

1

ANTHONY DEWILDE, OD

ANTI-VEGF AND THE EYE

2

FINANCIAL DISCLOSURE

No financial disclosures

3

GOALS

Understand AMD, Diabetic Retinopathy, RVO

Evidence regarding Anti-VEGF

Develop referral strategy

ANTI-VEGF

4

Vascular Endothelial Growth Factor

Embryonic Development

Collateral Development

New Vessels

ANTI-VEGF

5

1994 - VEGF increased with hypoxia

2000's - anti-VEGF can treat certain tumors

2006 - anti-VEGF (ranibizumab) for wet AMD

Macular Degeneration

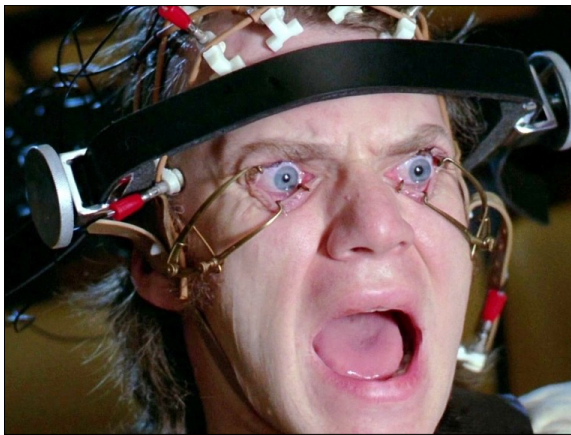
Retinal Vein Occlusions

Diabetic Retinopathy

6



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8

MACULAR DEGENERATION

Threats to Vision

- Atrophy
- Neovascularization

9

Atrophy



10

Neovascularization



11

MACULAR DEGENERATION

Four potential findings

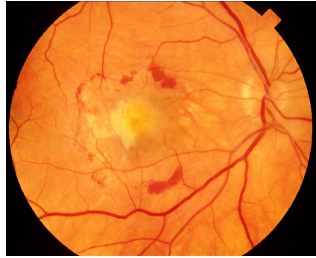
Sensory detachment

Pigment epithelium detachment (PED)

