Bascom Palmer Files

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Mark Dunbar: Disclosure

• Consultant for Allergan
• Optometry Advisory Board for:
  – Allergan
  – Carl Zeiss Meditec
  – Regeneron
  – BioTissue

Mark Dunbar does not own stock in any of the above companies
Agenda

• Historical perspective
• Retinal Disease -> macular degeneration
• Retinal Glaucoma Imaging
• Glaucoma
• Cornea/External Disease
Bascom Palmer Eye Institute is named the #1 eye hospital in the country by U.S. ophthalmologists surveyed by Good Housekeeping magazine.

And a trend is born!
A Tradition of Excellence!

Bascom Palmer
Eye Institute
#1 in Eye Care in the U.S.A. for 12 Consecutive years
65 y/o White Female

↓ VA RE X 6 Wks, ↓ VA LE X > 1 Yr

20/100 20/400
Idiopathic Macular Holes

- VA 20/400 to 20/60
- 1/3 DD full thickness round hole
- Surrounding cuff of fluid
- Yellow deposits in the base of the hole
- Translucent operculum (anterior) 50%
- May have associated ERM (10-20%)
Idiopathic Macular Holes

Pathogenesis

– Anterior-posterior vitreous traction

– 1989 Gass/Johnson: Tangential traction due to shrinkage and contraction of the prefoveal vitreous cortex
Stages of Macular Holes

- **IA:** Yellow spot or ring in macula
- **IB:** Loss of foveal depression
- **II:** Partial tear in the sensory retina
- **III:** Fully developed full thick mac hole
- **IV:** Macular hole with posterior vitreous separation
Full Thickness Macular Hole

Diagnostic Tools

• Clinical appearance
• OCT
• Slit Beam Test (Watzke-Allen Test)
• Amsler Grid
• Laser Aiming Beam Test
Vitreous Surgery for Macular Holes

  - 52 patients
  - PPV/Removal vitreous cort, Fld/Gass exchange
  - 58% anatomic success, 73% visual success
  - Overall 42% success rate

- Kelly, Wendel: Ophth Nov 1993
  - 170 patients
  - 73% anatomic success, 76% visual success
  - Overall 56% success rate
Heidelberg Spectralis
Macular Holes
Loss of Vision

• Loss of neurosensory retinal tissue
• Rim of subretinal fluid around the hole (microdetachment)
Macular Hole Surgery

Postoperative Period

– Face down for 2 weeks
– Has evolved to face down for 1 wk
Chorioretinitis Sclopetaria

- Closed globe injury that results from high velocity object bumping, but not perforating the sclera.
- Full-thickness defect in Choroid, Bruch’s membrane, and Retina, but Intact Sclera.
- Tissue replaced with dense fibrous connective tissue.
Commotio Retinae

• Whitening of outer retinal layers
• Shock waves traversing the eye
• Cherry red spot and decreased vision in Berlin’s edema
• Good prognosis
50 y/o Hatian Female

Decreased vision OU L > R X 6 months
Vitreomacular Traction
Impending Macular Hole

Stage I B
7/27/2014

65 y/o Hispanic Female
VA: 20/40
VMT evolving into a Macular Hole
Lamellar Macular Hole

- Originally described in 1975 by JDM Gass
  - Identified a peculiar macular lesion that resulted from cystoid macular edema
- Used to describe the abortive process of a developing a full thickness macular hole
Lamellar Macular Hole in the Era of OCT

• Witkin et al reported on 19 eyes of 18 patients with lamellar holes imaged with ultra-high resolution OCT

• All the lamellar holes shared some common features
  – An irregular foveal contour
  – A break in the inner fovea
  – Separation of the inner from the outer foveal layers, leading to an intraretinal split
  – Absence of a full thickness defect with intact photoreceptors posterior to the area of foveal dehiscence.
45 y/o Hispanic Female
Routine Exam
VA 20/25
Leonardo
57 y/o Hispanic Male

• “Routine” exam
• Has had poor vision for ~ 25 yrs or so
• VA: 20/70 RE; 20/60 LE
• CVF: FTFC OU
• Pupils: ERRL – No APD
• SLE – Tr NS
Leonardo
10/17/06
1 ½ yr later
s/p IV Avastin X 2 Weeks
2 Wks s/p IV Avastin
DRCR.net: Protocol S

• Is Lucentis as good (noninferior) as traditional PRP for patients with PDR?
• 55 U.S. clinical sites
• 203 eyes were randomly assigned to receive PRP (completed in 1 to 3 visits) and 191 eyes received 0.5 mg intravitreous ranibizumab at baseline and as frequently as every 4 weeks (based on a structured re-treatment protocol)
• Primary endpoint: mean change in VA letter score from baseline to 2 years.

