GLAUCOMA
(2006)

PHILIPPINE GLAUCOMA SOCIETY
Philippine Glaucoma Society (PGS)

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**Management of Glaucoma**

**DEFINITION**

The term “glaucoma” refers to a large group of diseases which cause a characteristic pattern of optic nerve damage with corresponding visual field defects (scotomas). The mechanisms which cause optic nerve damage have not been fully elucidated yet. Increased intraocular pressure (IOP) is considered a major risk factor for optic nerve damage but is not present in all cases of glaucoma.

**Types of Glaucoma**

Glaucoma is divided into two main types based on the status of the anterior chamber drainage angle. These are open angle glaucoma and angle closure glaucoma. The two most common types of glaucoma are the primary glaucomas (primary open angle glaucoma (POAG) and primary angle closure glaucoma (PACG)) that can be classified into several subtypes. There are also secondary types of glaucoma and glaucomas that occur in childhood. Secondary glaucomas may be secondary to systemic or ocular conditions. Examples of secondary types of glaucoma are post-traumatic glaucoma, glaucoma associated with Sturge-Weber Syndrome, neovascular glaucoma which occurs due to end-stage diabetic retinopathy or entral retinal vein occlusion, and lens-induced glaucoma which may be a complication of a hypermature cataract.

**DIAGNOSIS OF GLAUCOMA**

**History**

The presence of risk factors and symptoms of glaucoma should be identified during history taking.

**Risk Factors/Conditions associated with a higher risk of glaucoma or glaucoma progression**

- increase intraocular pressure
- increased age
- family history of glaucoma
- diabetes mellitus
- vascular factors such as hypertension, reduced perfusion pressure, and nocturnal hypotension
- vasospastic conditions such as Raynaud's phenomenon and migraine
- myopia/nearsightedness (associated with open angle glaucoma)
- hyperopia/farsightedness (associated with angle closure glaucoma)
- sleep apnea
- race (e.g. people from certain parts of Africa - primary open angle glaucoma, Chinese - angle closure glaucoma, Japanese - normal tension glaucoma)
- current or previous chronic steroid use (including systemic, nasal spray and ophthalmic steroids)
- history of ocular trauma

**Symptoms of Glaucoma:**

The vast majority of glaucoma patients are asymptomatic until the optic nerve damage is advanced and their glaucoma is usually diagnosed on routine eye exam. The type of glaucoma that is symptomatic is acute angle closure and the symptoms include acute onset of:

- heavy or pressure-like eye pain
- periorbital headache usually only on the affected side
- iridescent vision (seeing rainbows around lights)
- blurrings of vision
- red eye
- nausea or vomiting

These symptoms usually have their onset at night or in dim light when the pupil enlarges and causes closure of the anterior chamber angle. They may be mild and resolve spontaneously but recur often or they may be severe and persist for several hours.

**Signs of Glaucoma**

**Visual Acuity**

- Acutely decreased visual acuity can occur during an acute angle closure attack. Otherwise, the visual acuity remains normal until the end stage of optic nerve damage.

**External eye exam**

- Congested bulbar conjunctiva without congestion of palpebral conjunctiva. This is seen only during an acute angle closure attack. Involvement of the palpebral conjunctiva indicate conjunctivitis. However, conjunctivitis and glaucoma may co-exist.
Hazy cornea. This is seen during an acute angle closure attack.

Pupil
- Fixed, mid-dilated pupil may indicate a current or previous attack of angle closure.
- Relative afferent pupillary defect (Marcus-Gunn pupil) is seen in the worse eye in cases of advanced glaucoma.

Funduscopy
- Enlarged cup to disc ratio. A cup to disc ratio of greater than 0.5 or a difference between the two eyes of 0.2 or more are considered suspicious. Cupping to the disc margin is also strongly suspicious.
- Optic disc hemorrhage (rare and may be difficult to detect even by experts at funduscopy)

Palpation
- Firm eyeball due to increased IOP (this is very difficult to assess unless there is a large difference in the IOP between the two eyes)

Visual Field Testing by Confrontation
- Only large scotomas can be detected and only if the testing is done very meticulously.