Sub-Retinal hemorrhage

Sub-RPE hemorrhage

12



13

MACULAR DEGENERATION

Historically treated with

Nothing

Laser

Visudyne

14

STUDIES

MARINA/ANCHOR

VIEW

CATT/GEFAL

Treat and Extend

15

STUDIES

16

90% maintain acuity with treatment

Only 50% untreated maintain

STUDIES

17

41% gained 3 lines of acuity with treatment

Only 6% untreated gained

STUDIES

18

33-42% achieve 20/40 or better treated

Only 6% untreated reach 20/40

STUDIES

19

Avastin = Lucentis = Eylea

Fewer injections with Eylea

11 vs 16 at 2 years

TREAT AND EXTEND

20

Treat every month for 3 months

If stable, extend out

TREAT AND EXTEND

21

90% had stability at 2 years

45% had 20/40 acuity

TREAT AND EXTEND

22

Fewer injections (13 versus 17) - over 2 years

Fewer Visits

Less \$\$

PATIENT

23

80 YO WM

AMD OU

S/P PCIOL OU

PATIENT

24

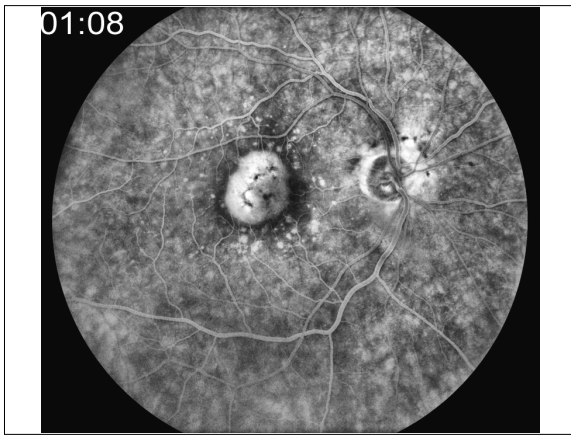
2007

20/50 OD

20/20 OS



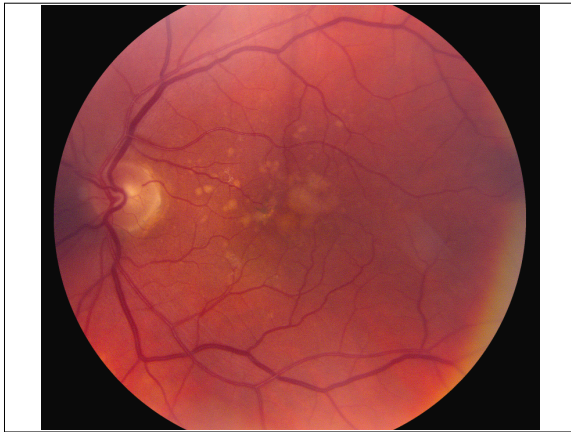
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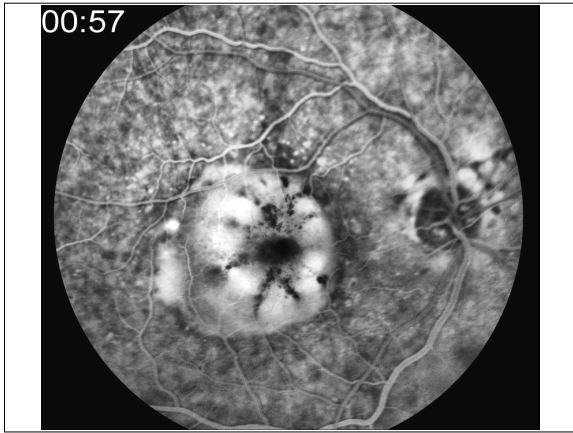
PATIENT

