Pigmentary Uveitis

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Pigmentary Uveitis - Clinical Signs

- Breed Predisposition
  - Golden Retriever
  - Labrador Retriever
  - Flat Coat Retriever
  - Great Dane
- No sex predisposition
- Age: Ciliary Body Cysts @ 3 – 4 years
- Clinical Signs:
  - In early cases it is hard to document overt inflammatory disease
  - Ciliary Body Cysts
    - Iris cysts, uveal cysts, ciliary body cysts
  - Persistent or re-occurring conjunctivitis
  - Progressive hyperpigmentation of the iris
  - Pigment migration onto the anterior lens capsule
  - Posterior synechia
  - Focal cataracts - progressive
  - Angle Closure
  - Secondary Glaucoma
Iris Cysts

Dogs

Cats

© Dr. Maria Joao Vieira

© Dr. Dennis Brooks
Iris cysts seen in numerous breeds

Husky

Boston Terrier

© Dr. Carla Kolta

© Dr. Brian Watson
Always Measure IOP

Normal Intraocular Pressure
"normal" range varies depending upon how the IOP is measured.

Indentation tonometry
   Schiötz tonometer
   15 to 25 mmHg

Applanation tonometry
   Tonopen (XL or Vet)
   15 to 20 mmHg

Rebound Tonometry
   Tonovet
   12 to 18 mmHg
Pigmentary Uveitis – early signs

© Dr. David Whitney

© Dr. Sara Patton
Pigmentary Uveitis
Pigmentary Uveitis with Iris Cysts

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Pigmentary Uveitis

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Pigmentary Uveitis – later signs

© Dr. April Hahn

© Dr. Alison Litchfield
Golden retriever cystic uveal disease: a longitudinal study of iridociliary cysts, pigmentary uveitis, and pigmentary/cystic glaucoma over a decade in western Canada

Some cysts remain hidden behind the iris, displacing the iris root forward resulting in a shallow anterior chamber and possible compromise of the drainage angle.

Use of high-resolution ultrasound as a diagnostic tool in veterinary ophthalmology
Ultrasound biomicroscopy (UBM) for detection of canine uveal cysts

UBM: 50 MHz probe

Regular ocular ultrasound probe is 7.5 or 12 MHz

- Comparison of ultrasound biomicroscopy and standard ocular ultrasonography for detection of canine uveal cysts

<table>
<thead>
<tr>
<th>Type of probe</th>
<th>% detected</th>
</tr>
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<tbody>
<tr>
<td>Ocular u/s probe</td>
<td>0%</td>
</tr>
<tr>
<td>UBM probe</td>
<td>sensitivity 47%</td>
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<tr>
<td></td>
<td>specificity 92%</td>
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The pathogenesis of uveitis. An imbalance between the regulatory mechanisms and inflammatory mechanisms contribute to uveitis. Only some examples of contributing role players such as regulatory T cells versus Th17 cells are shown. A combination of environmental risk factors and genetic risk factors tip the balance towards the development or chronicity of uveitis. RPE: retinal pigment epithelium; PMNs: polymorphonuclear cells
Pathogenesis of Pigmentary Uveitis

• What comes first?

- Uveal Cysts
- Genetic predisposition
- Uveitis
- Genetic predisposition
- Uveitis
- Uveal Cysts
Golden Retriever Foundation
Health Survey of 1444 Goldens (1998-1999)

<table>
<thead>
<tr>
<th></th>
<th>0 – 3 yrs</th>
<th>3 – 8 yrs</th>
<th>8 – 13 yrs</th>
<th>13+ yrs</th>
<th>Total</th>
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<tbody>
<tr>
<td>Uveitis</td>
<td>0</td>
<td>2</td>
<td>11</td>
<td>3</td>
<td>16</td>
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<tr>
<td>Iris Cysts</td>
<td>0</td>
<td>5</td>
<td>7</td>
<td>0</td>
<td>12</td>
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<tr>
<td>Eye dx / all</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>381 / 1444</td>
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</table>

COPLOW – Comparative Ophthalmic Pathology Laboratory of Wisconsin
survey of 2176 enucleated or eviscerated dog eye submissions

