative, diagnostic, cosmetic or other health-related purpose in a situation in which a consent is required by law, without such a consent.
- 12. Treating or attempting to treat an eye or vision system condition which the member recognizes or should recognize as being beyond his or her experience or competence.

13. Failing to refer a patient to a regulated health professional when the member recognizes or should recognize a condition of the eye or vision system that appears to require such referral and examination.
16. Recommending or providing unnecessary diagnostic or treatment services.
17. Failing to maintain the standards of practice of the profession.

Professional Standard

Optometrists must be knowledgeable and competent in the diagnosis and management of glaucoma.

The examination of patients with either glaucoma, or a suspicion of developing glaucoma, must include an appropriate assessment of any patient-specific risk factors. The core considerations for the examination of glaucoma include:

- case history
- measurement of the intraocular pressure
- evaluation and description of the optic nerve head
- biomicroscopy examination of the anterior segment and anterior chamber angle
- gonioscopy, when clinically indicated
- investigation of threshold visual fields, when clinically indicated; and
- measurement of central corneal thickness, when clinically indicated

Members are expected to use instrumentation and techniques consistent with current professional standards of practice.

Management Options

For patients with glaucoma or glaucoma suspects, options include:

1. follow-up examinations at suitable intervals
2. drug therapy when indicated:
 - a. by referral to an ophthalmologist,
 - b. by an optometrist with authority to prescribe drugs for the treatment of primary open angle glaucoma
 - c. by an optometrist with authority to prescribe drugs in collaboration (OPR 4.8) with an ophthalmologist for the treatment of primary open angle glaucoma when complicated by a concurrent medical condition or potentially interacting pharmacological treatment;
 - d. by referral to a physician or hospital, for secondary glaucomas

- e. the immediate application of drugs in an emergency situation, such as angle-closure glaucoma, where no physician is available, then, immediately refer the patient to a physician or hospital once the emergency no longer exists or once a physician becomes available, whichever comes first.

Optometrists must discuss the appropriate option(s) with the patient and obtain informed consent.

The management plan must be clearly documented in the patient health record (OPR 5.1)

In summary:

Optometrists with authority to prescribe drugs are required to refer patients with primary open angle glaucoma to an ophthalmologist if the treatment is complicated by either a concurrent medical condition or a potentially interacting pharmacological treatment. Treatment may be provided in collaboration with an ophthalmologist with whom the member has established a co-management model of care for that patient.

Optometrists are required to refer patients with secondary glaucoma to a physician or hospital.

Clinical Guideline

Glaucoma Examination

The need for and extent of a glaucoma investigation will generally be determined by the identification of patient specific risk factors and/or as the result of specific clinical findings from an optometric examination. Other indications for conducting a glaucoma examination include referral from another practitioner or assessment of a patient currently being treated for the condition. Multiple examinations may be required to confirm a diagnosis or monitor patients at risk of developing glaucoma.

Frequency

The frequency of glaucoma examinations depends upon the patient's clinical presentation, risk factors and the optometrist's professional judgment. Recommendations from accepted clinical guidelines^{1,2} and current professional literature should be used as a guide. For example, the Canadian Ophthalmological Society (COS)² has the following recommendations;

Recommended clinical assessment intervals for stable chronic glaucomas.

Glaucoma Suspects	1 – 2 Years
Early Glaucoma	At least every 12 months
Moderate Glaucoma	At least every 6 months
Advanced Glaucoma	At least every 4 months

Evaluation of Patients with Glaucoma or Glaucoma Suspects

Generally, a comprehensive glaucoma evaluation would include consideration of the following:

1. History

- family history of glaucoma
- demographics, including race, age, sex
- medical status and history, including medications, and
- ocular history, including refractive error and previous corneal surgery and/or trauma

2. Measurement of Intraocular Pressure

Intraocular pressure should be measured using a reliable, calibrated and disinfected instrument. At this time, the Goldmann applanation tonometer is commonly used and appears to be the most precise when compared to other methods².