2009
20/50 OD
20/40 OS

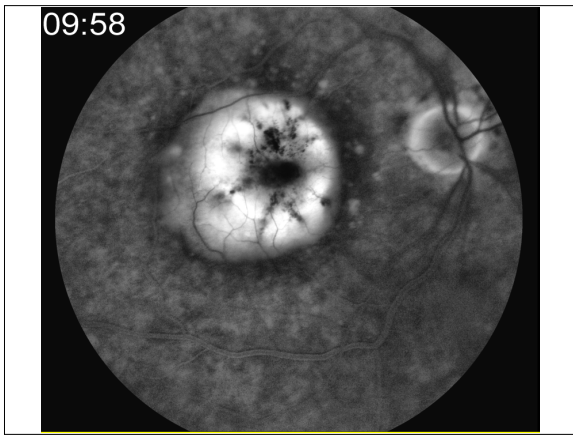
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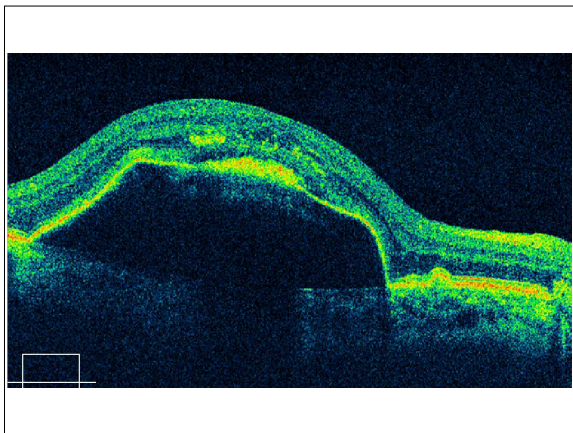
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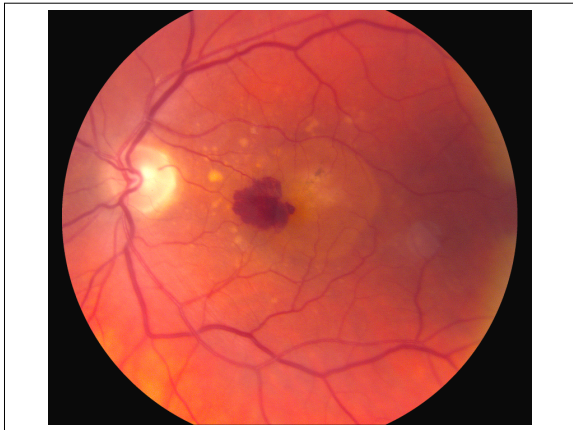
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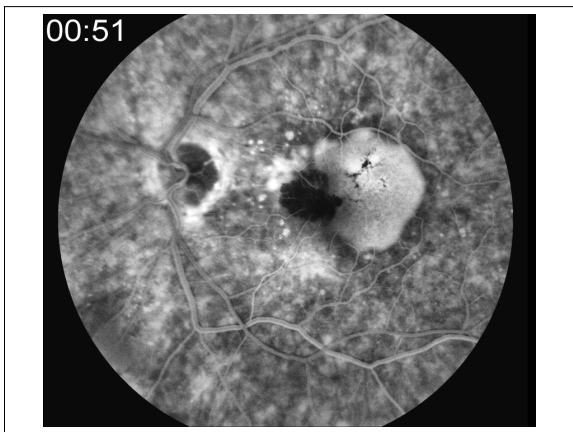
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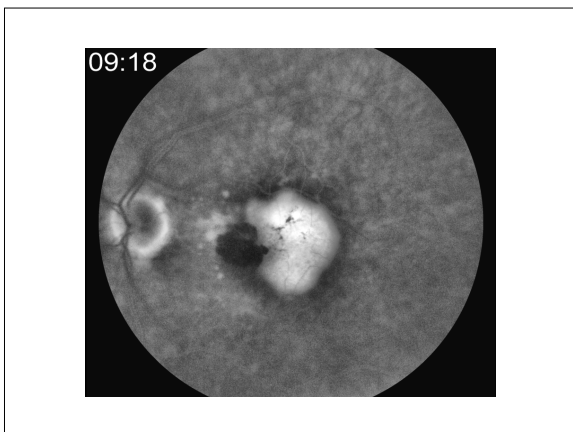
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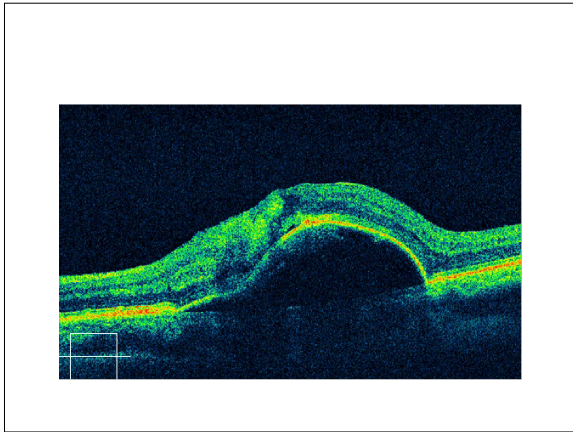
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PATIENT

Start Lucentis OS
Stable PED w/o net OD

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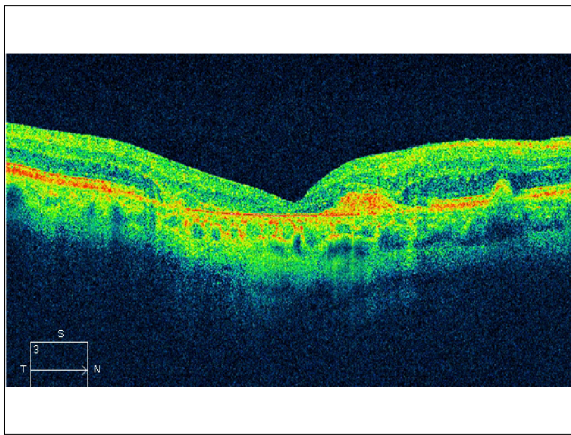
PATIENT

Between 2009 - 2014 was sent to local specialist
Lucentis OD x 16, OS x 22
Eylea OS x 3
20/400 OD
20/25 OS

