

Sunday Morning Glaucoma Case
Conference
AKA The Day After The Bengals
Win!!!!!!

Linda J. Greff, M.D.
Cincinnati Eye Institute
Vol Associate Clinical Professor
University of Cincinnati
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MJ 3yoaf

- Age 3 presented w/IOP OS 45 (MTMT)
- PMHx- Sturge-Weber, port-wine on left
- Va sc 20/25, 20/200; C/D .4, .65
- EUA confirmed above findings, gonio grade

IV OU, “blush” of blood in Schlemm’s OS, tomato ketchup fundus OS

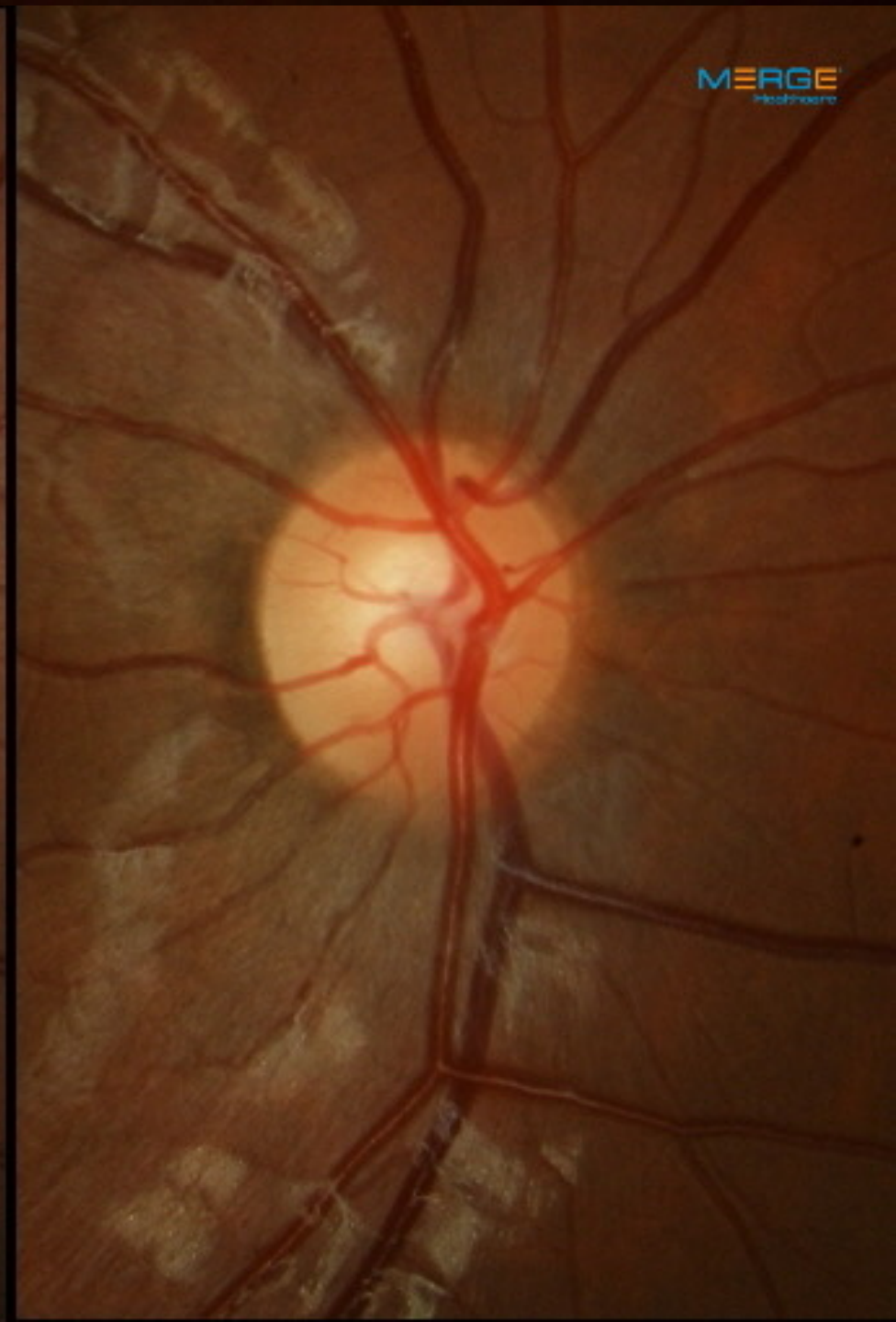
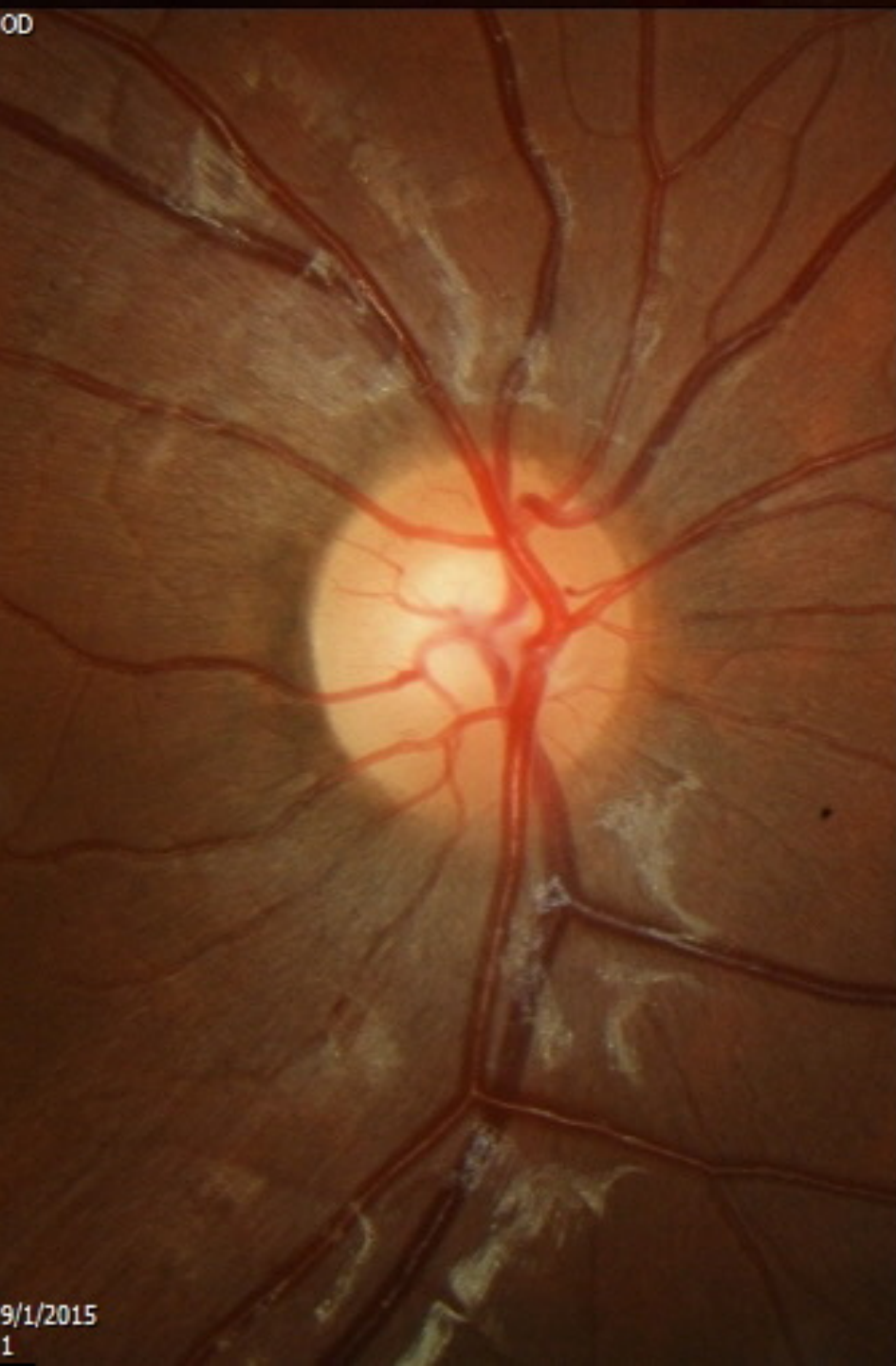
- Nasal g-otomy OS, signif bleeding requiring a/c washout a few days later