Consideration should be given to recording relevant factors, such as:

- the effect of pupillary dilation
- time of day and diurnal variations
- additional significant clinical features, such as blepharospasm
- previous corneal surgery,
- existing corneal disease, scarring or dystrophy
- high corneal toricity
- instrument used

3. Evaluation of the Optic Nerve

The optic nerve head should be examined stereoscopically when possible, using a technique that provides sufficient resolution and magnification to accurately assess the following:

- cup/disc ratio
- colour
- depth of cupping
- visibility of lamina cribrosa
- neuroretinal rim appearance
- presence of peripapillary atrophy
- overall size of disc
- presence of disc hemorrhages

This evaluation will generally require pupillary dilation.

4. Analysis of the Visual Field
The visual field should be measured using an instrument that has thresholding capabilities. Frequency of testing is individualized for each patient and is based on risk factors and previous findings. (OPR 6.8)
5. Evaluation of the Anterior Segment and Angle
The anterior segment should be evaluated initially and periodically as indicated for risk factors such as pseudoexfoliation, pigment dispersion, iris transillumination defects, and narrow or anomalous anterior chamber angles. Biomicroscopy and gonioscopy are generally the preferred methods of examination.
6. Measurement of the Corneal Thickness (Pachymetry)
Corneal thickness is an independent risk factor for the development of glaucoma⁴. Corneal thickness should be measured using a reliable, calibrated and disinfected instrument and recorded.

Risk factors are assessed at subsequent visits as clinically indicated.

Additional Considerations

1. Specialized Visual Field Testing and Analysis
Specialized forms of visual field testing, such as frequency doubling or blue-yellow perimetry, may be useful in detecting visual field loss at an earlier stage. Analysis software programs may also be helpful, particularly in identifying and assessing changes in the visual fields over time.
2. Imaging of the Optic Nerve and/or the Nerve Fiber Layer
Imaging and computer-assisted evaluation of the optic nerve and nerve fiber layer may aid in early diagnosis, analysis of progression and management of glaucoma. Examples include fundus photography, optical coherence tomography (e.g. OCT), retinal tomography (e.g. HRT), and laser polarimetry (e.g. GDx).
3. Exploration of other influential factors, such as blood pressure, cardiovascular health, high myopia, migraines, blood transfusions

Treatment

General considerations

The therapeutic management of primary open angle glaucoma² is within the scope of practice of optometrists with therapeutic qualifications (OPR 4.4). The treatment should adhere to accepted clinical guidelines and current literature. Comprehensive guidelines are available from: the Canadian Ophthalmological Society², the American Optometric Association¹, American Academy of Ophthalmology⁷ and the European Glaucoma Society⁸. Consideration should be given to:

- severity and rate of progression of the disease
- pre-treatment intraocular pressure and diurnal influence
- target intraocular pressure
- barriers to compliance and appropriate administration of treatment (i.e. dexterity, cognition, finances)
- the age and systemic health status of the patient
- known drug sensitivities, allergies or interactions

Collaboration and Shared Care (OPR 4.8)

There will be situations where the patient’s best interests are served by a collaborative relationship between the optometrist and other consultants (i.e. another optometrist, physician, pharmacist, etc). The recording of information exchanged among all parties in a collaborative care relationship is crucial. Each party, including the patient, should understand the responsibilities and expectations in the collaborative relationship.

Drug Therapy

Open Angle Glaucoma

- Treatment considerations for patients with glaucoma are constantly evolving. It is beyond the scope of this guideline to discuss all considerations; however treatment must be based on current clinical guidelines and research. The table below outlines the major classes, examples, generic names, indications and contraindications of glaucoma medications:

