Secondary Open-Angle Glaucoma

Shawn Cohen

MDCM, FRCSC, DABO
Assistant Professor of Ophthalmology
McGill University
“Location, Location, Location…”
Secondary Glaucoma: Classification

- Pre-trabecular
- Trabecular
- Post-trabecular
Corneal Light Wedge
The Normal Angle
Gonioscopy

A = Appositional
ATM = Anterior TM
PTM = Posterior TM
SS = Scleral Spur
CB = Ciliary Body

Inlet: Slit / 10° / 20° / 30° / 40°

Pigment: 1 to 4+

Iris Insertion / Bowing

Structure Changes (eg. Sampaolesi line, NVA)
The Approach

- Demographics
  - Age, Sex, Race
  - Unilateral vs. Bilateral
  - Statistics
- History
  - Risk factors, Symptoms
- Exam
- What can blind the patient?
  - Example: RD risk in PDS
- What can kill the patient?
  - Example: Secondary glaucoma and melanoma
Pre-Trabecular

- Fibrovascular membrane
  - NVG
- Descemet-like membrane
  - ICE
  - PPD of Schlichting
  - Trauma
- Epithelial downgrowth
- Fibrous downgrowth
- Inflammatory membrane
  - Fuch's cyclitis
  - Luetic IK
Blood Vessels on Gonioscopy

Normal
- Radial
- Circumferential
- Anterior ciliary vessels
- Don’t arborize
- Don’t cross scleral spur

NVG
- Cross scleral spur
- Arborize over trabecular meshwork
- “Trunk-like” vessels
- May have accompanying fibrosis

Fuch’s
- Fine
- Branching
- Unsheathed
- Meandering
Neovascular Glaucoma

Systemic Vascular Disease
- Carotid occlusive dis. (OIS 13%)
- CC Fistula
- GCA
- Takayasu (pulseless) arteritis

Ocular Vascular Disease
- Diabetes mellitus (30-60% if PDR)
- Vascular occlusion (36% CRVO)
- Radiation therapy
- Anterior segment ischemia
- Sickle cell disease
- Coat’s disease
- Eale’s disease
- ROP
- PHPV

Intraocular Tumors
- Uveal melanoma
- Metastatic carcinoma
- Retinoblastoma (Ped. Unilateral)
- Reticulum cell sarcoma

Other Vascular Diseases
- Chronic uveitis
- Chronic RD
- Endophthalmitis
- Stickler syndrome
- Retinoschisis

Trauma
- Primary trauma
- Post-Surgical
  - Lensectomy in DM
  - PPV in DM
Neovascular Glaucoma

- Treat the underlying cause
  - Laser therapy to retina
    - Watch for secondary ACG!
    - (PI NOT indicated for PAS and MAY be ineffective if posterior pushing)
  - Trabeculectomy with MMC
  - Non-penetrating surgery
  - Tube implant (not inferiorly due to hyphema)
  - Cyclodestruction
  - +/- Scleral fenestrations
Pre-Trabecular

- Fibrovascular membrane
  - NVG
- Descemet-like membrane
  - ICE
  - PPD of Schlichting
  - Trauma
- Epithelial downgrowth
- Fibrous downgrowth
- Inflammatory membrane
  - Fuch’s cyclitis
  - Luetic IK
1) Post. polymorphous corneal dystrophy
2) ICE syndromes
3) Chronic intraocular inflam.
4) Following blunt trauma
5) Following penetrating injury
6) Rubeosis
Iris Distortion

1) Axenfeld-Rieger’s - Bilateral
2) ICE syndrome - Unilateral
3) PPD?
4) Rubeosis
5) Iris melanoma
6) Post trauma
The Approach

- Demographics
  - Age, Sex, Race
  - Unilateral vs. Bilateral
  - Statistics

- History
  - Risk factors, Symptoms

- Exam

- What can blind the patient?
  - Example: RD risk in PDS

- What can kill the patient?
  - Example: Secondary glaucoma and melanoma
ICE Syndrome

- **Iridocorneal Endothelial Syndrome**

- **Three clinical variations have been described:**
  - Iris nevus (Cogan-Reese) syndrome;
  - Chandler’s syndrome;
  - Essential (progressive) iris atrophy.

- Abnormal corneal endothelium that is responsible for variable degrees of iris atrophy, secondary angle-closure glaucoma in association with characteristic peripheral anterior synechiae (PAS), and corneal edema.
ICE Syndrome
ICE Syndrome: Demographics

- Unilateral
- Subclinical irregularities of the corneal endothelium commonly noted in the fellow eye.
- 20-50 years of age
- More often in women.
- No consistent association has been established with any other ocular or systemic disorder, and familial cases are very rare.
- 50% Chandler's syndrome; the other two 25% of all cases.
- Glaucoma occurs in approximately 50%
A-R Syndrome

- Rare spectrum of developmental disorders
- Abnormalities of both ocular and extraocular structures derived from the neural crest
- Bilateral
- Secondary glaucoma because of arrested angle development in about 50%
- Rare, AD inherited disorder
- A significant association with chromosome 4 has been shown, but no sex predilection has been found
- The extraocular defects most frequently seen involve the teeth and facial bones
  - Axenfeld anomaly: limited to peripheral anterior segment defects
  - Reiger's anomaly: iris and peripheral abnormalities
  - Reiger's syndrome: Reiger's anomaly plus microdontia, hypodontia, maxillary hypoplasia, telecanthus, flat nasal bridge, hypertelorism
- Anteriorly displaced Schwalbe's line (posterior embryotoxon), which appears as a white ring on the posterior cornea near the limbus. (only 8-15% of normals; tends to be more common temporarily if it is not seen over 360°)
<table>
<thead>
<tr>
<th>ICE vs. AR</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ICE</strong></td>
</tr>
<tr>
<td>✦ Unilateral</td>
</tr>
<tr>
<td>✦ Age 20-50</td>
</tr>
<tr>
<td>✦ Females mainly</td>
</tr>
<tr>
<td>✦ Sporadic inheritance</td>
</tr>
<tr>
<td>✦ No systemic assoc.</td>
</tr>
<tr>
<td>✦ Glaucoma 50% (Pretrabecular)</td>
</tr>
</tbody>
</table>
ICE Syndrome Treatment

