

# Glaucoma

## Blindness may strike at any age

BY SHAWN COHEN, MD

Glaucoma is a multifactorial eye disease with a characteristic loss of optic nerve fibres. The main classes are infantile or congenital, a less common juvenile or later onset form, primary open-angle glaucoma (POAG), secondary open-angle and angle-closure (ACG) glaucomas. In ocular hypertension, the intraocular pressure (IOP) is elevated but the optic nerve remains unaffected. POAG affects about 1 in 100 Canadians over the age of 40 and is one of the leading causes of blindness. ACG and infantile forms are a bit less frequent, while ocular hypertension affects about 6% of the population. Fewer than 10% of ocular hypertension patients will progress to glaucoma over a five-year period, so the "number needed to treat" remains high. About 50% of POAG cases go undetected, as there are no symptoms until extremely late in the disease. Screening programs are available but costly, and medical and surgical interventions can prevent blindness only if applied early on. Note that certain topical glaucoma treatments need to be monitored for systemic repercussions and that some meds such as nasal sprays may induce the disease.

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#### References:

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## Risk factors

- age
  - POAG — 40 years and over, greatest after age 65
  - ACG — mostly 55-65
- race
  - POAG — African American > Caucasian
  - ACG — Inuit > Caucasian
- sex — ACG — women > men, 3-4:1
- family — affected siblings
- refraction
  - POAG — more common in myopic or near-sighted eyes
  - ACG — affects hyperopic or far-sighted eyes
- high IOP — most important risk factor for POAG
- trauma, inflammation, secondary causes
- diabetes mellitus types 1 and 2
- systemic hypertension
- ischemic vascular disease
- corticosteroid use: oral, local injection in remote areas, topical, nasal sprays

## Classes

- infantile or congenital
- juvenile
- POAG
  - 1% Canadians over age 40
  - asymptomatic until late in the disease
  - one of leading causes of blindness
- ACG
- ocular hypertension — 6% of population, may progress to POAG

## Symptoms and signs

### Infantile

- failure to fixate and/or follow
- frequent tearing
- cloudy cornea
- white or absent pupillary reflex
- enlarged or prominent eye and/or cornea
- presence of systemic syndromic features

### ACG

- seeing halos around lights
- frequent headaches or brow aches often associated with red eyes and nausea/vomiting in extreme cases
- sudden loss of vision
- shadow cast by a dome of the iris with tangential lighting in the eye

### POAG

- no vision complaints until too late
- enlargement of the optic nerve cup on direct ophthalmoscopy
- eye pressure reading elevated or normal — unrelated to damage
- afferent pupillary defect — late manifestation only

## When to refer

- any child, teenager or adult with symptoms or signs
- if no risk factors for eye disease
  - ages 20-39 — at least once
  - ages 40-64 — every 2-4 years
  - age 65 or older — every 1-2 years
- patients with diabetes — onset
  - before age 30 — within 5 years after onset, then yearly
  - after age 30 — every year
- pregnancy — prior to conception or early in first trimester, then every 3 months
- high-risk — e.g. African-American or strong history
  - ages 20-39 — every 3-5 years
  - ages  $\geq$  40 — as regular risk
- children and teenagers
  - perinatal screening — once, birth-1 month
  - infants 1-12 months — once
  - early childhood — ages 1-5 — once
  - ages 6-12 — every 2 years
  - ages 11-19 — twice

## Treatments

### Prostaglandin analogues

- preferred treatment, first-line
- not indicated in pregnancy
- adverse effects — conjunctival redness, shady pigmentation of eyelids, iris colour darkening, increased eyelash growth

### Miotics

- not for use with uveitis
- require q.i.d. dosing, so less frequently prescribed
- side effects — blurred vision, pinpoint pupils

### Beta-blockers

- contraindications — asthma, depression, bradycardia, low systemic blood pressure, COPD
- systemic effects — bradycardia, reduced blood pressure, shortness of breath, impotence

### Carbonic anhydrase inhibitors

- oral and topical
- contraindications — sulfa allergy, renal calculi history (oral form), pregnancy
- possibility of bad taste, ocular stinging

### Alpha-agonists

- not for children — increased risk of apnea
- generally, over 10% risk of local allergic reaction

### Mannitol and glycerin hyperosmotic agents

- reserved for acute, high-pressure glaucoma only

## Laser therapy/surgery

- Argon and selective laser trabeculoplasty for POAG
  - 80% effective in lowering IOP for two years
  - efficacy comparable to a single topical glaucoma medication
- Nd:YAG or argon laser iridotomy
  - for ACG prophylaxis and management
- goniotomy and/or trabeculotomy for children
- trabeculectomy
  - standard glaucoma intervention for adults
  - may be combined with regular cataract surgery
- viscocanalostomy and non-penetrating deep sclerectomy for traumatic glaucoma and IOP
- implant — shunting device