Anti-Glaucoma Medication	Trade Name	Generic Name	Conc.(%)	Indications	Contraindications²
Miotics	Isopto-Carpine (& Pilopine HS 4% Gel)	pilocarpine	1, 2, 4	Primary/Chronic Open Angle Glaucoma (POAG/COAG) Angle Closure Glaucoma (ACG)	Miosis, RD, ocular inflammation, neovascular glaucoma, cataracts
	Carbachol	carbachol	1.5, 3		Known sensitivity to any component
Adrenergic Agonists	Iopidine	apraclonidine	0.5		
	Alphagan P	brimonidine	0.1, 0.15		
Beta-Blockers	Timoptic & XE	timolol maleate	0.25, 0.5		Sulfa allergies, Sickle cell disease, renal stones, aplastic anemia
	Betagan	levobunolol	0.25, 0.5		
	Betoptic S	betaxolol	0.25		
CAI's	Trusopt	dorzolamide	2		Known sensitivity to any component, ocular inflammation
	Azopt	brinzolamide	1		
	Diamox ¹	acetazolamide	125, 250, 500 mg		
Prostaglandins	Neptazane ¹	methazolamide	25, 50 mg		As above
	Xalatan	latanoprost	0.005		
	Travatan	travoprost	0.004		
Combos	Lumigan	bimatoprost	0.03		
	Combigan	brimonidine + timolol			
	DuoTrav	travoprost + timolol			
	Xalacom	latanoprost + timolol			
	Cosopt	dorzolamide + timolol			

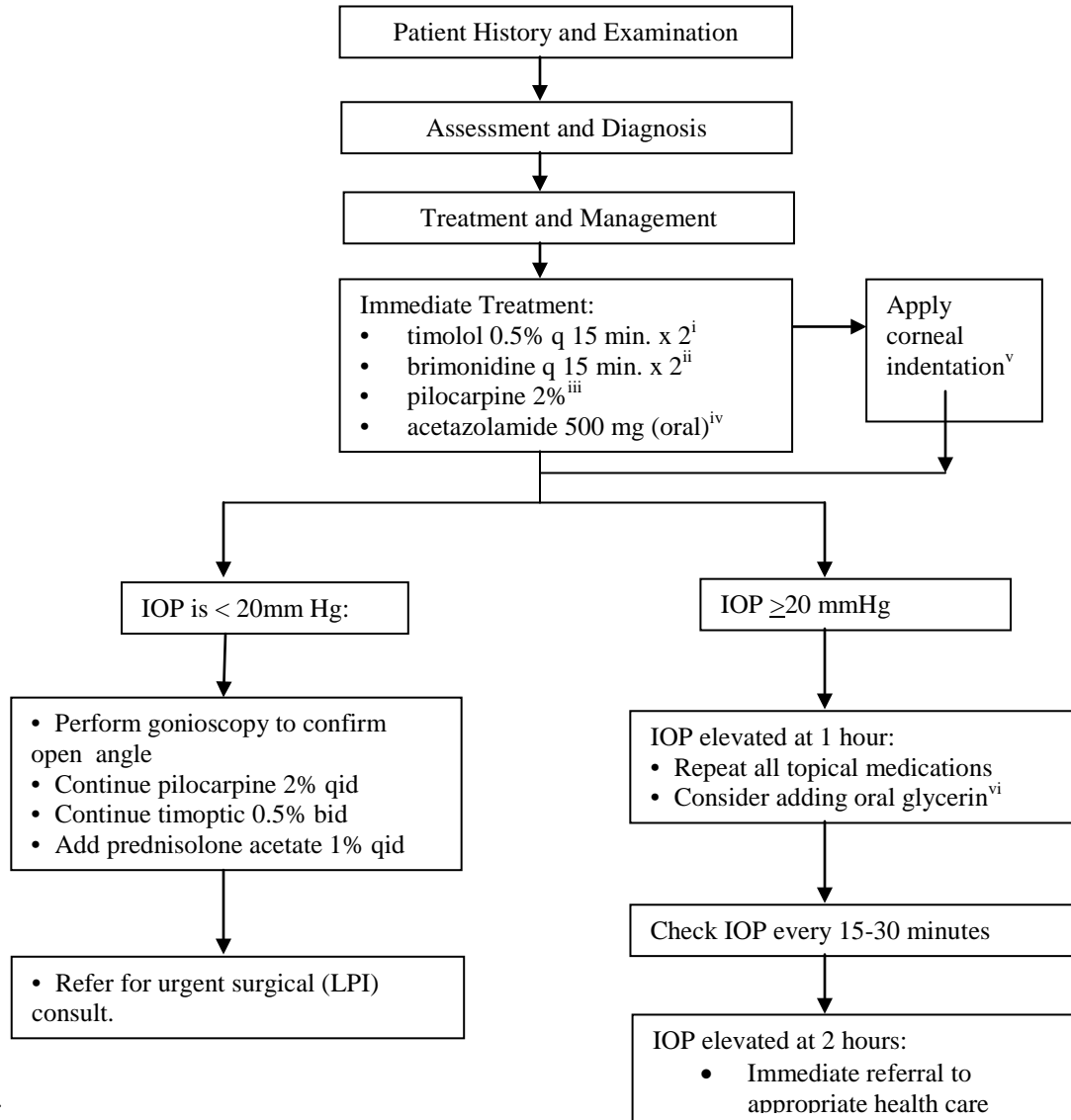
¹Oral glaucoma agents for emergency treatment of angle closure glaucoma only.