- Antiglaucoma meds
  - May need lower IOP than usual due to corneal edema
- Muro-128 for corneal edema
- ALT useless
- Implant
  - High trab & non-penetrating OR failure rate
- PKP
Pupilloplasty
Secondary Glaucoma

- 7 month old girl noted to have this iris abnormality since birth
- Diagnosis
- Management
- Systemic disease association
Secondary Glaucoma

- Congenital ectropion uveae
- Regular IOP checks because a significant percentage of cases develop glaucoma between early childhood and puberty due to an associated angle anomaly
- Association with Neurofibromatosis type 1
Combined Baerveldt-Trab: WHY?
Secondary Glaucoma: Classification

- Pre-trabecular
- Trabecular
- Post-trabecular
Trabecular Causes

Clogging
- Erythrocytes: Heme, Ghost cell
- Macrophages: Phagolytic, Hemolytic, Melanolytic
- Neoplastic: Melanoma, NF, Nevus of Ota, JXG
- Pigment: PDS, Uveitis, Melanoma
- Proteins: PXF, Exfoliation, Uveitis, Lens particle
- Mucopolysaccharides: Vitreous, Viscoelastic
- Gas & Oil: $C_3F_8$, $SF_6$, Air, Silicone oil
- Retinal Photoreceptors Swartz’s syndrome

TM Alteration
- Edema / Inflammation
- Chemical burn
- Blunt trauma, angle recession
- Fe IOFB, siderosis of TM
- Steroid-induced
Secondary Glaucoma

- Ochre membrane in vitreous
- Heinz bodies in swollen RBC (ghost cells)
Pigmented TM

1) Pseudoexfoliation
2) Pigment dispersion syndrome
3) Post hyphema
4) Melanomalous
tic
5) Aging
6) DM
7) Race
8) Chronic uveitis
9) Iris color
10) Post PI
11) Post trauma
12) COAG ?
Pigment Dispersion Syndrome

- Reverse pupil block with blinking is alleviated by a peripheral iridotomy
- Zonular fiber contact with the peripheral iris results in TID and pigment liberation
- Incidence reduces with age as miosis ensues
- But why do only some myopes develop this and why the link with lattice degeneration / RD? Could this be a 1° epitheliopathy?
PDS vs. PXF

**Pigment Dispersion Syndrome:**
- **General:**
  - 20-50 yo; disappears later in life
  - Autosomal Dominant
  - Myopes
  - M > F
  - Caucasians > Others
  - 50% dev. Glaucoma & half need surgery
  - Scheie strip: pigment on ant. lens
  - Higher incidence of lattice degen. & RD (? 1° epitheliopathy)
  - Pigment “storm” with exercise

**Mechanism:**
- Overwhelms macrophages in TM
- EC death
- Blockage of TM opening

**Pseudoexfoliation Syndrome:**
- **Age:**
  - 75-85 yo: 5%
  - 65-74 yo: 2.6%
  - 50-64 yo: 0.67%
- Scandinavian, S. African Blacks
- Zonular degenerative changes
- Poor dilation
- Sampaolesi line
- “Iron filings” on microscopy = Bussaca deposits
- Higher incidence of narrow angle
  - Correlates with cataract surgery complications
Pseudoexfoliation
## Table 1. Clinical Features of Pigment Dispersion Syndrome vs. Exfoliation

<table>
<thead>
<tr>
<th>Ocular Structure</th>
<th>Pigment Dispersion Syndrome</th>
<th>Exfoliation Syndrome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cornea</td>
<td>Krukenberg spindle</td>
<td>Occasional endothelial pigment</td>
</tr>
<tr>
<td>Iris</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contour</td>
<td>Concave</td>
<td>Flat or convex</td>
</tr>
<tr>
<td>Transillumination</td>
<td>Midperipheral, radial</td>
<td>Pupillary border</td>
</tr>
<tr>
<td>Surface pigment deposition</td>
<td>Concentric rings in iris furrows</td>
<td>Scattered across iris surface</td>
</tr>
<tr>
<td>Pupillary ruff</td>
<td>Normal</td>
<td>Partially or wholly absent</td>
</tr>
<tr>
<td>Anterior chamber</td>
<td>Occasional pigment floater</td>
<td>Quiet</td>
</tr>
<tr>
<td>Trabecular pigmentation</td>
<td>Dense, homogenous</td>
<td>Variegated</td>
</tr>
<tr>
<td>Lens</td>
<td>Pigment on posterior capsule</td>
<td>Exfoliation material, occasional phacodonesis</td>
</tr>
<tr>
<td>Zonules</td>
<td>Normal, may be covered with pigment</td>
<td>May be covered with pigment or exfoliation material, rupture may occur</td>
</tr>
<tr>
<td>Ciliary body</td>
<td>Normal</td>
<td>May be covered with exfoliation material</td>
</tr>
<tr>
<td>Exfoliation material</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>
What type of glaucoma does this patient have?
Secondary Glaucoma

- What is the diagnosis?
- At what level is the hyperpigmentation?
- What is the risk of malignant transformation?
- What other lesions may be present?
Congenital Ocular Melanocytosis

- Subepithelial pigmentation
- No risk of malignant transformation (compare with PAM with atypia = 4%)
- Other lesions:
  - Hyperpigmentation of facial skin and mucus membranes (Nevus of Ota is very common)
  - Hyperpigmentation of ipsilateral uveal tract (common)
  - Hyperpigmentation of TM and glaucoma (uncommon)
  - Hyperpigmentation of cornea, lens, optic nerve (rare)
  - Malignant melanomas of the uvea, skin, orbit and CNS (rare)
  - Hyperpigmentation of orbit, meninges, brain (very rare)
Tumors and Glaucoma

1) Direct invasion angle
2) Neovascularization of angle
3) Hemorrhage (hyphema, ghost cells)
4) Necrosis with t.m. blockage by tumor cells
5) Displacement of lens-iris diaphragm
Identify and Treat

