CME
in the Phaco era
Myth or Reality
Nicholas Lee
Hillingdon & Western Eye
Scope

- History
- Incidence
- Pathogenesis
- Treatments
  - None
  - Steroids
  - Acular
  - Yellox
  - Diamox
  - Anti-vegf
- Prevention
- Audit
Irvine – Gass Syndrome

- Irvine described 1st 1953
- Gass Norton FFA 1966
- Irvine 1976 Survey of Ophthalmology review
- Over 100 Papers on the subject
- Medicare Estimate 47% increase in cost of cataract care if patients develops CME.

Irvine AR A newly defined vitreous syndrome following cataract surgery, interpreted according to recent concepts of the structure of the vitreous. AM J Ophthalol 1953 36: 599-619
Gass JD nort wn EW Cystoid macular edema and papilledema following cataract extraction: a fluorescein fundoscopic and angiographic study. Arch ophthal mol 1966; 76:646-681

2012 Reviews Conceicao Lobo Pseudophakic CME in OphthalmologicaYoshihiro in www.co-ophthalmology.com
Aetiology and Risk factors

- Type of Cataract surgery
- Light toxicity
- Vitreo macular traction
- Inflammatory mediators
- Use of Adrenaline in BSS
- Intracameral Drugs eg Cefuroxime
- Vitreous loss
- Integrity of capsule
- Hypertension
- Diabetes
Light Toxicity

- ? To use Yellow Filter or NOT?
- Light occluder made no difference in study.
- UV Absorbing IOLS?

Age

- Slight increase with age

Vitreous

- PCR – Increase 10 – 20%
- PCR Less of increase than if Extra Cap
- Dropped Nuclei / retained nuclei fragments
- IOL exchange
- Iris Incarceration
- Vitreous to wound
- Yag Capsulotomy

Loewenstein Post surgical Edema Deve Ophthal Basel Karger 2010: 47: 148-159
Glaucoma medication

- Latanoprost /BAK
  - Arcieri 2005 RCT Increased risk
  - Law 2010 Retrospective 1253 eyes no increased risk
  - PB Stop Xalatan after, Restart if necessary

- ? Change glaucoma medication?

- Also RVO, and Epiretinal membranes
  Increase risk
  - OCT prior to Ct operation.

Arcieri BAB Changes after use of Prsotaglandin analogues in .... Arch Ophthalmolo 2005 123:186-192
Law Sk, Clinical CME after ct surgery in Glaucoma J Glaucom 2010 18:100-104
Diabetics

- Increased Risk
- Even in R0
- Diabetic macular oedema VS Irvine-Gass – Co-exist
- Difficult to differentiate vs DME
  - Post op Hyperfluorescence of Optic disc on FFA
- Treat DME Prior to surgery
  - On table Anti-VEGF/Steroids.

Pollack CME Following cataract surgery in patients with diabetes BJO 1992: 76: 221-224
Uveitis

- More complicated Cataracts
  - Iris hooks, Prolonged operations
- Studies (Belair & Ram) show 8 to 21 even 50% Incidence
- Control Preoperative inflammation
  - Pre treatment with topical steroids reduces risk by x7 fold.

Ram. Phaco with IOL in Uveitis JCRS 2010
Belair Incidence of CME after Ct surgery with and without Iweitis using OCT. AJO 2009 148 128-135
Incidence

- Depends on Methodology used to detect
  - FFA
  - OCT
  - Symptoms – Vision
- Prophylactic NSAID, Post op NSAID/Steroids
- Intracapsular Surgery – 60%
- Extracapsular Surgery – 20-30%
- Phacoemulsification
  - Routine cases
  - Complicated cases - 4 -13%

Lobo C. Pseudophakic Cystoid macular Edema Review: Ophthalmologica 2012;227;61-67
### 1994 St Georges Hospital Audit of Angiographically CMO after PCR