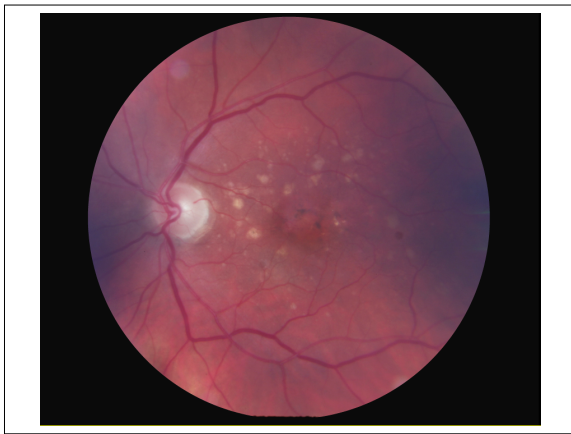
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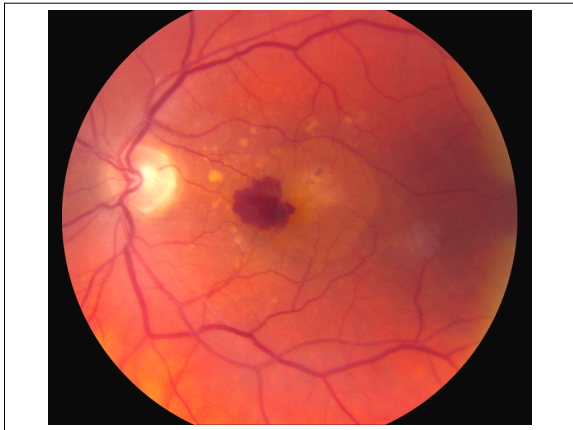
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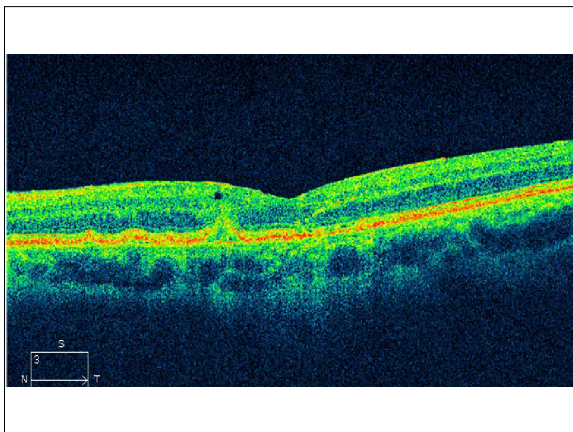
41



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AMD - SUMMARY

Lucentis and Eylea similar

 May be able to give Eylea less frequently

Lucentis and Avastin similar

45

AMD - SUMMARY

46

Still developing exit strategy

PRN vs Treat and Extend

AMD - SUMMARY

47

25-40% had 20/40 acuity with Anti-VEGF

90% had stable vision

Good safety profile

AMD REFERRAL

48

If Wet AMD

Does acuity matter?

VEIN OCCLUSIONS

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Threats to vision in BRVO

Macular edema

Macular ischemia

Proliferative (mostly V-Heme)



50

VEIN OCCLUSIONS

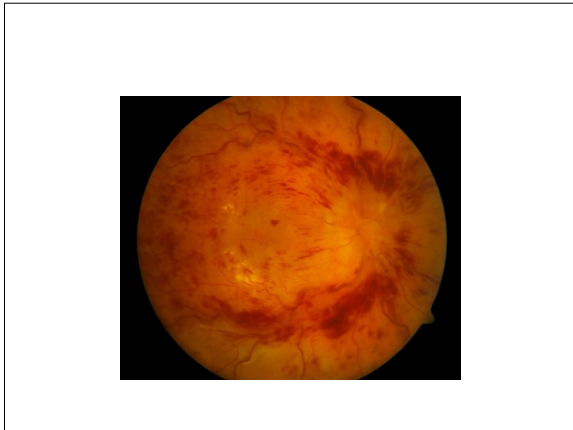
51

Threats to vision in CRVO

Macular edema

Macular ischemia

Proliferative (mostly NVG)