- This lesion has doubled in size within the last 2 years
- Discuss:
  - Diagnosis and DDx
  - Prognosis
  - Treatment options
Identify and Treat

- Malignant melanoma of the iris
- DDx of iris melanoma:
  - Other tumors:
    - Large iris nevus
    - Leiomyoma
    - Juvenile xanthogranuloma
    - Metastasis
  - Iris cysts
    - Primary
    - Secondary to intraocular surgery
  - Large inflammatory granuloma
- Excellent prognosis because the predominant cell type is usually spindle-B (not epithelioid)
- Treatment options:
  - Broad iridectomy for localized tumors such as this
  - Iridocyclectomy or iridotrabeculectomy for larger tumor involving the angle
  - Enucleation, rarely required for diffusely growing tumors
Tumors and Glaucoma

1) Direct invasion angle
2) Neovascularization of angle
3) Hemorrhage (hyphema, ghost cells)
4) Necrosis with t.m. blockage by tumor cells
5) Displacement of lens-iris diaphragm
Let’s Break!

Who says there’s no such thing as a free lunch?!
Fig. 10-2. The seven typical anterior tears that occur following blunt trauma to the eye.
Traumatic Glaucoma

Glaucoma risk in angle recession:
- $270^\circ$: 4-5%
- $360^\circ$: 24%
- Bimodal onset at 1 year and year 10

Glaucoma risk in traumatic hyphema:
- $<50\%$ hyphema: 13%
- $>50\%$ hyphema: 27%
- Total hyphema: 52%
- 8-Ball hyphema: Near 100\%
Traumatic Glaucoma: Pearls

- Traumatic hyphema: Corneal blood staining if IOP > 50 x 5 days or total hyphema not 50% by 6 days with IOP > 25
- Watch for Sickle cell disease:
  - Screen test
  - Q6h IOP check
  - If consecutively > 24h IOP rise or spike > 30 mm Hg, drain
  - B-blockers, Atropine, Predforte, Amicar / Steroids
- Angle recession: Note wider CBB on the injured side (“Cleaner” scleral spur due to loss of ciliary processes)
- Avoid miotics as there might be a paradoxical IOP elevation in recession
  - Uveoscleral output becomes more important in recession so you can block the outflow further with miotics
- Alkali burn: IOP rise:
  - 40-50 mm Hg within 10 min from shrinkage eye wall; direct TM damage
  - 1 hour later: increased prostaglandin release, secondary inflammation
  - Weeks to months later: ACG from PAS; ant. uveal circulation damage
Post Cataract Surgery IOP Rise

- **Early (first 24-48 hours)**
  - Inflammatory debris (cells, pigment, blood)
  - Lens products
  - Viscoelastic
  - Zonular fragments (ICCE with alpha-chymotrypsin)
  - Suprachoroidal hemorrhage
  - Pupillary block

- **Midterm (2-30 days)**
  - Pupillary block
  - Malignant glaucoma
  - Steroid-induced

- **Late onset**
  - Open angle glaucoma
  - Synechial angle closure
  - Pupillary block glaucoma (IOL or vitreous)
Lens-Induced Glaucoma

Phacolytic:
- Lens protein leakage from mature or hypermature cataract
- TM blocked by high molecular weight protein
- Macrophage blockage in TM less important

Lens-Particle:
- After penetrating injury or cataract surgery
- Cortical material and inflammatory cells block TM

Phacoanaphylactic:
- After penetrating injury or cataract surgery
- Immune system sensitized to previously sequestered proteins
- Granulomatous inflammation in TM (Type IV not Type I)

Phacomorphic:
- ACG from pupil block

IOL-Induced:
- ACIOIOL or sulcus IOL from pupil block
The Importance of Gonioscopy
Trabecular Causes

Clogging
- Erythrocytes: Heme, Ghost cell
- Macrophages: Phacoelastic, Hemolytic, Melanomalytic
- Neoplastic: Melanoma, NF, Nevus of Ota, JXG
- Pigment: PDS, Uveitis, Melanoma
- Proteins: PXF, Exfoliation, Uveitis, Lens particle, Amyloid
- MPS: Vitreous, Viscoelastic
- Gas & Oil: C3F8, SF6, Air, Silicone oil
- Retinal Photorec.: Swartz's syndrome

TM Alteration
- Edema / Inflammation
- Blunt trauma, angle recession
- Fe IOFB, siderosis of TM
- Steroid-induced
Uveitic Glaucoma
Glaucoma and Uveitis: Classification

- Idiopathic uveitis with secondary OAG
- Idiopathic uveitis with secondary ACG
  - PAS
  - Exudative RD, ant. ciliary body rotation (VKH, scleritis…)
- Glaucoma with secondary uveitis (masquerade)
  - Primary ACG
  - PDS
  - Medication-induced (miotics, prostaglandins)
  - Post-operative (cataract surgery, glaucoma surgery, laser treatment…)
- Specific uveitic syndromes with secondary glaucoma
Glaucoma and Uveitis: Classification

Specific uveitic syndromes with secondary glaucoma

Autoimmune
- Glaucomatocyclitic crisis (Posner-Schlossman syndrome)
- Fuchs’ heterochromic iridocyclitis
- Sarcoidosis
- JRA

Infectious
- Viral (HSV, HZV, Rubella…)
- Syphilis
- Toxoplasmosis

Other
- Phacolytic
- NVG
- Schwartz’s syndrome
Uveitis- vs. Steroid-Induced IOP Rise

History

- Risk for IOP rise with steroids:
  - POAG (46-92% vs. 5-6%)
  - Family history of POAG
  - DM
  - Myopia
  - Other: connective tissue diseases, peds < 10 yo