<table>
<thead>
<tr>
<th></th>
<th>Intact Vitreous face</th>
<th>Vitreous loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECCE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CMO</td>
<td>2 (14%)</td>
<td>7 (15%)</td>
</tr>
<tr>
<td>NO CMO</td>
<td>14</td>
<td>46</td>
</tr>
<tr>
<td>Total</td>
<td>16</td>
<td>53</td>
</tr>
</tbody>
</table>
Ocular Complications with Cataract surgery in US Veterans AAO 2012

Study Objectives

- To investigate the prevalence and predictors of intraoperative and 90-day postoperative ocular complications from cataract surgery in the US Veterans Health Administration (VHA)
  - Ninety days - the follow up endpoint
    - Centers for Medicare and Medicaid Services (CMS) global surgical package

Methods

- Retrospective cohort study
  - Inclusion criteria
    - Veterans who had cataract surgery 10/1/05 – 9/30/07
      - One surgery within 90 days of the index surgery
  - Exclusion criteria
    - Cataract surgery in the fellow eye within the 90-day period
    - VHA administrative database
    - ICD-9 & CPT codes: National Patient Care Database

Results

- 53,786 unique patients
  - 45,082 met inclusion criteria
- Demographics
  - Mean age: 71.8 years
  - 97.6% male; 76.0% white
- Most common comorbidities
  - Systemic: Diabetes mellitus (DM; 40.6%), chronic obstructive pulmonary disease (21.2%), DM with complications (14.2%)
  - Ocular: Age-related macular degeneration (14.4%), DM with ophthalmic manifestations (14.0%), glaucoma (13.6%)

<table>
<thead>
<tr>
<th>Intraoperative Complication</th>
<th>Number (%)</th>
<th>n = 45,082</th>
</tr>
</thead>
<tbody>
<tr>
<td>Posterior capsular tear and/or vitreous loss</td>
<td>1,590 (3.5)</td>
<td></td>
</tr>
<tr>
<td>Retained lens fragments</td>
<td>73 (0.2)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Postoperative Complication</th>
<th>Number (%)</th>
<th>n = 45,082</th>
</tr>
</thead>
<tbody>
<tr>
<td>Posterior capsular opacification</td>
<td>1,893 (4.2)</td>
<td></td>
</tr>
<tr>
<td>Cystoid macular edema</td>
<td>1,469 (3.3)</td>
<td></td>
</tr>
</tbody>
</table>

Paul B. Greenberg, MD, Victoria L. Tseng, BS, Wen-Chih Wu, MD, Jeffrey Liu, MD, Lan Jiang, MS, Christine K. Chen, BA, Ingrid U. Scott, MD, MPH, Peter D. Friedmann, MD, MPH
<table>
<thead>
<tr>
<th>Study</th>
<th>Year</th>
<th>Total</th>
<th>Incidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Veterans</td>
<td>2012</td>
<td>45,082</td>
<td>3.3%</td>
</tr>
<tr>
<td>Gallego-Pinazo</td>
<td>2011</td>
<td>250</td>
<td>4.4%</td>
</tr>
<tr>
<td>Pegaptanib</td>
<td></td>
<td>250</td>
<td>0.4%</td>
</tr>
<tr>
<td>Lee pp</td>
<td>2011</td>
<td>125</td>
<td>3%</td>
</tr>
<tr>
<td>Hillingdon</td>
<td>2010</td>
<td>1200</td>
<td>3%</td>
</tr>
</tbody>
</table>
Classification

- Angiographic CME – Normal Vision
  - Normal OCT
- Clinically Significant CME
  - Reduced vision, CME on OCT
  - Within 4 months of surgery Usually 4-6 Weeks
- Late on set CME > 4 months
- Chronic CME Lasts > 6 Months
**Natural history**

- Most recovery spontaneously
- 50% - 75% achieving improving vision with in 6 months
- 1-3 % persist
  - Fluid corresponds to Symptoms

Salmon LD – Efficacy of Topical Flurbiprofen and Indomethacine in preventing CME JCRS 1995 21:37-81
Multiple Reports Show effectiveness of NSAIDS
- Ketorlac
- Bromfenac

Topical Corticosteroids synergistic

Heier Ketrolac VS prednisolone ... Am cade Ophthalmology 2000 107 2034-2038
Treatment Acetazolamide

- Stimulate RPE pump to pump excess fluid out of the macular
- Induces acidification of subretinal space increasing fluid absorption through RPE or choroid

Inflammatory mediators (prostaglandins, cytokines ..) Induce disruption of blood-retinal barrier after surgery, increasing permeability form the perifoveal capillaries with resultant fluid accumulation in perifoveal retina.