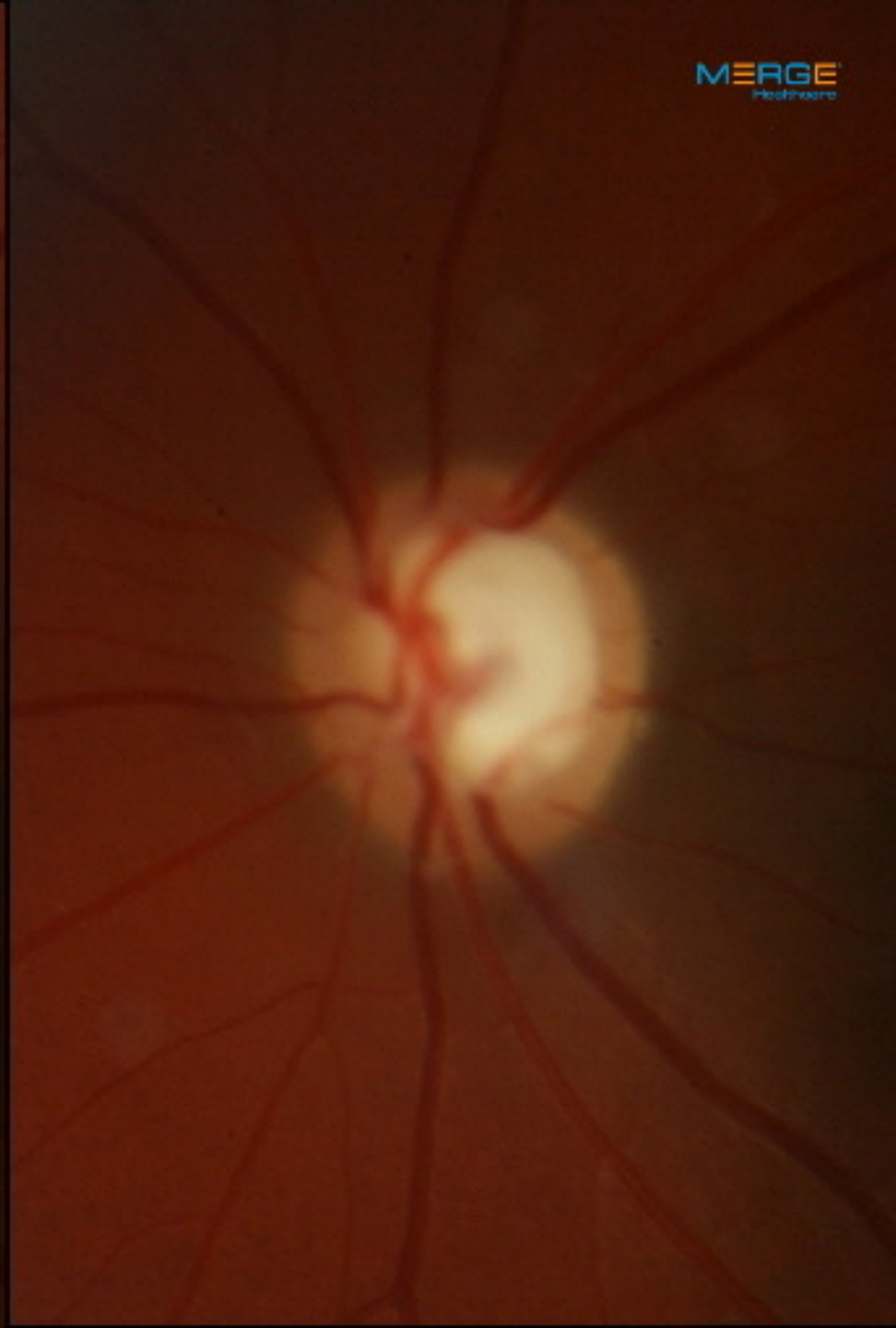


OD

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Healthcare

9/1/2015
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- Age 4 :staged Ahmed, IOP 15,18 no meds
- Age 11: IOP 13, 19 on dorz/tim, brimon, lat OS, C/D stable .4, .6



BG 45 yowm

- PMHx: migraines, overbite correction
- POHx: PDG at age 20, Tmax 32
- Age 36: Va cl 30/30 OU, IOP 19,17 (4 meds)

C/D .8, .2 (hypoplastic), gonio IV OU, HVF

OD: paracentral loss

- Age 39: IOP 39, 15

SLT OD → 51...Trab w MMC, hyphema,
TPA

BG 45 yowm

- Age 45: Va cl 20/100, 20/25, IOP 13/25
- With history of IOP spike in OD pt elected to have T-Tome OS