- Onset timing / dose / frequency / duration
Mechanisms of IOP Rise in Uveitis

<table>
<thead>
<tr>
<th>Causes of Raised Intraocular Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Secondary open-angle glaucoma</td>
</tr>
<tr>
<td>Trabecular meshwork obstruction</td>
</tr>
<tr>
<td>Canal of Schlemm and episcleral venous outflow obstruction</td>
</tr>
<tr>
<td>Corticosteroid-induced elevation of intraocular pressure</td>
</tr>
<tr>
<td>Hypersecretion</td>
</tr>
<tr>
<td>Permanent, direct trabecular meshwork tissue damage</td>
</tr>
<tr>
<td>Post-trabecular outflow damage</td>
</tr>
<tr>
<td>Pre-existing primary open-angle glaucoma</td>
</tr>
<tr>
<td>Secondary angle-closure glaucoma</td>
</tr>
<tr>
<td>Peripheral anterior synechiae</td>
</tr>
<tr>
<td>Posterior synechiae</td>
</tr>
<tr>
<td>Pre-existing disposition to primary angle-closure glaucoma</td>
</tr>
<tr>
<td>Combined-mechanism glaucoma</td>
</tr>
</tbody>
</table>
Mechanisms of IOP Rise with Steroids

- Restoration of aqueous humor formation by reducing inflammation
- Inhibition of lysosomes which normally digest GAGs; GAGs accumulate in angle
- Blockage of PG synthesis; PGs facilitate uveoscleral outflow
- Decreased phagocytic activity of endothelium

<p>| EFFECTS OF CORTICOSTEROIDS ON INTRAOCULAR PRESSURE |
|-----------------|-----------------|----------------|</p>
<table>
<thead>
<tr>
<th>Action</th>
<th>Result</th>
<th>Effect on intra-ocular pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decrease trabecular meshwork inflammation</td>
<td>Increase trabecular meshwork outflow</td>
<td>Decrease</td>
</tr>
<tr>
<td>Increase blood-aqueous barrier</td>
<td>Decrease aqueous viscosity Increase trabecular meshwork outflow</td>
<td>Decrease</td>
</tr>
<tr>
<td>Decrease ciliary body inflammation</td>
<td>Return aqueous inflow to normal</td>
<td>Increase</td>
</tr>
<tr>
<td>Alter trabecular meshwork endothelial cells in corticosteroid responders</td>
<td>Decrease trabecular meshwork outflow</td>
<td>Increase</td>
</tr>
</tbody>
</table>
The Importance of Gonioscopy
Acute Increased IOP

1) ACG
2) Posner-Schlossman
3) Inflammatory glaucoma
4) Malignant glaucoma
5) Postop glaucoma
6) Suprachoroidal hemorrhage
7) Retrobulbar hemorrhage
The Approach

- Demographics
  - Age, Sex, Race
  - Unilateral vs. Bilateral
  - Statistics
- History
  - Risk factors, Symptoms
- Exam
- What can blind the patient?
- What can kill the patient?
### Guide to Diagnosis of Inflammations

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Time course</th>
<th>Side</th>
<th>Age (years)</th>
<th>Sex</th>
<th>Race</th>
<th>Systemic Symptoms</th>
<th>Systemic Signs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Anterior uveitis</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Idiopathic uveitis</td>
<td>Acute</td>
<td>Unilateral</td>
<td>16–45</td>
<td>Either</td>
<td>-</td>
<td>Arthritis</td>
<td>Arthritis</td>
</tr>
<tr>
<td>Juvenile rheumatoid arthritis</td>
<td>Chronic</td>
<td>Bilateral</td>
<td>0–15</td>
<td>Female</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Fuchs' heterochromic iridocyclitis</td>
<td>Acute</td>
<td>Unilateral</td>
<td>25–45</td>
<td>Either</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Herpes virus</td>
<td>Acute</td>
<td>Unilateral</td>
<td>0–99</td>
<td>Either</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Ankylosing spondylitis</td>
<td>Acute</td>
<td>Bilateral</td>
<td>16–45</td>
<td>Male</td>
<td>Caucasian</td>
<td>Arthritis</td>
<td>Sacroileitis</td>
</tr>
<tr>
<td>Reiter's syndrome</td>
<td>Acute</td>
<td>Bilateral</td>
<td>16–25</td>
<td>Male</td>
<td>Caucasian</td>
<td>Arthritis</td>
<td>Urethritis</td>
</tr>
<tr>
<td>Inflammatory bowel disease</td>
<td>Acute</td>
<td>Bilateral</td>
<td>25–65</td>
<td>Either</td>
<td>-</td>
<td>Diarrhea</td>
<td>Oral ulcers</td>
</tr>
<tr>
<td><strong>Intermediate or posterior uveitis</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Idiopathic (pars planitis)</td>
<td>Chronic</td>
<td>Bilateral</td>
<td>0–70</td>
<td>Either</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Toxoplasmosis</td>
<td>Acute</td>
<td>Bilateral</td>
<td>0–45</td>
<td>Either</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Idiopathic retinal vasculitis</td>
<td>Acute</td>
<td>Bilateral</td>
<td>25 onward</td>
<td>Either</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Idiopathic posterior uveitis</td>
<td>Acute</td>
<td>Bilateral</td>
<td>25 onward</td>
<td>Either</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Presumed ocular histoplasmosis</td>
<td>Chronic</td>
<td>Bilateral</td>
<td>20–40</td>
<td>Either</td>
<td>Caucasian</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Toxocariasis</td>
<td>Chronic</td>
<td>Unilateral</td>
<td>2–31</td>
<td>Either</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Serpiginous choroidopathy</td>
<td>Chronic</td>
<td>Bilateral</td>
<td>16–65</td>
<td>Either</td>
<td>Caucasian</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Acute posterior multifocal placoid pigment epitheliopathy</td>
<td>Acute</td>
<td>Bilateral</td>
<td>Up to 30</td>
<td>Either</td>
<td>-</td>
<td>-</td>
<td>Cerebrospinal fluid cells</td>
</tr>
<tr>
<td>Acute retinal necrosis</td>
<td>Acute</td>
<td>Unilateral</td>
<td>16–65</td>
<td>Either</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Birdshot choroidopathy</td>
<td>Chronic</td>
<td>Bilateral</td>
<td>45–65</td>
<td>Female</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Intraocular lymphoma</td>
<td>Chronic</td>
<td>Unilateral</td>
<td>40–70</td>
<td>Either</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td><strong>Localized or pan-uveitis</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Syphilis</td>
<td>Either</td>
<td>Either</td>
<td>25 onward</td>
<td>Either</td>
<td>-</td>
<td>Multiple</td>
<td>Multiple</td>
</tr>
<tr>
<td>Sarcoidiosis</td>
<td>Chronic</td>
<td>Either</td>
<td>5–45</td>
<td>Either</td>
<td>African–Caribbean</td>
<td>Multiple</td>
<td>Multiple</td>
</tr>
<tr>
<td>Vogt-Koyanagi–Harada disease</td>
<td>Acute</td>
<td>Bilateral</td>
<td>15–45</td>
<td>Either</td>
<td>Japanese</td>
<td>Multiple</td>
<td>Multiple</td>
</tr>
<tr>
<td>Behçet's disease</td>
<td>Either</td>
<td>Bilateral</td>
<td>25–65</td>
<td>Either</td>
<td>Mediterranean origin</td>
<td>Japanese</td>
<td>Multiple</td>
</tr>
<tr>
<td>Infectious endophthalmitis</td>
<td>Either</td>
<td>Unilateral</td>
<td>-</td>
<td>Either</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
Treatment of Uveitic Glaucoma