52

VEIN OCCLUSIONS

BRVO historically treated

If NV, treat with sector PRP

If edema, wait 3 months - then laser

53

VEIN OCCLUSIONS

CRVO historically treated

If NVG, treat with PRP

If edema, no treatment

54

VEIN OCCLUSIONS

55

Intravitreal steroids improved vision

Complications

Cataract

Glaucoma

STUDIES

56

BRAVO/CRUISE/RETAIN

GALILEO/COPERNICUS

STUDIES- BRVO

57

61% gained 3 lines with Lucentis

Only 29% with laser did

STUDIES- BRVO

58

68% achieved 20/40 or better with Lucentis

Only 42% with laser reached 20/40

STUDIES - CRVO

59

48% gained 3 lines of acuity with Lucentis

Only 17% gained when left untreated

STUDIES - CRVO

60

47% achieved 20/40 with Lucentis

Only 21% when left untreated

STUDIES - CRVO

61

Lucentis and Eylea are similar

DEVELOPMENT OF NV

62

Development of NV @ 2 years

6% Eylea

9% Sham

In CVOS this was 35% in control group (all ischemic)

Reduced to 22% with PRP

DEVELOPMENT OF NV

63

Does anti-VEGF eliminate NV or temporize it?

COPERNICUS

64

Development of NV year 1

0% Eylea

7% Sham

Development of NV year 2

6% Eylea

8% Sham + PRN

BRVO - CASE

65

46 YO WM

New to Eye Clinic

Uncontrolled HTN

Borderline Diabetes Mellitus

H/O CVA, MI

BRVO - CASE

66

“Seems like letters are there and then missing in and out of vision”

BRVO - CASE

67

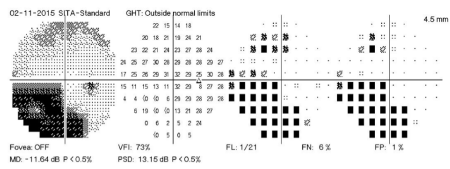
BCVA
20/25 OD
20/40 OS
Anterior Segment Unremarkable

BRVO - CASE

68

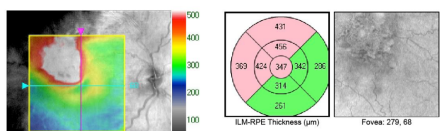
ONH - 0.1 OU - Healthy

++Tortuous Vessels OU
Sup BRVO OD - Paramacular Heme
Old BRVO OS - Collaterals

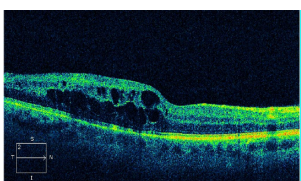


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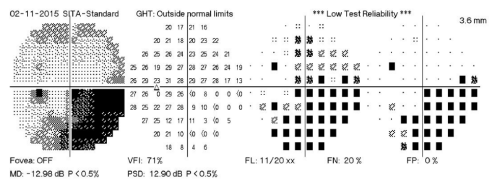
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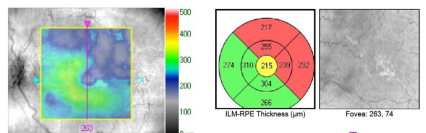
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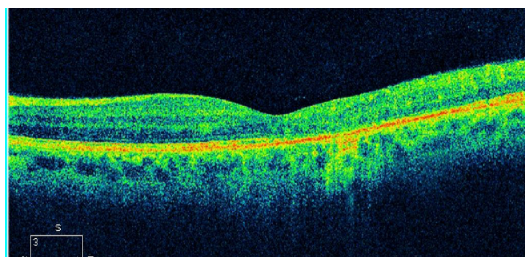
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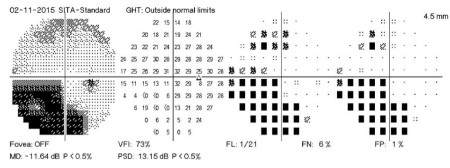
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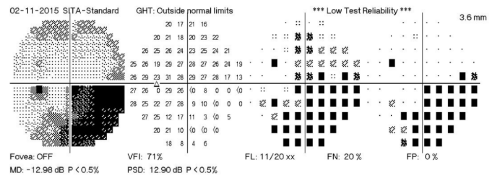
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Bi-Nasal??