<table>
<thead>
<tr>
<th>COPLOW Cases</th>
<th>numerator</th>
<th>denominator</th>
<th>percentage</th>
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<tr>
<td>Glaucoma</td>
<td>530</td>
<td>2176</td>
<td>24%</td>
</tr>
<tr>
<td>Golden Retrievers</td>
<td>25</td>
<td>530</td>
<td>5%</td>
</tr>
<tr>
<td>Iridociliary Cysts</td>
<td>13</td>
<td>25</td>
<td>52%</td>
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</table>
COPLOW’s Cases of Glaucoma with Iris Cysts in Golden Retrievers

- large thin-walled cysts lined with attenuated cuboidal epithelium filling most of the posterior chamber (13/13; 100%)
- thick walled cysts containing hyaluronic acid (8/13; 62%)
- a solid cellular proliferation (2/13; 15%)
- a retro-corneal membrane associated with a defect in Descemet's membrane (7/13; 54%)
- iris bombe (5/13; 38%)
- a pre-iridal fibrovascular membranes (4/13; 31%)
- hemorrhage (4/13; 31%)
- a cellular membrane on the anterior lens surface (6/13; 46%)
- retinal detachment (5/13; 38%)
- peripheral anterior synechia (5/13; 38%)
- posterior synechia (6/13; 46%)
Pathogenesis of Secondary Glaucoma in Pigmentary Uveitis

- Genetic Predisposition
- Golden Retriever

Glaucoma

Uveitis

Uveal and Iris Cysts

PIFM

Cataracts

Synechia

- a. Cytokines
- b. Inflammatory debris blocks drainage angle
- c. PIFM blocks drainage angle
- d. Synechia blocks drainage angle
- e. Lens induced uveitis
Histopathology – ciliary cysts

© Dr. John Sapienza
The histopathological and immunohistochemical characteristics of pigmentary and cystic glaucoma in the Golden Retriever
A histopathological study of iridociliary cysts and glaucoma in Golden Retrievers
A histopathological study of iridociliary cysts and glaucoma in Golden Retrievers
A histopathological study of iridociliary cysts and glaucoma in Golden Retrievers
Treatment Options - Topical
Treatment Options - Oral

- Prednisone Tablets USP 50 mg
- Atopica 100 mg
- Imuran 50 mg Azathioprine
- Ketoconazole Tablets USP 200 mg
Treatment Options - Injectable

- Triamcinolone
  - Administer 0.2ml (8mg) by subconjunctival injection
  - Intravitreal injection

- TPA - Tissue Plasminogen Activator
  - Administer 0.2ml by intracameral injection
Preparation of Triamcinolone for intravitreal injection

**Method: to wash out preservatives**

- Triamcinolone can be purchased in 40 mg/mL or 10 mg/mL concentrations, both of which have significant preservatives when taken straight from the bottle.
- For intravitreal injection, the preservatives must be washed out by removing the liquid carrier and re-suspend the triamcinolone in sterile balanced salt solution.
- Step 1. Draw 1 cc of triamcinolone (40 mg/mL) into a 5 cc syringe.
- Step 2. Place a 0.22 µm filter on the syringe and reattach the needle.
- Step 3. Expel the fluid through the filter and discard it, thereby trapping the triamcinolone particles in the filter.
- Step 4. Draw 4 cc of sterile balanced salt solution into the syringe, thereby re-suspending the triamcinolone particles.
- Step 5. Expel and discard the fluid again and re-suspend the triamcinolone particles by drawing up 4 cc of balanced salt solution again. The triamcinolone is now washed.
- Step 6. Remove the filter and needle and attach a blunt canula for intraocular use. The final concentration of triamcinolone is 10 mg/mL.
The Future:

Sustained drug delivery

Intravitreal Anti-metabolite agents

- Anti-VEGF therapy has been used in the treatment of glaucoma & ocular neovascular diseases.
- anti-angiogenic properties
- anti-fibrotic properties
- Bevacizumab & Ranibizumab

A, Retisert®; B, I-vation™ implant; C, Suprachoroidal implant; D, E, Intravitreal implants (e.g. Ozurdex®, Illuvien); F, microparticles, nanoparticles, liposomes; G, Verisome system; H, Cortiject emulsion.
Sustained-release cyclosporine implant (6mm diameter) overlying sclera flap prior to placement just above choroid (suprachoroidal).

The scleral flap is then sutured over the implant and finally the conjunctival flap closed separately.
References

- **Townsend WM¹, Gornik KR.** (2013) Prevalence of uveal cysts and pigmentary uveitis in Golden Retrievers in three Midwestern states. *JAVMA* 243:1298-301