Medical therapy
- None
- Topical: \( \beta \)-blockers, \( \alpha \)-agonists, CAI
- Avoid miotics (increased pain, inflammation, PAS, pupil block)
- Cycloplegics
- Role of prostaglandin analogues?
- Corticosteroids
- Immunosuppressive Rx (vision-threatening, systemic disorders; medical consultation)
- New agents (PG, IL...)

Surgical therapy: Directed at the mechanism responsible for outflow obstruction
- Laser therapy (PI, cyclophotocoagulation; NO ALT)
- Trabeculectomy with adjuvant antimetabolites (5-FU, mitomycin C)
- Setons (Ahmed, Baerveldt, Molteno, Schocket, Krupin...)

Additional specific therapies: JRA
- Avoid CAI if salicylate use (metabolic acidosis)
- Goniotomy
- Trabeculodialysis
- Nd:YAG goniotomy
Secondary Glaucoma

- Loss of vision with NO history of trauma
- Diagnosis and etiology?
Spontaneous Hyphema

- Causes: all acquired
  - Tumor:
    - Intraocular neoplasms such as retinoblastoma
    - Juvenile xanthogranuloma
  - Inflammation:
    - eg. Severe iritis
  - Infection:
    - HSV keratouveitis
    - HZV iritis
  - Hematological disorders
    - Leukemia
    - Hemophilia
  - Vascular disorders
    - eg. Rubeosis iridis
Diving and Hyperbaric Ophthalmology (Major Review)

Captain Frank K. Butler, Jr., MD


Online Summary:

http://scuba-doc.com/diveye.htm
SCUBA
Self-Contained Underwater Breathing Apparatus
Regulator
(Diaphragm, 1st Stage)

Diagram showing the components of a diaphragm regulator:
- High pressure (dark green)
- Input from cylinder
- Spring to close the valve
- Valve (red)
- Valve lifter (yellow)
- Medium pressure rotating turret
- Turret retainer
- O-rings
- Medium pressure (light green)
- Ambient pressure (light blue)
- Diaphragm (dark blue)
- Output to a second stage valve
- Output to contents gauge
Regulator Maintenance
Rebreather

- Open, semi-closed, closed circuits
  - Open: CO2 exhaled in bubbles
    - Inefficient use of O2, worsens with depth
  - Closed circuit rebreather (CCR):
    - Counterlung for expansion, volume mvt
    - CO2 absorber (LiOH…)
    - O2 regulator
    - Upstream and downstream check valves
    - Shut-off valve (H2O exposure)
Boyle’s Law

- $P_1 V_1 = P_2 V_2$  or
- $P_1 V_1 = \text{Constant}$
- Temperature is constant
SCUBA Diving

- **Boyle’s Law** \((P_1V_1 = P_2V_2 = \text{Constant})\)
  - Temperature is constant
  - During descent, \(P\) increases so \(V\) decreases
    - Eg. Face mask barotrauma / sucking
  - Re-expansion occurs during ascent
    - Eg. Intraocular gas expansion / CRAO; Lung rupture

- **Henry’s Law** of gas solubility in liquids
  - Eg. Decompression sickness

\[
P_{\text{gas}} = kC \text{ at constant } T
\]

\[
\frac{C_1}{P_1} = \frac{C_2}{P_2}
\]

Low pressure equilibrium
Low concentration

Double the pressure equilibrium
Double the concentration
Face Mask Barotrauma

- Compression of the air in the mask results in a relative vacuum
TABLE 3
Recommended Minimum Convalescent Periods Prior to Diving after Ophthalmic Surgery

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Recommended Convalescent Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anterior segment surgery</td>
<td></td>
</tr>
<tr>
<td>Penetrating keratoplasty</td>
<td>6 months</td>
</tr>
<tr>
<td>Corneal laceration repair</td>
<td>6 months</td>
</tr>
<tr>
<td>Cataract surgery</td>
<td></td>
</tr>
<tr>
<td>Non-corneal valve incision</td>
<td>3 months</td>
</tr>
<tr>
<td>Corneal valve incisions</td>
<td></td>
</tr>
<tr>
<td>Clear corneal</td>
<td>2 months</td>
</tr>
<tr>
<td>Scleral tunnel</td>
<td>1 month</td>
</tr>
<tr>
<td>Radial keratotomy</td>
<td>3 months</td>
</tr>
<tr>
<td>Astigmatic keratotomy</td>
<td>3 months</td>
</tr>
<tr>
<td>Glaucoma filtering surgery</td>
<td>2 months (Relative contraindication)</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Photorefractive keratectomy</td>
<td>2 weeks</td>
</tr>
<tr>
<td>Pterygium excision</td>
<td>2 weeks</td>
</tr>
<tr>
<td>Conjunctival surgery</td>
<td>2 weeks</td>
</tr>
<tr>
<td>Corneal suture removal</td>
<td>1 week</td>
</tr>
<tr>
<td>Argon laser trabeculectomy or iridectomy</td>
<td>No wait necessary</td>
</tr>
<tr>
<td>Yag laser capsulotomy</td>
<td>No wait necessary</td>
</tr>
<tr>
<td>Vitreoretinal surgery</td>
<td></td>
</tr>
<tr>
<td>Vitrectomy</td>
<td>2 months (Diving contraindicated until intraocular gas resorbed)</td>
</tr>
<tr>
<td>Retinal detachment repair</td>
<td>2 months</td>
</tr>
<tr>
<td>Pneumatic retinopexy</td>
<td>2 months (Diving contraindicated until intraocular gas resorbed)</td>
</tr>
<tr>
<td>Retinal cryopexy or laser photocoagulation for breaks</td>
<td>2 weeks</td>
</tr>
<tr>
<td>Oculoplastic surgery</td>
<td></td>
</tr>
<tr>
<td>Sutured wound</td>
<td>2 weeks</td>
</tr>
<tr>
<td>Skin graft or granulating wound</td>
<td>Until epithelialization is complete</td>
</tr>
<tr>
<td>Enucleation</td>
<td>2 weeks (Diving contraindicated with hollow orbital implants)</td>
</tr>
<tr>
<td>Strabismus surgery</td>
<td>2 weeks</td>
</tr>
</tbody>
</table>