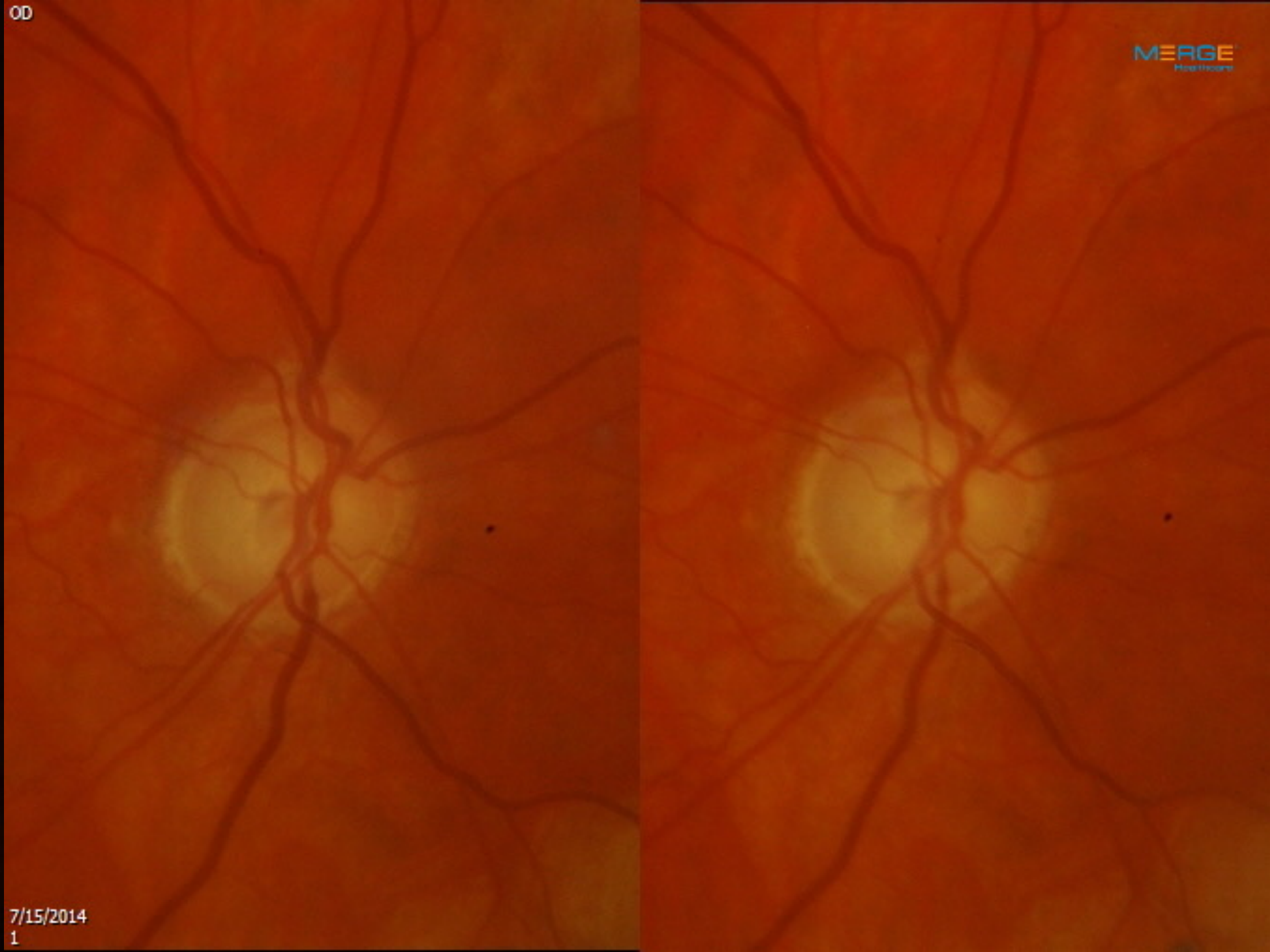
In OR: 360 heavy blood in Schlemm's canal, 90 degrees nasal ablation done, significant bleeding and large post op hyphema

- IOP 13, 16 (dorz/tim, latan OU)