DRCR.net: Protocol S

- At 2 years, VA improved by 2.8 letters from baseline in the ranibizumab group vs. improvement of 0.2 letters from baseline in the PRP group
- There was more peripheral VF loss and more vitrectomy’s in the PRP group vs. Lucentis
  - VF Loss: 213 dB in the ranibizumab group vs. 531 dB in the PRP group
  - PPV: 15% with PRP vs. 4% with Lucentis
- When DME present, Lucentis did a better job treating

"Welcome Doctor to Neuro-opthalmology Tape #72" Thus starts nearly all of the tapes that may have helped make Dr. J. Lawton Smith so famous. Interestingly enough, it appears that Dr. Smith was so far ahead of his time, that he had invited the Podcast well before the internet was even invented!!

Many of our society members who knew J. Lawton Smith personally or who trained under him understand well the special charisma that he possessed and shared with the world. His lectures were known throughout the ophthalmology world and still stand as classics within our field. We are pleased to announce that many of these lectures are available by podcast. We encourage you to visit these pages and listen to Dr. Smith's lectures which still stand the test of time.

The Legend of Lawton PDF
71 y/o Hispanic Male

- Presented with blurred VA distance and near
  - Not sure how long
- VA: 20/70 RE; 20/60 LE
- CVF: FTFC (I think)
- Pupils: No APD
- SLE: 2-3+ NSC OU; 2+ PSC LE
- Fundus: Normal
71 y/o Hispanic Male

Diagnosis
- Cataracts OU

Plan
- CE/IOL LE 1st

- CE/IOL done: LE 06/08, RE 07/08
71 y/o Hispanic Male

08/12/08

• Pt happy with vision
• VA: 20/60 RE; 20/40 LE
• Minimal refractive error
• No APD
• Fundus looks normal
3 Mo Later

11/19/08

• Reports to the ER with sudden ↓ VA RE
  – No Pain
• VA: LP RE; 20/80 LE
• Constricted VF LE
• Pupils: No APD
• Anterior Seg: Unremarkable
• Fundus: Normal ON’s and macula
3 Mo Later

11/19/08

Impression

• Unexplained vision loss
  – Functional
  – GCA

• Send to Neuro

• Order ESR and CRP
  – Sed Rate: 10, CRP 0.15 (normal < 0.8)
5 Days Later: 11/24/08

• Neuro-ophthalmology evaluation
• VA: HM RE: 20/200 LE
• VF

What now?
Central 30-2 Threshold Test

Fixation Monitor: Blindspot
Fixation Target: Central
Fixation Losses: 0/16
False POS Errors: 0 %
False NEG Errors: N/A
Test Duration: 09:25

Fovea: <0 dB

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Total Deviation

Stimulus: III, White
Background: 31.5 ASB
Strategy: SITA-Standard

Pupil Diameter: RX: +3.00 DS DC X
Visual Acuity: Age: 65
Date: 12-08-2008
Time: 1:16 PM

GHT
Outside normal limits

MD: -28.19 dB P < 0.5%
PSD: 6.92 dB P < 0.5%

Pattern Deviation

:: < 5%
:: < 2%
MRI: Axial Scans
MRI: Coronal and Sagittal Views
Impression

Pituitary Adenoma with Chiasmal Compression
Anterior Segment
15 y/o CL Wear

Corneal Infection

• Attributed to CL case that mom provided
15 y/o Corneal Ulcer

- Corneal scrape and culture
- Presumed pseudomonus
- Treatment:
  - Fortified tobramycin
  - 4th generation FA

Q 15 min X 3 hr
Q 30 min alternating
Fluoroquinolones

• The 1st safe, broad-spectrum ophthalmic antibiotics
• 1st released for ophthalmic use in early 1990’s
• Represented an important break-through for clinicians
• For the 1st time strong commercially available antibiotics available to treat bacterial conjunctivitis and ulcerative keratitis
• Broad spectrum including pseudomonas
Fluoroquinolones