TABLE 4
Ophthalmic Contraindications to Diving

1. Intraocular gas
2. Presence of a hollow orbital implant
3. Any acute infectious or inflammatory ocular disorder which produces significant pain, photophobia, diplopia, or decrease in vision
4. Recent ophthalmic surgery prior to completion of the recommended convalescent period
5. Inadequate vision to function safely in the underwater environment
6. Visually significant deficits from previous episodes of decompression sickness or arterial gas embolism
7. Functioning glaucoma filter (relative contraindication)
Henry’s Law

Solubility of gases in liquids

- Nitrox 78% N2, 21% O2
- Less toxicity, fewer decomp. stops, less fire hazard than high O2

\[ \frac{C_1}{P_1} = \frac{C_2}{P_2} \]

Diagram:
- Low pressure equilibrium: Low concentration
- Double the pressure equilibrium: Double the concentration
### Decompression Sickness

<table>
<thead>
<tr>
<th>DCS Type</th>
<th>Bubble Location</th>
<th>Signs &amp; Symptoms (Clinical Manifestations)</th>
</tr>
</thead>
</table>
| **BENDS** | Mostly large joints of the body (elbows, shoulders, hip, wrists, knees, ankles) | - Localized deep pain, ranging from mild (a “niggle”) to excruciating. Sometimes a dull ache, but rarely a sharp pain.  
- Active and passive motion of the joint aggravates the pain.  
- The pain may be reduced by bending the joint to find a more comfortable position.  
- If caused by altitude, pain can occur immediately or up to many hours later. |
| **NEUROLOGIC** | Brain | - Confusion or memory loss  
- Headache  
- Spots in visual field (scotoma), tunnel vision, double vision (diplopia), or blurry vision  
- Unexplained extreme fatigue or behaviour changes  
- Seizures, dizziness, vertigo, nausea, vomiting and unconsciousness may occur, mainly due to labyrinthitis |
| | Spinal Cord | - Abnormal sensations such as burning, stinging, and tingling around the lower chest and back  
- Symptoms may spread from the feet up and may be accompanied by ascending weakness or paralysis  
- Girdling abdominal or chest pain |
| | Peripheral Nerves | - Urinary and rectal incontinence  
- Abnormal sensations, such as numbness, burning, stinging and tingling (paresthesia)  
- Muscle weakness or twitching |
| **CHOKES** | Lungs | - Burning deep chest pain (under the sternum)  
- Pain is aggravated by breathing  
- Shortness of breath (dyspnea)  
- Dry constant cough |
| **SKIN BENDS** | Skin | - Itching usually around the ears, face, neck arms, and upper torso  
- Sensation of tiny insects crawling over the skin  
- Mottled or marbled skin usually around the shoulders, upper chest and abdomen, with itching  
- Swelling of the skin, accompanied by tiny scar-like skin depressions (pitting edema) |
# Decompression Sickness

## TABLE 1

<table>
<thead>
<tr>
<th>Ocular Manifestations of Decompression Sickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Nystagmus</td>
</tr>
<tr>
<td>2. Diplopia</td>
</tr>
<tr>
<td>3. Visual field defects</td>
</tr>
<tr>
<td>4. Scotoma</td>
</tr>
<tr>
<td>5. Homonymous hemianopia</td>
</tr>
<tr>
<td>6. Orbicularis oculi pain</td>
</tr>
<tr>
<td>7. Cortical blindness</td>
</tr>
<tr>
<td>8. Convergence insufficiency</td>
</tr>
<tr>
<td>9. Central retinal artery occlusion</td>
</tr>
<tr>
<td>10. Optic neuropathy</td>
</tr>
</tbody>
</table>
Altitude DCS!

- In excess of 18,000 feet (standard commercial flight!)
- O2 mask 100%O2
- Emergency decent (Continue O2!)
  - Resolution confirms the diagnosis! So, don’t stop Rx!
- If joint pain occurs, keep the area still
- Be your own advocate; hyperbaric specialists are rare!
- Delayed onset of symptoms can occur
- Do not fly for 24 hours after the event
- Always allow min. 24 hours between flight and diving
- Divers Alert Network (DAN) (USA) 919-684-4DAN
Causes of Acutely Decreased Vision After Diving (Table 2)

- Decompression sickness
- Arterial gas embolism
- Displaced contact lens
- Anti-fog keratopathy
- Ultraviolet keratitis
- Corneal edema from bubbles under PMMA or RGP contact lenses
- Contact lens adherence syndrome
Secondary Glaucoma: Classification

- Pre-trabecular
- Trabecular
- Post-trabecular
Post-Trabecular

Local Vascular
- CC Fistula
- Cavernous sinus thrombosis
- Orbital Varix
- Sturge-Weber syndrome

Local Compressive
- Retrobulbar mass
- Thyroid orbitopathy
- Scleral buckle

Distal Compressive
- SVC syndrome
- Mediastinal mass
- Wind-instrument players

Idiopathic
- Familial elevated EVP
Post-Trabecular

- Elevated episcleral venous pressure

\[ \text{IOP} = \left( \frac{F}{C} \right) + P_v \]

- \( F \) = rate of aqueous formation
- \( C \) = facility of outflow
- \( P_v \) = episcleral venous pressure
Sturge-Weber Syndrome

**Congenital mesodermal angle abnormality**
- Glaucoma early in life
- Buphthalmos
- Anisometropia
- Amblyopia
- Advanced cupping
- Refractory to med. Rx

**Increased EVP from hemangioma**
- No buphthalmos
- High IOP at menarche, teens
Sturge-Weber Syndrome

- Avoid hypotony at all costs during trabeculectomy or else choroidal effusions may develop.