OD

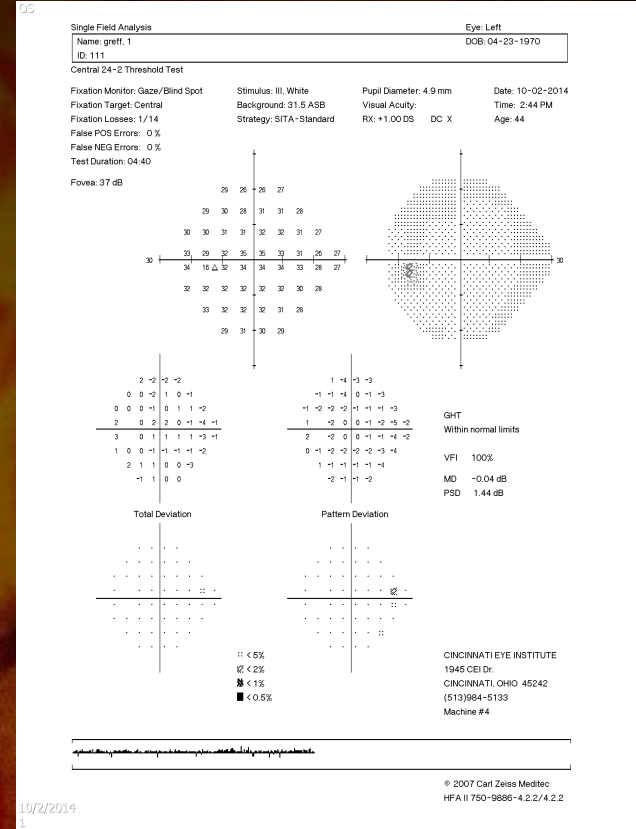
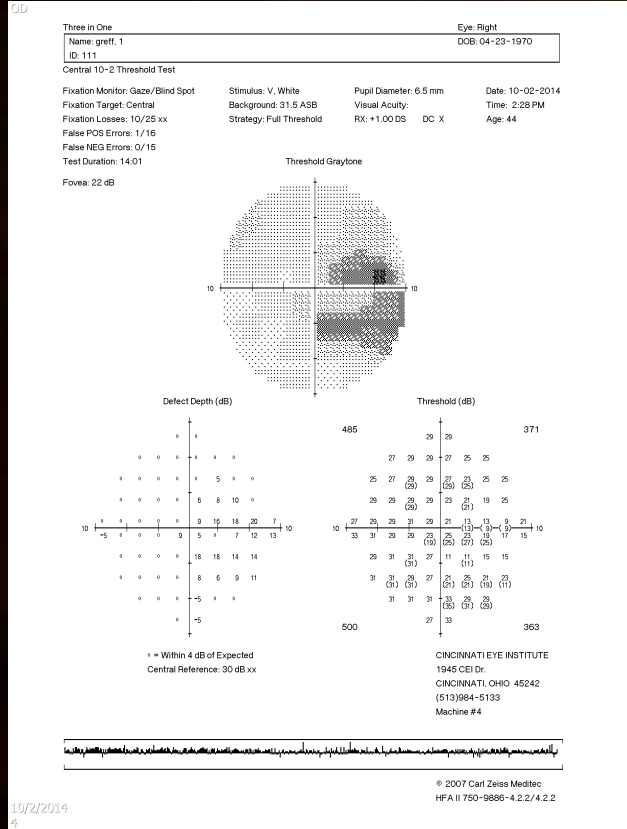
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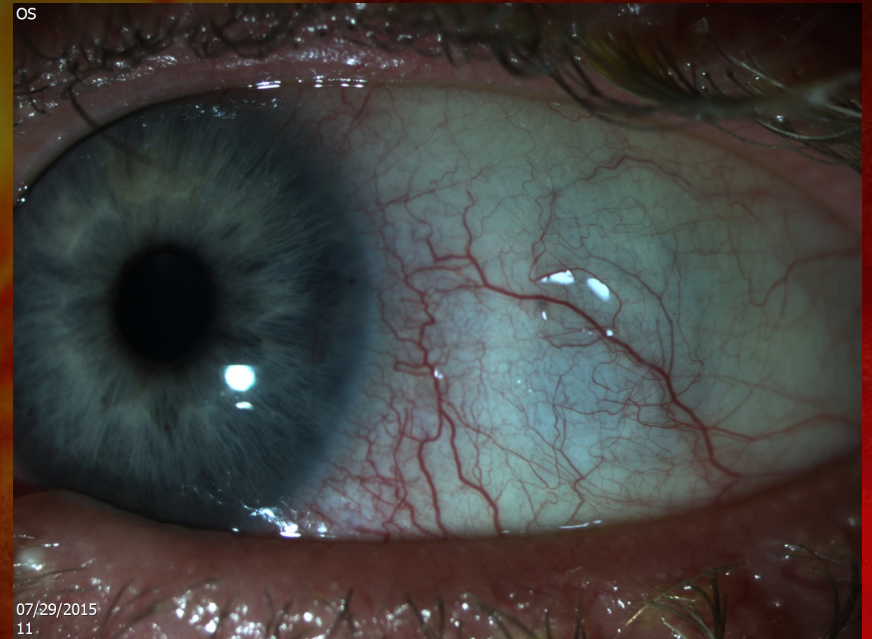
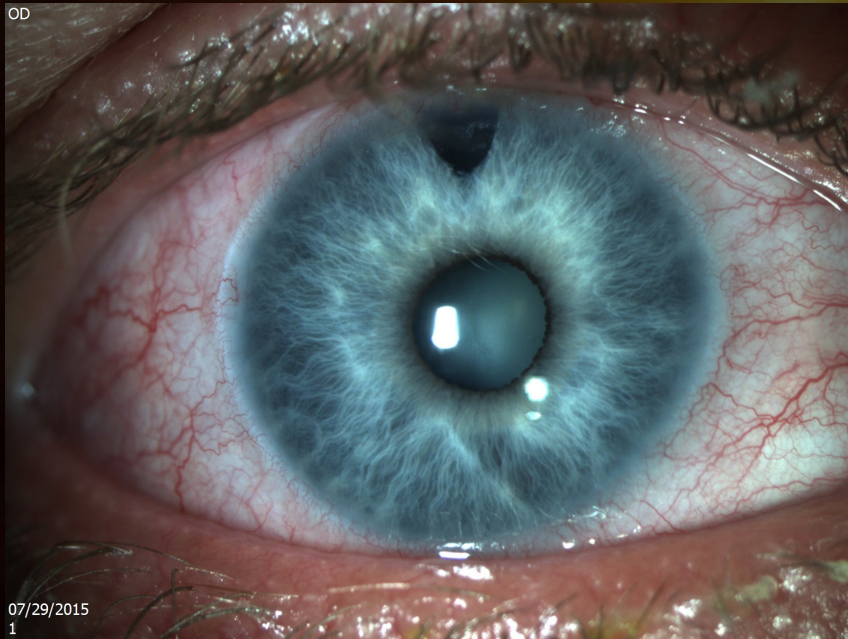




