

Glaucoma

Mark Slabaugh, MD
Associate Professor - Clinical
Department of Ophthalmology
The Ohio State University Wexner Medical Center

Disclosure

- Nothing to disclose.

- Anatomy and pathophysiology
- Epidemiology
- Screening
- Treatment

Glaucoma: What is it?

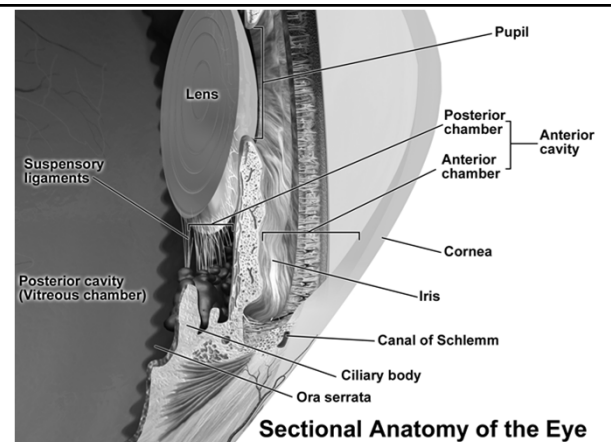
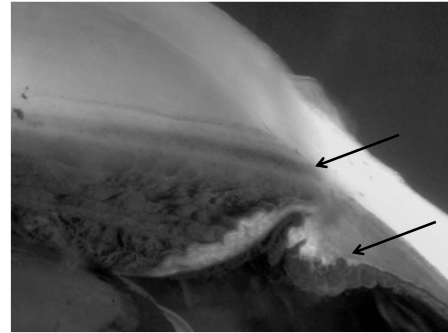
- Progressive optic neuropathy
- Characteristic optic nerve changes
- Characteristic visual field changes
- Elevated intraocular pressure is one (the most important?) risk factor.



How is eye pressure controlled?



Author: Tun Soe/Neomedix Corporation



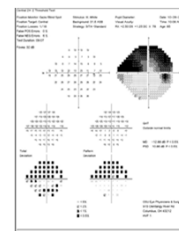
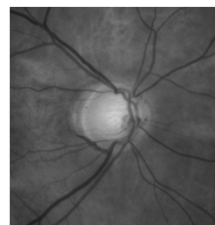
Sectional Anatomy of the Eye

Blaugen.com staff. "Blaugen gallery 2014". Wikiversity Journal of Medicine. DOI:10.15347/wjm/2014.010. ISSN 20018762

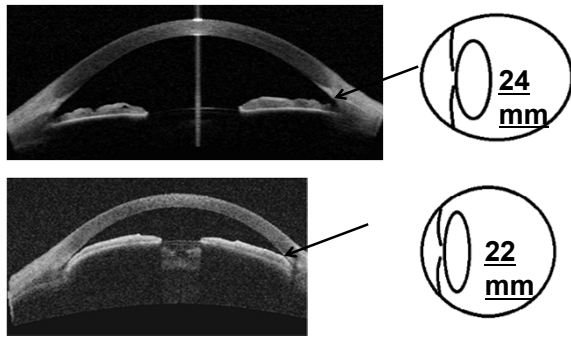
CC BY 3.0

Glaucoma: What is it?

- Progressive optic neuropathy
- Characteristic optic nerve changes
- Characteristic visual field changes
- Elevated intraocular pressure is one (the most important?) risk factor.

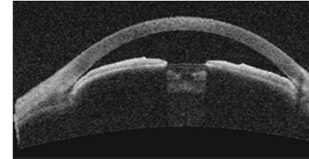


What is a narrow angle?



FAQ

- I have glaucoma, can I use this over-the-counter cold medication?



Diphenhydramine = anticholinergic
Pseudoephedrine = sympathomimetic

FAQ

- People with narrow angles do not usually know that they are at risk of angle closure.
- Patients with a known diagnosis of glaucoma have had their angles evaluated and should not be at risk.