Disruption of this barrier causes fluid accumulation

Though the pattern is distinctive dependant on the cause eg Post surgery looks different to diabetic CMO or Vein occlusion CMO.
Refractory Cases Bevacizumab

- VEGF well known to be associated with break down of blood-retinal barrier
- ? Role in Post op CMO?
- 2007 Pan American Collaborative group retrospective study showed 71% improvement by 2 lines at 6 months to those pts refractive to other rx.
  - Well tolerated, low side effects
- Spitzer et Al – However found no improvement
Bevacizumab Pan American Collaborative Retina study group

- Patients unresponsive to other rx.
- 71% - topical steroids
- 30% Intravitreal Trimacinolone
- 29% NSAID
- 13% periocualr steroids
- 10% Systemic steroids
Vitreous

- Vitreous to the wound
  - Vitreolysis
  - VMT - Vitrectomy
Case Study.

- 76 F Vision 0.12 & 0.90
- May 2009 Left phaco Uncomplicated Vision improved 0.26
- July 2009 V Keen for Right eye Vision 0.4
- Oct 2009 Right Phaco, Topical, Squeezing, ST4
  - PCR at Choping stage. Anterior vitrectomy, Lens in sulcus
  - Squeezing, Lens haptic in iris angle – bleeding
- Day 1 Post op HM, Intense Topical steroids
- Day 7 – repositioned IOL, Iris Dialysis noted.
- Day 30 – 0.62 vision
- 6 weeks – 0.26 – NO cmo
- 12 weeks 0.5 Vision CMO – Acular, Diamox, Maxidex
29 months ON still on Bromfenac and Dexamethasone alternate Days.
Vision improved to 0.2 vs 0.0 Fellow eye
## Management

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Summary</th>
<th>Highest level of evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topical Corticosteroids</td>
<td>1&lt;sup&gt;st&lt;/sup&gt; Proposed treatment</td>
<td>Case Series</td>
</tr>
<tr>
<td></td>
<td>May act synergistically with NSAID</td>
<td></td>
</tr>
<tr>
<td>Topical NSAIDS</td>
<td>Multiple studies show effect in both prophylaxis and Treatment. More effective than Steroids?any NSAID superior</td>
<td>Multicentre RCT Meta analysis</td>
</tr>
<tr>
<td>Sub conjunctival steroids</td>
<td>Data limited</td>
<td></td>
</tr>
<tr>
<td>Orbital floor</td>
<td>Used when refractory to other treatments and Chronic</td>
<td></td>
</tr>
<tr>
<td>Intravitreal steroids</td>
<td>Anatomical and visual benefits but may be transient, multiple injections side effects</td>
<td></td>
</tr>
<tr>
<td>Dexamethasone implant</td>
<td>Anatomical and visual benefits but may be transient, multiple injections side effects</td>
<td></td>
</tr>
<tr>
<td>Intravitreal Anti-VEGF</td>
<td>Option to refractory Cases 72% improved</td>
<td></td>
</tr>
<tr>
<td>Oral Acetazolamide</td>
<td>Effective but not well tolerated Second line</td>
<td></td>
</tr>
</tbody>
</table>
Conclusions/Recommendations

- Pre Op evaluation of Patient
  - Minimise risk factors, treat Uveitis, DME
- Prophylactic Treatment NSAID for first month with Topical Steroids which can be reduced after first 2 weeks.
  - Lobo 2012 – Adopted as Hillingdon Regime 2011
- If CME is Diagnosed
  - Topical NSAID & Steroids reintroduced for 1 month
  - OCT VA at one month
    - No improvement
      - Acetazolamide
      - Periocular Corticosteroids
      - Intravitreal Trimacinolone
      - Intravitreal Anti-VEGF
  - If there is vitreous Incarceration
    - Vitrectomy