**Examination by the Ophthalmologist**

In addition to the examinations that can be done by the general practitioner, the ophthalmologist will be able to take more precise measurement of the IOP using a tonometer, take a closer look at the anterior chamber using a slit lamp, view the anterior chamber angle using a gonioscopy lens, and have a better view of the optic nerve using a slit lamp in combination with an indirect lens.

**Diagnostic Tests**

The basic diagnostic tests that may be requested by the ophthalmologist include perimetry to test for visual field defects and stereoscopic optic disc photos to have a record of the optic disc appearance. Other tests that may be requested include optic disc imaging other than photography, pachymetry (corneal thickness measurement), and anterior segment ultrasonography or imaging.

The diagnosis of glaucoma is made based on a combination of the risk factors present, the symptoms if any, the signs, and the results of diagnostic tests.

**TREATMENT**

All types of glaucoma are best managed by the ophthalmologist. The treatment of glaucoma can be generally divided into acute and chronic treatment. Acute treatment is directed at lowering acutely and severely increased IOP and opening the angles in cases of acute angle closure attacks. This includes systemic and topical medication and the appropriate laser or surgical treatment. Chronic treatment is aimed at maintaining a low IOP in order to preserve the visual field. Treatment options include medication, various laser procedures and/or surgery.

Eye drops are the most commonly used medication for glaucoma. The available classes of glaucoma eye drops are the beta blockers (timolol, levobunolol, metipranolol, and betaxolol), prostaglandins and lipid receptor agonist (latanoprost, travoprost, bimatoprost, and unoprostone), alpha agonist (brimonidine), beta-blockers (brimonidine), and carbonic anhydrase inhibitors (dorzolamide and brinzolamide). Systemic medications used for glaucoma include the oral carbonic anhydrase inhibitors acetazolamide, IV mannitol, and oral glycerin.

When the cause of a secondary type of glaucoma is treatable (e.g. lens-induced glaucoma) then that treatment (e.g. cataract extraction) is usually done first before resorting to the chronic glaucoma treatment modalities.

**Referral to an Ophthalmologist**

When the acute angle closure symptoms listed above are severe and persist beyond a few hours, this constitutes an ophthalmic emergency and warrants immediate referral to an ophthalmologist. When the symptoms are mild and recurrent, the patient needs to be referred to an ophthalmologist promptly, not necessarily an emergency basis, for possible laser and or medical treatment to prevent further attacks and permanent damage to the eye.

Because the majority of glaucoma patients are asymptomatic and because age is a major risk factor for glaucoma it is important that all patients aged 40 and older be seen by an ophthalmologist regardless of whether they are symptomatic or not. Patients with a strong family history of glaucoma, especially early onset glaucoma, with multiple risk factors or with signs of glaucoma need to be referred for glaucoma screening even before they reach 40 years of age. Patients should be instructed that an initial negative screening is not a guarantee that they will not develop glaucoma later on and that they will need periodic ophthalmologic examinations after the initial screening.
### Recommended Therapeutics

(Drugs Mentioned in the Treatment Guideline)

The following index lists therapeutic classifications as recommended by the treatment guideline. For the prescriber’s reference, available drugs are listed under each therapeutic class.

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**Recommended Therapeutics**

- Brimonidine
  - Alphagan P

**Betablockers**

- Timolol
  - Fotil*
  - Glocure-Opta
  - Nyolol
  - Oftan
  - Timabak
  - Timoptol
  - Timoptol-XE
  - Xalacom*

- Metipranolol
  - Beta-Ophtiole
  - Normoglaucn*

- Betaxolol
  - Alcon Betoptic
  - Betoptic S
  - Optabet

**Prostaglandins/Lipid Receptor agonist**

- Latanoprost
  - Xalacom*
  - Xalatan

- Bimatoprost
  - Lumigan

- Unoprostone
  - Rescula

**Cholinergic**

- Pilocarpine
  - Asthenopin
  - Fotil*
  - Isopto Carpine
  - Normoglaucn*
  - Piloman

**Carbonic anhydrase inhibitors**

- Dorzolamide
  - Trusopt

- Brinzolamide