Glaucoma Risk Factors

- Age
- Race
- Family history
- Intraocular pressure

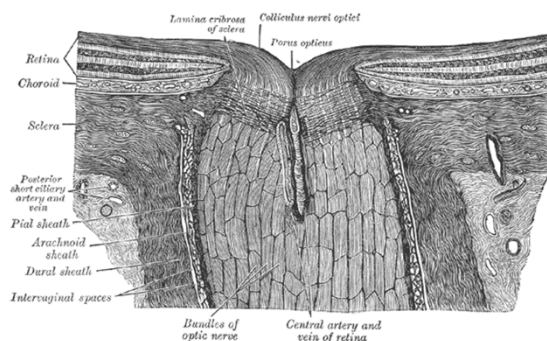
Glaucoma Risk Factors

- Intraocular pressure: Baltimore Eye Survey
 - › IOP 16-18: RR 2.0 (2 x the baseline risk)
 - › IOP 19-21: RR 2.6
 - › IOP 22-24: RR 12.8
 - › IOP 25-29: RR 12.8
 - › IOP 30-34: RR 39.0
 - › IOP ≥ 35 : RR 40.1



What about low pressure glaucoma?

- Approximately 50% of individuals developing glaucoma never have a statistically “high” eye pressure.

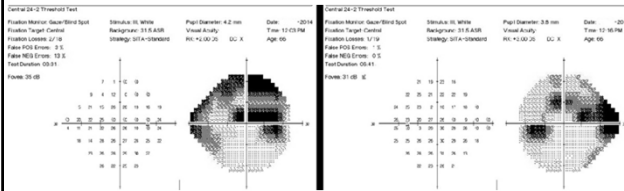


<http://commons.wikimedia.org/wiki/File:Gray880.png>

Are there other contributing factors?

- Optic nerve head blood flow
- CSF pressure
- Neurodegenerative predisposition
- Abnormal connective tissue support

- **Glaucoma and elevated eye pressure are linked but not the same.**



- **Anatomy and pathophysiology**
- **Epidemiology**
- **Screening**
- **Treatment**

How big of a problem is it?

- **Prevalence estimates average 3.5% in North America, similar worldwide.**
- **Total number with disease (age 40-80) in North America is approximately 3.4 million.**
- **Some estimates indicate that up to half of cases are undiagnosed**

Yih-Chung Tham, Xiang Li, Tien Y. Wong, Harry A. Quigley, Tin Aung, Ching-Yu Cheng, Global Prevalence of Glaucoma and Projections of Glaucoma Burden through 2040: A Systematic Review and Meta-Analysis, Ophthalmology, Volume 121, Issue 11, November 2014, Pages 2081-2090.

How common is blindness?

- **Visual field less than 20 degrees**
- **Visual acuity less than 20/200**
- **Prevalence estimates range from 8% to 27% in patients with glaucoma**

What are other complications?

- **Decreased quality of life**
- **Increased incidence of falls**
- **Loss of driving ability**
- **Decreased reading speed**
- **Impaired sleep**

- **Anatomy and pathophysiology**
- **Epidemiology**
- **Screening**
- **Treatment**

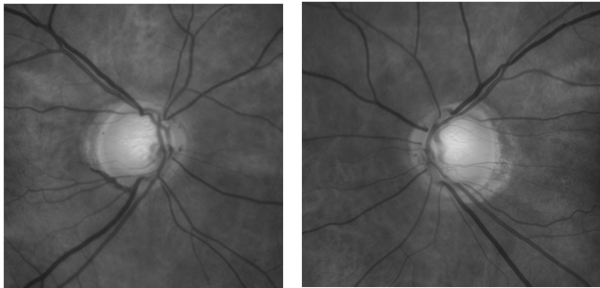
Screening

- **Most patients are asymptomatic until they have very advanced vision loss**

- **General population based screening is not felt to be cost effective at this time**
 - › **Intraocular pressure is only one risk factor**
 - › **Generally slow progression**
 - › **Visual field loss can be hard to detect and becomes manifest relatively late in the disease**

Screen based on risk factors.