BG



BG





Why These Two Cases??

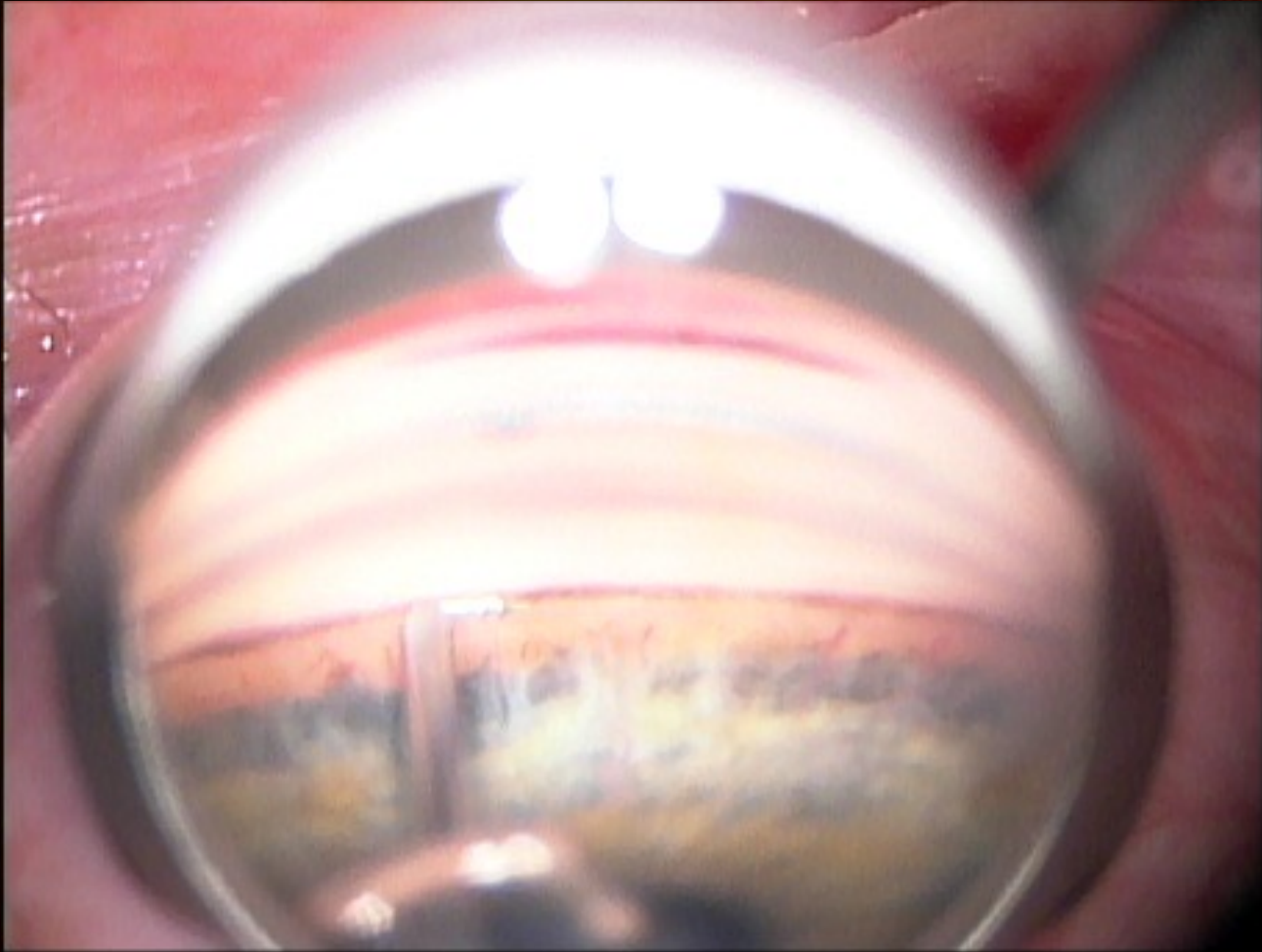
Clinical Features of ↑EVP

- Dilated/tortuous episcleral veins
- Chemosis/proptosis
- Orbital bruit
- IOP mid 20-30's
- ↑ ocular pulse amplitude
- Blood in Schlemm's canal (open angle)
rare: angle closure, nvgl
- NI outflow facility (↓ in chronic)

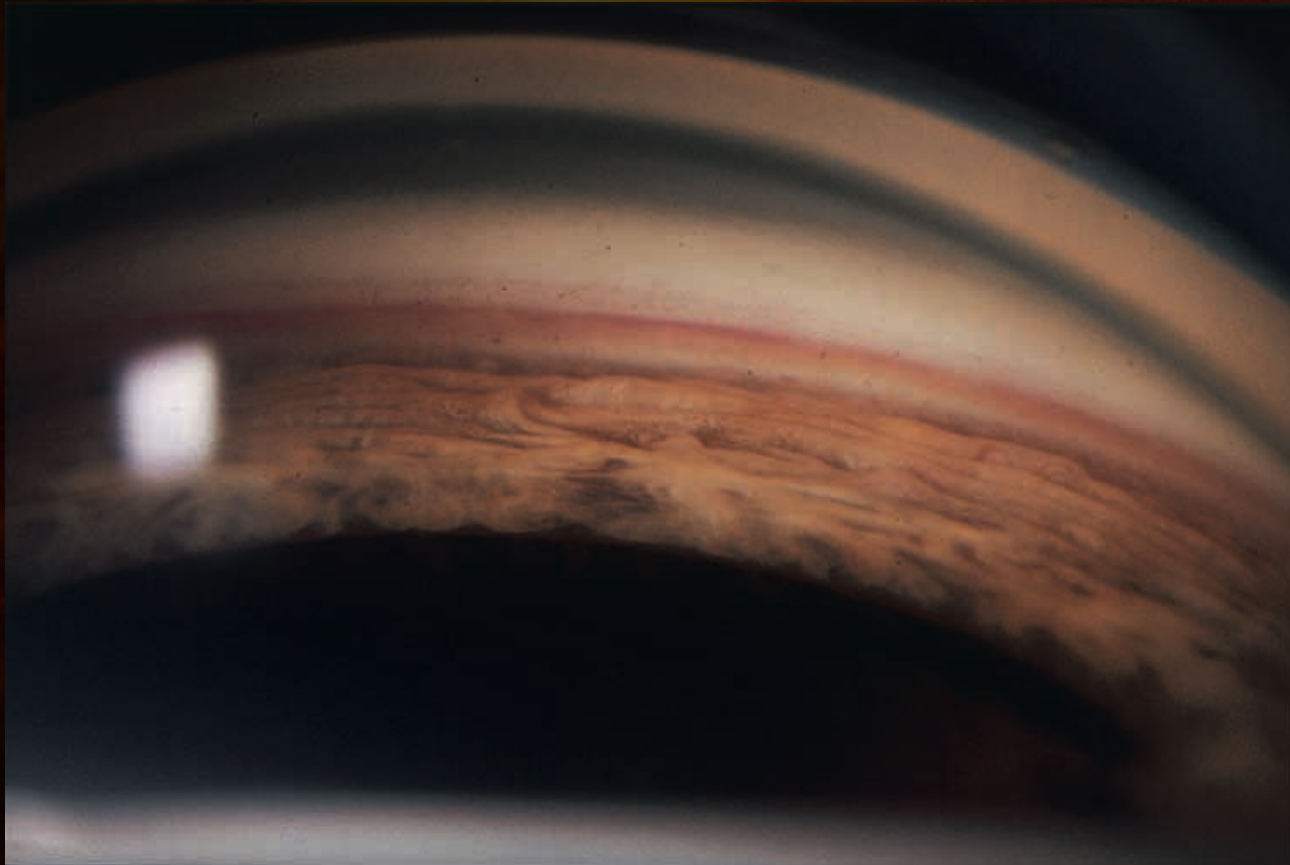
Blood in Schlemm's Canal

- ↑EVP
- Compression of episcleral veins
- Ocular hypotony
 - injury or procedure that lowers IOP
 - inflammation
 - cyclodialysis

Blood in Schlemm's Canal



Blood in Schlemm's Canal



Episcleral Venous Pressure

- $IOP = \frac{Q-U}{C} + EVP$
 - Q = aqueous flow rate
 - U = u-s outflow rate
 - C = outflow facility
- Imprecise measurements (8-10 mmHg)
- May be regulated
- Small ↓ change in EVP can be of therapeutic benefit

Sit AJ, McLean JW Exp Eye Res vol 93, 2011

How Does ↑ EVP Cause Glaucoma?