Ophthalmology July 1999; 106 (7): 1313-8

• The **BIG** problem with the fluoroquinolones has been bacterial resistance!
  – **1993** – 5.8% resistance
  – **1997** – 35% bacterial resistance
  – **2001** – 100% resistance to staph aureus isolates cultured in endophthalmitis
    • Resistance to cipro, oflox, levoflox
Trends in Infectious Keratitis

- 73% of MRSA strains are resistant to multiple antibiotics
- 23% of ALL staphylococci strains are resistant to at least 3 ocular antibiotics commonly used to treat
Culture Positive Rates
BPEI 2011-2013

% Culture Positive Rate

- All Ocular (N=5626): 46.8%
- Anterior Chamber (N=243): 29.2%
- Vitreous/Wash (N=534): 38.8%
- Cornea (N=2279): 41.6%
- Conjunctiva (N=1173): 47.2%
Impact of Prior Therapy (59.8%)-Pathogen Recovery 2013*, N=338,

- First and last quarter-2013, Significant differences, p=0.001
- 64.7%-Monotherapy
Presenting Monotherapy Choice
N=119/184 (64.7%)

Monotherapy-Presenting

- Others, N=23: 19.3%
- Steroids (N=5): 4.2%
- Antihistal (N=2): 1.7%
- Antifungal (N=9): 7.6%
- Aminoglycoside (N=20): 16.8%
- Fluoroquinolone (N=51): 42.9%
- Polytrim (N=9): 7.6%
Impact of Prior Therapy - Detection Time (N=153)

- Treated (N=77): 95% (72 hrs), 96% (96 hrs), 99% (7 days), 100% (>7 days)
- Not treated (76): 90% (72 hrs), 97% (96 hrs), 100% (7 days), 100% (>7 days)

- Percentage of patients detected within specified time frames.
Update on Epidemiology and Anti-Microbial Resistance in South Florida

Organism group-Distribution
Ocular Pathogens 2011-2013

- gpos (N=1320) 42%
- mold 8%
- gneg (N=1257) 40%
- MOTT (N=142) 5%
- acan (N=43) 1%
- yeast (N=139) 4%
- Organism group-Distribution
- Ocular Pathogens 2011-2013
- Update on Epidemiology and Anti-Microbial Resistance in South Florida
Significant decline in nonbacterial pathogens from 2005 to 2013, p=0.00016
Free Living Ameoba

- 80% associated with contaminated contact lens/cases

Trends - Decline, NS, p=0.2065, >90% Acanthamoeba
Indications for Culturing

- Involving the visual axis
- Size > 3 mm
- Significant tissue destruction or localized corneal ectasia
- Multiple lesions
- Suspect Fungi or acanthamoeba

- One eyed patient
- Suspected infection in the presence of:
  - Filtering bleb
  - Penetrating trauma
  - Wound leak
  - Exposed buckle or seton
- Immunocompromised patient
Predicting Visual Loss after Healing of Bacterial Corneal Infection

**1-2-3 Rule**

1. Cells $\geq 1+$ in the anterior chamber  
   (10 cells or greater in 1-mm beam)

2. Dense infiltrate $\geq 2$ mm in size in greatest linear dimension

3. Edge of infiltrate $\leq 3$ mm from the center of cornea

What Do You Do If You Are Not Sure?

The Scenario

- Unilateral red eye
- Pain and photophobia
- Keratitis
  - Suspicious for a dendrite
What Do You Do If You Are Not Sure?

The Scenario

• Unilateral red eye with pain/photophobia
• Keratitis - suspicious for a dendrite

Determine

• Is there a preauricular node and follicles?
• Corneal sensitivity?
• How does it stain – RB is hugely important
What Do You Do If You Are Not Sure?