- Trabeculectomy may require two 4x4 mm full-thickness scleral windows inferiorly to prevent choroidal effusions from hypotony.
Sudden Headache and Red Eye

- 72 yo hypertensive female
- What is the probable diagnosis?
- What may cause this condition?
- What other signs might she develop?
- What are the causes of “dynamic proptosis”? 
Direct Carotid-Cavernous Fistula

- **Causes:**
  - Basal skull fracture - most common cause
  - Intracavernous rupture of an aneurysm or an arteriosclerotic artery

- **Other signs:**
  - Pulsatile proptosis associated with a bruit that is abolished by ipsilateral carotid compression
  - Raised IOP
  - Rubeosis iridis
  - Ophthalmoplegia
  - Retinal vascular engorgement or CRVO
“Dynamic Proptosis”

Pulsatile with a bruit
- CC fistula
- Orbital arteriovenous malformation

Pulsatile without a bruit
- Congenital defect in sphenoid bone, NF 1
- Defect in orbital roof
- Indirect CC fistula

Intermittent but non-pulsatile
- Orbital varices
- Orbital capillary hemangioma
Secondary Glaucoma: Classification

- Pre-trabecular
- Trabecular
- Post-trabecular
Goals of Therapy

- Keep the IOP below the target level at all times
- Stabilize the diurnal curve
- Identify and treat secondary causes
Medical Therapy First
Dilators Indicated

1) Aphakic / pseudophakic pupil block
2) Malignant glaucoma
3) Uveitic glaucoma
4) Nanophthalmos (usually)
5) Phacomorphic glaucoma
6) Spherophakia (microspherophakia)
Miotics

Indicated
- COAG
- Most 2° OAG
  - Pigment dispersion
    - Caution!
  - Pseudoexfoliation
- Acute ACG
- Plateau iris syndrome

Contraindications
- Uveitic glaucoma
- Angle recession
Antiglaucoma Therapy
## Daily Drug Reminder

<table>
<thead>
<tr>
<th>Drug</th>
<th>Eye</th>
<th>Breakfast</th>
<th>Lunch</th>
<th>Supper</th>
<th>Bedtime</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drop 1</td>
<td>R</td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Drop 2</td>
<td>L</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Drop 3</td>
<td>B</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

R = Right  
L = Left   
B = Both

Place drops 5 minutes apart
Know When to Refer

- Prior to the onset of significant loss
- Prior to MTMT
When Medications are Not Enough

1. Inadequate pressure control
   ✦ Target pressure not attained
   ✦ Diurnal variation not stabilized

2. Global patient assessment
   ✦ Progression
   ✦ Compliance
   ✦ Medication intolerance
   ✦ Cost
   ✦ Geographic factors
   ✦ Lifestyle
   ✦ Drug interactions / concomitant systemic disease
Surgical / Laser Options

1. Laser Trabeculoplasty
2. Trabeculectomy
3. Glaucoma implants
4. Nonpenetrating surgery
   A. Viscocanalostomy
   B. Nonpenetrating deep sclerectomy (NPDS)
5. Wound modulation
WELCOME!

My name is Dr. Shawn Cohen. I am an ophthalmologist trained at both McGill University in Canada and Duke University in the United States of America. I developed this website for patients, not just my own patients, but anyone who walks into an eye specialist's office and is at a loss.

Being a patient is a very hard thing to be. Many emotions go through a person's mind while visiting an eye professional: nervousness, fear, anxiety... I would like to help patients overcome these often paralyzing emotions in order to gain control over their own health care.

Since this site is a work in progress, your comments would be most welcome. So, please browse the links and stay healthy!!

We are grateful to Rhena Cohen and The Real Deal With Twins for generous sponsorship.
Super Eye Care Artwork
Benefiting the Montreal Association for the Blind

Under Construction... please stay tuned!

Please remember to click your "refresh" or "reload" button on your browser or empty the cache file to see the latest changes in our site!

The Montreal Association for the Blind

Stay tuned for a selection of artwork available for purchase with a portion of proceeds going to the Montreal Association for the Blind.
### Shawn Cohen, MD: Links

**My Glaucoma**

Common questions and answers about glaucoma.

**New Advances in the Management of Glaucoma**

A review of diagnostic and treatment factors in glaucoma.

**Medication Scheduler**

French and English Excel table for eye drops after cataract surgery and for glaucoma drops.

**Glaucma Checklist**

Parkhurst exchange glaucoma checklist featuring risk factors, signs, symptoms, treatments and more.

**Predicting Glaucoma Progression!**

A published method to predict ocular hypertension progression to open-angle glaucoma. *(Summary)*

**Study Proposal**

Please support our specific research proposal about an innovative way to detect glaucoma much earlier than current methods.

**Amazing Advances in the Treatment of Glaucoma and Cataracts**

Public lecture supported by the McGill Center for Studies in Aging.

**Invention**

A patentable hand-held laser beam delivery system for sale.

### Links to Great Sites!

**Canadian Ophthalmological Society**

A great organization, sincerely dedicated to great patient care.

**American Glaucoma Society**

A patient-oriented resource for glaucoma care.

**Glaucoma Service Foundation**

Glaucoma support site as well as education, awareness and research insights.