- Direct effect on IOP
- Outflow resistance (when chronic)
- Acute angle closure (dural shunts) with vortex vein congestion, choroidal effusions, suprachoroidal heme
- NVG from decreased arterial flow
- Mean IOP rises 1mmHg for every 1mmHg elevation of EVP

Classification of ↑EVP Glaucomas

- Increased EVP Directly Causes ↑IOP
 - Venous obstruction
 - Arteriovenous anomalies
 - Idiopathic
- Increased EVP Plays Partial Role in ↑IOP
 - Venous obstruction
 - Arteriovenous anomalies

↑EVP Directly ↑IOP

- Venous obstruction
 - Superior vena cava syndrome
 - Cavernous sinus thrombosis
 - Jugular vein obstruction
- A-V anomalies
 - Direct & indirect (dural) C-C fistula
 - Orbital varix
- Idiopathic

Superior Vena Cava Syndrome

- Lesions of upper thorax
- Cyanosis
- Upper torso vein dilation
- Exophthalmos

C-C Fistulas

- #1 Cause for ocular injection and EVP/IOP elevation)
- Traumatic (high flow) ICA—cav sinus
pulsating exophthalmos, orbital bruit,
dilated episcleral v, dilated SOV, ischemia
- Spontaneous (low flow) dural—cav sinus
mostly middle age/elderly females
episcleral/conj dilation, no proptosis or
bruit, resolves spontaneously

More ↑EVP Direct-acting on ↑ IOP

- Orbital varix
 - intermittent, proptosis w Valsalva, nl ONH
- Idiopathic
 - may be congenital, familial

Is It Idiopathic ↑EVP or A-V Fistula?



	Idiopathic Elevated EVP	A-V Fistula
Onset	May be congenital	Often acquired
Predisposing factors	Familial?	Trauma, hypertension
Symptoms	None	Bruit, tinnitus, pain, diplopia
Neurological signs	None	CN VI or III paresis
External signs	Dilated episcleral vessels, conjunctival may be nl	Dilated corkscrew episcleral & conjunctival vessels, chemosis, edema
Orbital signs	None	Bruit, proptosis
Imaging	Normal	Dilated SOV or cav sinus
Angiography	Normal	A-V fistula

Adapted from Faroozan, et al.

↑EVP Partial Role in ↑IOP

- Venous obstruction
 - Thyroid orbitopathy
 - Retrobulbar tumors
 - Pseudotumor
 - Amyloidosis
- A-V anomalies
 - Sturge-Weber syndrome

Sturge-Weber Syndrome

- Hemangioma along trigem distrib
- Ipsilat leptomeningeal angioma
- Choroidal hemangioma
- No race, sex or inheritance pattern



Glaucoma in Sturge-Weber

- 50-70%
- Usually unilateral
- Early glaucoma (congenital mesodermal angle abnl, buphthalmos)
- Later glaucoma (teenage red eye, ↑evp)
- Rx: pre-placed sclerotomies, trabeculotomy
trabeculectomy (Netland)

Diagnostic Tests for EVP

- Orbital u/s, doppler
- CT/MRI
- Angiography

Treatment of ↑EVP Glaucoma

- Treat underlying cause
- Often recalcitrant to meds, use aq. sup.
- If outflow facility normal (most acute cases) → IOP normalizes with Rx of EVP, avoid treating TM (avoid slt, Rock inhib)
- If outflow facility abnl (chronic cases) → TM dysfunction and IOP remains high then TM drugs may help
- Surgical cautions: post sclerotomies, smaller incisions, OVD's

Conclusions

- Elevated EVP should be considered in the differential diagnosis of ocular injection and elevated IOP

Conclusions

- Blood in Schlemm's canal can often be a sign for ↑EVP
- Blood in Schlemm's canal can also be an artifact or associated with ocular hypotension and can be a useful surgical anatomic marker

Conclusions

- ↑EVP important to diagnose b/c effective treatment often directed to underlying primary etiology
- Such glaucomas often difficult to medically treat
- Special cautions needed with surgery and complications more frequent than with other forms of glaucoma

WHO DEY