Your Options

• Wait a day
• Treat as if it were HSV
The Diagnosis is Not Always Easy

- 32 year-old white female, complaining that “My EYES HURT!”
  - Reduced acuity and sensitivity to light
  - Soft CL wearer

- Problems began 3 weeks earlier
  - Presented to eye care provider with pain and light sensitivity
    - Treated with antibiotic then Tobradex – with no improvement
  - Saw another Dr. – Dx with HSV
    - Treated with Viroptic, Valtrex, Diflucan, Vigamox
      - Eventually put on Pred Forte
32 year-old white female
“My EYES HURT!”
What Does She Have

• Labs grow out Acanthamoeba
• Treated with:
  – Neosporin i gtt OD q1hr
  – Bacquacil i gtt OD q1hr
  – Chlorhexadine gluconate 0.02% i gtt OD q1hr
  – Tylenol #3 i-ii tabs PO qid or prn
3 Months After Initial Symptoms
Be Suspicious

• CL wearer
• PAIN!!!! – Out of proportion to findings
• RING INFILTRATES
• Multiple treatments and flare ups
• No Improvement

*It might just be Acanthamoeba....
SM: Rookie Pro Football Player

• Suspicion of Acanthamoeba
  – Based on history
  – Based on Confocal microscopy

• Started on
  – Baquicil (polyhexamethylene) gtts q2h
  – Chlorohexidine q1h
  – Vigamox q2h

• Asked to return in 2 days
2 days later
His Course

- Returned to training camp and August 2-a-days
- Had steady improvement
- Was cut on the last day of training camp
SM: 23 y/o Rookie Pro Football Player

- Noted redness, pain, irritation and photophobia LE X 1 week
- Soft CL wearer
- Had spent several days in the Bahamas fishing and doing a lot of boating – Rinsing off with freshwater from the boat water tank
- In training camp and having difficulties
- VA: 20/30
SM

- Nonspecific Keratitis
- Culture and confocal microscopy obtained
Strikingly Similar Presentation

Optometrist

Football Player
Glaucoma
Tania: 44 y/o Hispanic Female

- Has been seen several times over the yrs for routine eye care
- 1998: TA 20/22
- 09/05: TA 18/20
- 12/07: 19/20
Tania: 44 y/o Hispanic Female

- **12/08**: TA: 25/21
  - Pach: 610/620 μ
  - OCT done 1/5/08

- **4/20/09**: TA 23/24
- **4/19/10**: TA 23/25
- **10/11/2010**: TA 22/23
Tania

- Ocular HTN
  - No treatment
  - Is there a reason to justify treating her?
- What is her risk for developing glaucoma?
  - 5 yrs vs. lifetime?
Ocular Hypertension Treatment Study (OHTS)

• Long-term randomized, multicentered controlled, clinical trial

• 1500 OHT pts with moderate risk for POAG randomized
  – Observation vs stepped medical therapy

• 5 yr minimum follow up

• Pts seen 2X/yr for IOP ck and HVF
Ocular Hypertension Treatment Study (OHTS)

• 30-40 clinical centers
• Each center randomized minimum of 50 pts
• Men and women 40-80 yo
• IOP
  \[\rightarrow 24, \leq 32 \text{ in 1 eye}\]
  \[\rightarrow 21, \leq 32 \text{ in the fellow eye}\]
1636 participants randomized, followed 60 mo
  – Observation vs Treatment

Goal: Reduce IOP 20% or IOP ≤ 24
  – Treatment: reduction 22.5% ± 9.9%
  – Observation: reduction 4.0 ± 11.6%

Outcome: reproducible visual field defect or Reproducible optic disc deterioration
OHTS Results *Arch Ophthalmology*
June 2002;120:701-713

- Treatment reduced the chance of developing glaucoma by $\geq 50\%$
- The chance of developing POAG in 5 yrs:
  - Observation group: 9.5%
  - Treatment group: 4.4%

**Conclusion:** Meds are effective in delaying or preventing the onset of POAG
Corneal thickness was a strong predictive factor

- Corneal thickness of < 555 µ had a 3X greater risk for developing POAG vs pts with thickness > 588 µ
  - African Americans had 23.5 µ thinner corneas than other races – closer to normal
  - Other races had thicker corneas than normal
Risk Factors POAG
Arch Ophthal June 2002; 120: 714-720

• Thin corneas
• Age
• Cup-disc ratio
• IOP

• Race – but African Americans had thinner corneas and greater vertical C/D ratios
  – Sig in Univariate analyses (59% greater risk),
  – Not sig in multivariate analysis
Which are NOT Risk Factors POAG?