- Age greater than 50
- African American race
- First degree relative with glaucoma



Glaucoma Risk Factors

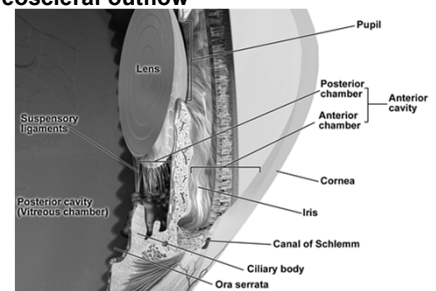
- Age
- Race
- Family history
- Intraocular pressure

- Eye pressure lowering therapy is proven to slow the progression of glaucoma

Medical therapy

- Inexpensive*
- Can be stopped
- Effective
- It is an eye drop
- Requires patient dexterity and compliance
- Variable local and systemic absorption

- Prostaglandins
 - › Latanoprost
 - › Travaprost
 - › Bimatoprost
 - › Tafluprost
- Enhanced uveoscleral outflow



Sectional Anatomy of the Eye
 Blausen.com staff. "Blausen gallery 2014". Wikiversity Journal of Medicine. DOI:10.15347/wjm/2014.010. ISSN 20018762. CC BY 3.0

- **Beta-blockers**
 - › **Timolol**
 - › **Levobunolol**
 - › **Betaxolol**
 - › **Carteolol**
- **Decrease aqueous production**

- **Contraindications**
 - › **Pulmonary conditions**
 - › **Heart block**
 - › **Systemic beta blocker use**

- **Alpha agonists**
 - › **Brimonidine**
 - › **Iopidine**
- **Decrease aqueous production**
- **Increase outflow?**
- **Neuroprotection?**

- **Carbonic anhydrase inhibitors**
 - › **Dorzolamide**
 - › **Brinzolamide**
 - › **Acetazolamide (oral)**
 - › **Methazolamide (oral)**
- **Decrease aqueous production**

- **Contraindications**
 - › **Sulfa cross-reactivity**

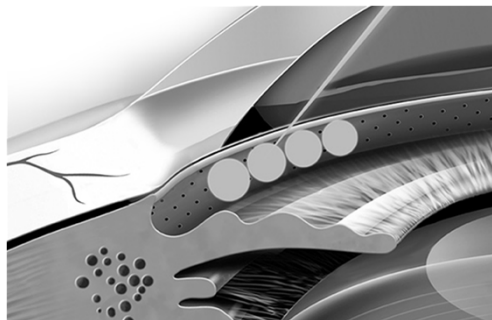
FAQ

- **What is marijuana's effect on glaucoma?**

FAQ

- **Marijuana lowers eye pressure**
- **The effect is very short-lived, making it an ineffective medical treatment for most patients.**

Laser Trabeculoplasty



Laser Trabeculoplasty

- About 25-30% lowering
- Equivalent to a single medical agent

Trabeculectomy

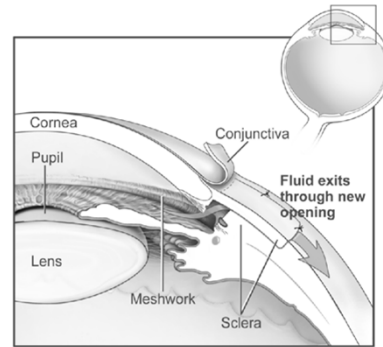


Image courtesy of National Eye Institute, National Institutes of Health

Conclusions

- Glaucoma is a common cause of blindness
- Therapy is aimed at reducing eye pressure
- Screening should be done on patients at risk
 - › Older than 50 years of age
 - › African American
 - › Family history of glaucoma