²Only significant contraindications are shown on the table. Consult formal drug information for complete listings. Some contraindications are absolute and others are relative. Members must use clinical judgment to assess the risk/benefit of using a drug when a contraindication is present.

Angle Closure Glaucoma

- An attack of angle closure glaucoma is an ocular emergency. A timely referral to a physician or hospital must be made. When it is in the patient's best interest, optometrists should initiate emergency treatment for these patients within their clinical practices using appropriate therapy.
- The following Primary Angle Closure Glaucoma Treatment Flow Chart describes a general management plan of a patient with acute angle closure glaucoma in such an emergency situation.

Primary ACG Treatment Flow Chart



Notes:

*All treatment is topical unless otherwise indicated.

ⁱ Use betaxolol 0.25% if patient has COPD.

ⁱⁱ Alternatively, apraclonidine 1% could be used

ⁱⁱⁱ Use every 15-60 minutes up to a total of 2-4 doses; if IOP is > 40mm Hg, iris sphincter muscle may be ischemic, so Pilocarpine may not cause miosis until IOP is reduced below this level by other drugs.

^{iv} Use two 250 mg tablets; avoid if patient has sulpha allergy; if patient has a kidney condition, use 100 mg Neptazane; if nauseated; consider IV Diamox. (if hospitalization available)

^v Corneal Indentation in the Early Management of Acute Angle Closure; K. Masselos, A. Bank, I. Francis, F. Stapelton; August 12, 2008

^{vi} Dosage 1.5 ml/kg body weight; serve over ice; if nauseated, consider IV Mannitol (if hospitalization available).

References and Additional Information

1. American Optometric Association Clinical Practice Guidelines
 - Care of the Patient with Open Angle Glaucoma
 - Care of the Patient with Angle Closure Glaucoma(<http://www.aoa.org/x4813.xml>)
2. Canadian Ophthalmological Society Evidence Based Clinical Practice Guidelines for the Management of Glaucoma in Adult Eyes.
Can J of Ophthalmol - Vol. 44, Suppl. I, 2009
3. College of Optometrists of Ontario: Guideline for the Use of Drugs by Optometrists (OPR 4.4)
4. Ocular Hypertension Treatment Study (OHTS), National Eye Institute, Initial results June 13, 2002. <http://www.nei.nih.gov/glaucomaeyedrops/>
5. Corneal Indentation in the Early Management of Acute Angle Closure; K. Masselos, A. Bank, I. Francis, F. Stapelton; August 12, 2008.
6. The Canadian Glaucoma Strategy (Draft): R.P. LeBlanc CM, MD, FRCSC, Department of Ophthalmology and Visual Sciences, Dalhousie University, Halifax N.S.
7. American Academy of Ophthalmology : Preferred Practice Pattern: Primary Open Angle Glaucoma Suspect. 2005; San Francisco
<http://www.aao.org/>
8. Terminology and guidelines for Glaucoma: European Glaucoma Society.

First published: March 2011