76



77



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BRVO - CASE

Referral to University of Kansas

Macular Atrophy OS

Mild edema - anti-VEGF

Prognosis?

BRVO - CASE 2

81 YO WM

Routine Eye Examination

No vision complaints

79

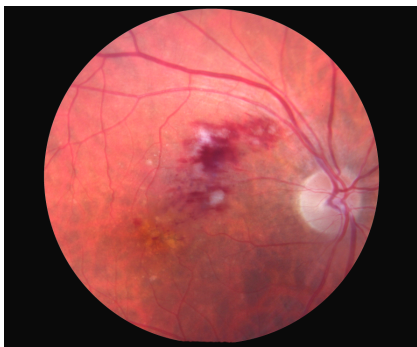
BRVO - CASE 2

BCVA 20/25 OD & OS

Anterior Segment Unremarkable

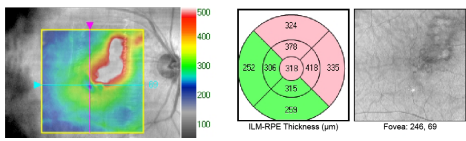
IOP 18/17

80

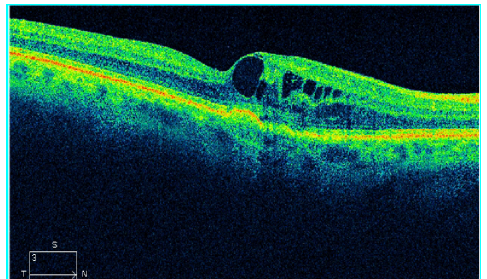


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82



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BRVO - CASE 2

BRVO OD
20/25 acuity
Refer?

84

VEIN OCCLUSION - SUMMARY

85

BRVO, CRVO improve on Eylea

BRVO, CRVO improve on Lucentis

Longterm outcome of CRVO shows guarded prognosis

VEIN OCCLUSION - SUMMARY

86

Laser photocoagulation still viable treatment option for BRVO

VEIN OCCLUSION - SUMMARY

87

Most benefit show in first year or two

Benefit lessens over time

VEIN OCCLUSION - SUMMARY

88

Very little NV on anti-VEGF treatment

Does this effect last?

VEIN OCCLUSION REFERRAL

89

BRVO - if central edema/reduced acuity

If no referral, monitor closely for NV or edema

VEIN OCCLUSION REFERRAL

90

CRVO - if central edema/reduced acuity

If no referral, monitor monthly for 6 months - gonioscopy

DIABETIC RETINOPATHY

Threats to Vision

Macular Edema

Macular Ischemia

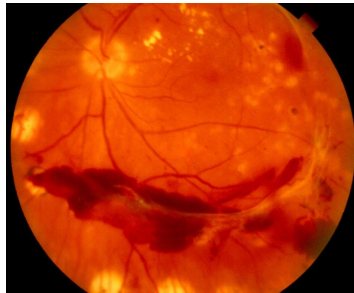
Proliferative

NVG

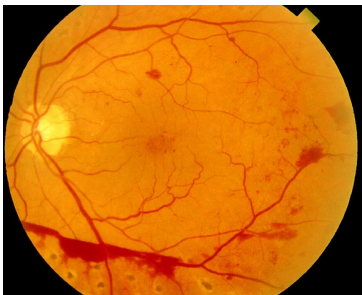
V-Heme

Traction RD

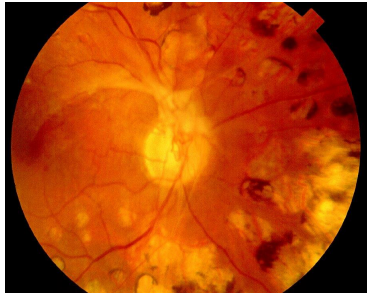
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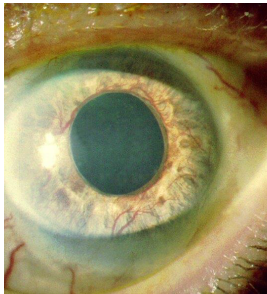
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94