**Test Yourself: Keep Your Sight!**

Online screening tests for glaucoma and macular degeneration. FDA registered.

**Glaucoma Treatments**

Very clearly written information on glaucoma medications, lasers and surgical procedures.

**A Patient’s Guide to Glaucoma**

Great free eBook and outstanding reference!

**West Coast Glaucoma**

Many links to free published documents on glaucoma.
SATURDAY, MARCH 17, 2007

**Online Patient Support**

Let us discuss the best ways to use the internet to better serve patient interests. My site, supereyecare.com, was started with this goal in mind. I have provided links to some useful free information sources that I commonly refer to as great patient guides. What you get that is extra is other information and sites that cost very little but can serve you and your loved ones extremely well right away and in the future.

I also believe in community support and as such will work with the Montreal Association for the Blind (MAB) to provide some opportunities for further community support. For now, this is in the form of artwork sales, for which I charge no fee yet serve as a link between the artist, the consumer and the MAB.

My question to you is how do you see this benefiting you and others and do you see ways in which I can help you even more?

I eagerly await your input!

Shawn Cohen, MD

POSTED BY SUPEREYECARE AT 9:33 AM · 0 COMMENTS
I Care About Eye Care
by Shawn Cohen

This item rated Everyone by its creator.

Price: select the products you want to purchase
- $14.94 Download
- $22.92 Paperback book

Add to cart

This item has not yet been rated. Be the first to rate it!
Buy this item to rate it.
E-mail this page to a friend

Description:

Being a patient is a very hard thing to be. Many emotions go through a person's mind while visiting an eye professional: nervousness, fear, anxiety... As a practicing ophthalmologist, I developed this document to help you get the answers you need. Most importantly, it will empower you to take a more active role in your own eye care so as to best ensure the successful implementation of the best treatment plan with your eye care professional. It is not intended to replace or question the information shared during the course of the eye exam but rather to serve as a guide to better focus the discussion in the examining chair. As you walk into the doctor's office, you often rely on your health professional to give you all the answers, but in order to get them you must first know the questions to ask. So, at the end of each topic is a section with special tips you might wish to discuss with your doctor.

Product Details:

Printed: 23 pages, 8.5" x 11", saddle-stitch binding, full-color interior ink
Publisher: Shawn Cohen
Copyright: © 2007 by Shawn Cohen, MD Standard Copyright License
Language: English
Country: Canada
Visual Fields

The visual field test measures the side or peripheral vision. It can be used to test for damage to the optic nerve, the visual nerve of the eye. Possible causes of damage include pressure problems (glaucoma), trauma, neurological diseases, strokes and even tumors! So, although it can be quite tedious and frustrating to do, it is a very important test. The key is to realize that the machine is designed to test what you DO NOT see. As such, there will be about half of the points that you will not see and you can still be normal. There is a central target to look at, either the larger hole for the more generalized exam or the center of the cross for the more central exam. With one eye covered and the other opened, you simply look at the target indicated by the tester and, WITHOUT looking away from the target, click on a hand-held button when you see a light that is shined randomly in the periphery somewhere.

Special Tips

It takes time to learn to administer eye drops properly. The usual method involves pulling down the lower lid and allowing the drop to fall in the pocket without having the bottle touch the eye. Another useful tip is to flip over a paper drinking cup, like a Dixie cup and make a hole in the bottom large enough to fit the bottle tip of the open eye drop through it. When lying down, the cup is placed over the eye. This ensures that drop will hit the eye and not the lids. Once the drop is in the eye, do not blink excessively or squeeze as this will force more of the drop into the tear ducts. Of course, I wouldn’t try to drink from that cup again!
The Real Deal With Twins

by Rhena Cohen

Price: select the products you want to purchase
- $14.94 Download
- $37.41 Hardcover book

Add to cart

This item has not yet been rated. Be the first to rate it!

Buy this item to rate it.
E-mail this page to a friend

Description:
As a parent of twins, I know that taking time to enjoy every moment is not easy to do, while you are occupied with your children and your daily routine. Simple pearls (tips of information with high value), which are provided for you in this memoir book, can be learned and then applied to your daily activities. This memoir book provides you with the space to write down your milestones of each child individually and together, where appropriate. As you know, each milestone comes with new activities and adjustments as these skills develop. The suggestions in each section were written to share with you ways to cope, have fun and enjoy the many enriching experiences you will encounter. Parents of twins share a common bond and a deep understanding of what raising twins is all about. This memoir book was written for this reason. I genuinely hope these acquired pearls help you savor your unique and privileged position and enable you to take the time to enjoy and record these precious moments.

Product Details:
Printed: 54 pages, 8.25" x 10.75", casewrap-hardcover binding, full-color interior ink
Publisher: Shawn Cohen
Copyright: © 2001 by Rhena Cohen Standard Copyright License
I Care About Eye Care
By: Shawn Cohen, MD

Price: $14.94
Format: Adobe Reader PDF
Availability: Download Now

Requirements: Free Adobe Reader (More Details)
Restrictions: Restrictions Vary (More Details)
Platforms: Windows, Mac, Linux, Palm, Pocket PC (More Details)
Features: Printing, advanced navigation, search, bookmarks, and multiple viewing options.

I Care About Eye Care

Being a patient is a very hard thing to be. Many emotions go through a person's mind while visiting an eye professional: nervousness, fear, anxiety... I developed this document to help you get the answers you need. Most importantly, it will empower you to take a more active role in your own eye care so as to best ensure the successful implementation of the best treatment plan with your eye care professional. It is not intended to replace or question the information shared during the course of the eye exam but rather to serve as a guide to better focus the discussion in the examining chair.

As you walk into the doctor's office, you often rely on your health professional to give you all the answers, but in order to get them you must first know the questions to ask. So, at the end of each topic is a section with special tips you might wish to discuss with your doctor.

Included are 10 subjects patients need to know about. This is vital information that patients may never be told or find out about but need to know. Topics include the eye exam, glaucoma, diabetes, macular degeneration, cataracts, trauma, pediatrics, plastic surgery, refractive surgery and blepharitis.

About the Author:
Thank You