- Family Hx of glaucoma not a risk factor
- Myopia – Not a risk factor
- Diabetes – “Protective” against POAG
- Migraine
- CVA
- HTN
- Low blood pressure
OHT: 5 Yr Risk for POAG

• Baseline IOP of 25.75 mmHg
  – Ave Corneal thickness < 556 µ: 36% Risk
  – Corneal thickness 565 to 588 µ: 13%

• Cup-Disc ratio > 0.3
  – Ave Corneal thickness < 556 µ: 24%
  – Corneal thickness 565 to 588 µ: 16%
POAG Risk Over 5 Years by Central Corneal Thickness and Baseline IOP in Observation Group

Baseline IOP (mmHg)

- >25.75
- >23.75 to ≤ 25.75
- ≤ 23.75

Central Corneal Thickness (microns)

- < 555
- 555 to < 588
- ≥ 588

- 36% 12% 10%
- 17% 9% 2% 7%
- 6%
POAG Risk Over 5 Years by Corneal Thickness and Baseline Vertical C/D Ratio in Observation Group

Central Corneal Thickness (microns)

<table>
<thead>
<tr>
<th>Corneal Thickness</th>
<th>Vertical C/D Ratio</th>
<th>POAG Risk Over 5 Years</th>
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<tr>
<td>&lt; 555</td>
<td>&gt;0.50</td>
<td>26%</td>
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<tr>
<td>&gt;555 to &lt; 588</td>
<td>&gt;0.50</td>
<td>22%</td>
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<tr>
<td>&gt;588</td>
<td>&gt;0.50</td>
<td>16%</td>
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<td>&gt;0.30 to &lt;0.50</td>
<td>1%</td>
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<td>≤ 0.30</td>
<td>15%</td>
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<td>4%</td>
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Note: The table shows the percentage of POAG risk over 5 years for different combinations of corneal thickness and baseline vertical C/D ratio.
Detection and Prognostic Significance of Optic Disc Hemorrhages during the Ocular Hypertension Treatment Study

Donald L. Budenz, MD, MPH, ¹ Douglas R. Anderson, MD, ¹ William J. Feuer, MS, ¹ Julia A. Beiser, MS, ² Joyce Schiffman, MS, ¹ Richard K. Parrish II, MD, ¹ Jody R. Piltz-Seymour, MD, ³ Mae O. Gordon, PhD, ² Michael A. Kass, MD, ² Ocular Hypertension Treatment Study Group

Main Outcome Measures: Incidence of optic disc hemorrhages and POAG end points.

Results: Median follow-up was 96.3 months. Stereophotography-confirmed glaucomatous optic disc hemorrhages were detected in 128 eyes of 123 participants before the POAG end point. Twenty-one cases (16%) were detected by both clinical examination and review of photographs, and 107 cases (84%) were detected only by review of photographs (P<0.0001). Baseline factors associated with disc hemorrhages were older age, thinner corneas, larger vertical cup-to-disc ratio, larger pattern standard deviation index on perimetry, family history of glaucoma, and smoking status. The occurrence of a disc hemorrhage increased the risk of developing POAG 6-fold in a univariate analysis (P<0.001; 95% confidence interval, 3.6–10.1) and 3.7-fold in a multivariate analysis...
• Disc hemorrhages detected in 128 eyes of 123 participants
• 21 cases detected by both doctor and photos
• 107 cases (84%) were detected only by a review of photography
Of Note:

Incidence of Progressing to POAG

- No Disc Heme: 5.2%
- + Disc Heme: 13.6%
- Presence of a disc heme increase risk of developing POAG 6 fold
Central 24-2 Threshold Test

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<th>Graytone</th>
<th>Threshold (dB)</th>
<th>Total Deviation</th>
<th>Pattern Deviation</th>
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<tr>
<td></td>
<td>GHT: Within normal limits</td>
<td>4.1 mm 20/15</td>
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<tr>
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<td>MD: +1.59 dB  FL: 0/13  FN: 0 %  FP: 0 %</td>
<td>1.17 dB</td>
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Fovea: 40 dB  VFI: 100%

|          | GHT: Within normal limits | 20/20 |                  |
|          | MD: +1.22 dB  FL: 0/13  FN: 0 %  FP: 4 % | 1.48 dB |                  |
|          | VFI: 100% |                  |

Rate of Progression: -0.1 ± 0.1 %/year (95% confidence)
Slope significant at P < 5%