95

DIABETIC MACULAR EDEMA

Treatable Threats to Vision

Macular Edema

NV

96

DIABETIC MACULAR EDEMA

97

Treatable Threats to Vision

Macular Edema

NV

DIABETIC MACULAR EDEMA

98

Historically treated with

Laser

Focal

Grid

Intravitreal steroids

DIABETIC MACULAR EDEMA

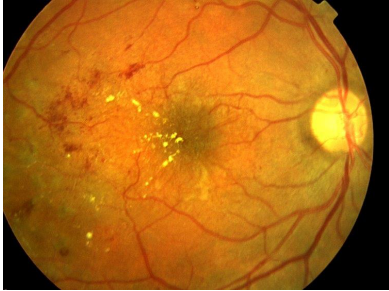
99

Treatment Criteria (CSME)

Retinal thickening within 500 microns of fovea

Exudate within 500 microns of fovea w/ adj thickening

≥1 disc area of thickening within 1 disc diameter



100

DIABETIC MACULAR EDEMA

Treatment Criteria - Anti-VEGF

Central retinal thickening

$\leq 20/30$

101

STUDIES

BOLT

RESTORE

RISE/RIDE

DRCR

102

STUDIES

103

100% lost < 3 lines with Avastin

Compared to 86% with laser

STUDIES

104

40% gained \geq 3 lines with Lucentis

Compared to 22% with laser (deferred Lucentis)

STUDIES

105

60% achieved 20/40 with Lucentis

Compared to 42% with laser (deferred Lucentis)

STUDIES

106

At 5 years Lucentis + Laser

75% achieved 20/40

DRCR

107

1% rate of endophthalmitis

0.06% per injection rate (out of 3176 injections)

STUDIES

108

Could Eylea be given less frequently?

VISTA/VIVID

109

2 Year Results

Aflibercept (Monthly or Bi-monthly) vs. Laser

Ophthalmology 2015;122:2044-2052

VISTA/VIVID

110

Gain 3 lines

Monthly 38%

Bi-monthly 33%

Laser 13%

VISTA/VIVID

111

Average injections

Monthly - 22

Bi-monthly - 14

DME - SUMMARY

112

Lucentis and Avastin effective for DME

60-75% reading acuity at 5 years

Can be combined with laser

DME - SUMMARY

113

Aflibercept may be given less often

When can we stop?

CASE

114

68 year old Hispanic Male

IDDM (A1c = 7.8%)

Hypertension

CASE

115

Insulin
Metformin
Metoprolol

CASE

116

F/U for NPDR

BCVA
20/25 OD
20/30 OS

CASE

117

IOP 18/18
Entrance tests unremarkable

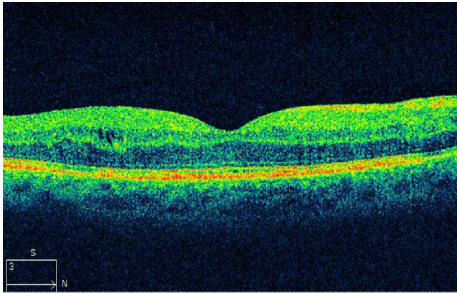
No NVI
Mild Nuclear Sclerosis OU

CASE



118

CASE



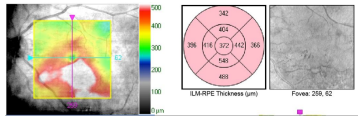
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CASE



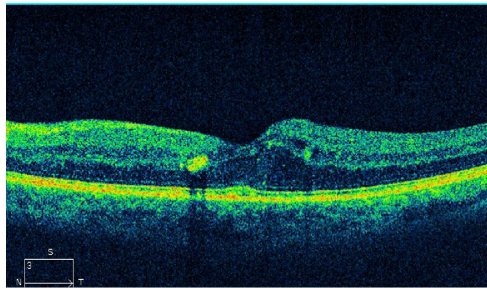
120

CASE



121

CASE



122

CASE

Diagnosis
NPDR OU
No CSME OD
CSME OS

123

CASE

124

Treatment

Prompt referral to retinal specialist

Under treatment with IVI Avastin

CASE

125

Prognosis?

CASE

126

62 YO WM

Follow up for DM

Mild blur OU

CASE

Anterior Segment Unremarkable

BCVA 20/30 OD, 20/25 OS

IOP 18/18

P + RXN NO APD

127

CASE



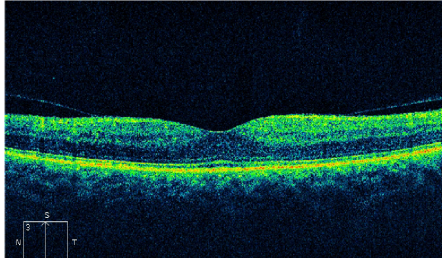
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CASE



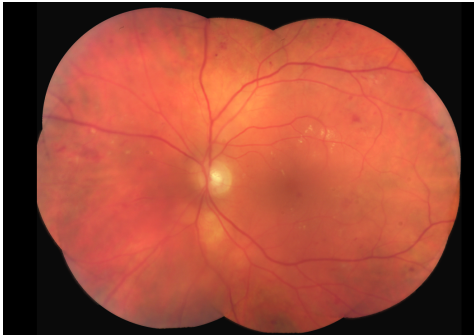
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CASE



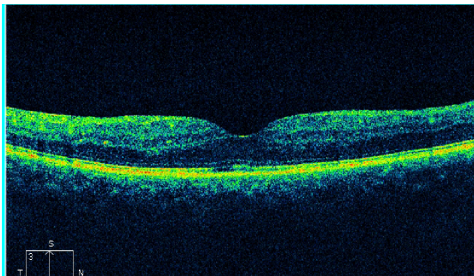
130

CASE



131

CASE



132

CASE

Posterior Segment

PDR OU

High risk OD - Shallow traction RD

Borderline CSME

133

CASE

Plan

PRP

Avastin — Why?

134

CASE



135

CASE

Worsening of CSME

10% of patients with PRP (Argon laser)

136

CASE

Can anti-VEGF help PDR?

137

ANTI-VEGF FOR PDR

Similar visual acuity at 2 years and 5 years

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ANTI-VEGF FOR PDR

139

Visual Field score

Anti-VEGF -23 dB

PRP -422 dB

Patients did not notice this difference

ANTI-VEGF FOR PDR

140

Develop Macular Edema @ 2 years

Anti-VEGF = 9%

PRP = 28%

ANTI-VEGF FOR PDR

141

Develop Macular Edema @ 5 years

Anti-VEGF = 22%

PRP = 38%

ANTI-VEGF

142

Benefits

Improvement of acuity!

Safe

Tolerable

ANTI-VEGF

143

Complications

Patient perception

Endophthalmitis

Systemic

Cost

ANTI-VEGF

144

Complications

Frequency of visits and injections!!

ANTI-VEGF

145

Future developments

PRN dosing

Treat and Extend

Trap-Eye

ANTI-VEGF

146

Future developments

Eye drop?

Implant (similar to Ozurdex)

REFERRAL

147

Neovascular AMD - Prompt

REFERRAL

BRVO - if central edema/reduced acuity
If no referral, monitor closely for NV and edema

148

REFERRAL

CRVO - if central edema/reduced acuity
If no referral, monitor monthly for 6 months - gonioscopy

149

REFERRAL

Central Diabetic Macular Edema - 20/30 or worse
Meets CSME criteria

150

FUTURE OF ANTI-VEGF

151

Longer lasting medication

Fewer injections

Vitreous inserts (similar to Ozurdex)

THANK YOU!

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