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Grand Rounds Outline- What Do I Do Now?

I**ntroduction**

- Dr. Edris background
- Financial Disclosure
- Retinal layer anatomy and overview
- Retinal fluid overview

Case #1 It's A Bit Twisted

Case Presentation: 72 year old female with central gray spot and gradual decline in vision in right eye. onset 3 months, has been monitored without treatment

- Medical History: hypertension, depression, insomnia, anxiety
- Family history: non contributory
- Medications: non contributory
- Social History: non contributory
- Ocular Exam:
  - Visual Acuity: OD 20/150, OS 20/40
  - All other preliminary tests: Normal
  - Anterior Segment: Normal
  - Posterior Exam: Photo and OCT presentation with description

Differential Diagnosis:

- Central Serous Chorioretinopathy
- Age Related Macular Degeneration
- Polypoidal Choroidal Vasculopathy
- Pachychoroid Pigment Epitheliopathy

Diagnosis: Central Serous Chorioretinopathy (CSC) with Neovascularization

Objectives:

- Discuss Presentation of CSC
- Pathogenesis of CSC
- Treatment Modalities
- OCTA use in Diagnosis neovascular membrane in CSC

What Is CSC?

- Characterized by Serous Retinal Detachments and RPE detachments
- Often in Macular region, can be peripheral
- Pathophysiology brief overview, increased cortisol, increased hyper-permeability of choroid, fluid accumulation, chronic ischemia, neovascular membrane formation

Risk Factors

- Middle aged men, older females
- Steroid use, increased cortisol levels
- Pregnancy

Symptoms

- Decreased Vision
- Micropsia
- Metamorphopsia
- Scotoma
- Asymptomatic if peripheral

OCT findings of CSC

Subretinal Fluid
Sub-RPE detachment
Thickened Choroid
OCT of our patient with subretinal fluid and shaggy photoreceptor layer, no PED

Fluorescein Angiography

Smokestack appearance as classical presentation- 15% of cases
Inkblot as most common presentation
Our patient rejected FA

OCTA findings of patient:

subclinical CNVM formation with possible flow

Treatment

Observation and Risk factor modification.

Discontinue steroids, reduce stress and improve lifestyle.

Photodynamic Therapy

94% resolution of subretinal fluid compared to placebo.
Decreased recurrence
Risks of ischemia, CNV, atrophy, loss of vision

Anti-VegF injections

VegF expression Due to choroidal hypoxia and ischemia
Mostly beneficial in chronic CSC cases, no benefit in acute cases .

Laser Photocoagulation:

Not Commonly used due to risks—Permanent scotoma, CNVM formation, decreased contrast sensitivity
Mostly beneficial in preventing recurrence, no influence on final VA

Mineralocorticoid Receptor Antagonist

Epleronone, Spironolactone
Block corticoid receptors to decrease cortisol and Aldosterone.
Mostly beneficial in non resolving CSC

Our Patient Treatment and Outcome:

Upon 3 month observation and no improvement, referred to retina specialist.
4 rounds of IVA, followed by Observation, Lifestyle Modifications.
Minimal improvement
Possible treatment with laser

Discussion:

Importance of OCT and OCTA in diagnosis CSC and CNV
If it doesn't fit the criteria, dig deeper
Know when to refer, when in doubt send it out, it could be a CNV, and you don't want to be sorry

Case #2 What Shall I Choose?

Case Presentation:

81 year old white female with visual distortions in the right eye
“looking through water”
no flashes/floaters
Onset 2 months
Medical History: hypertension, heart disease, diabetes type 2
Family history: Non Contributory

Medications: Amlodipine, Losartan, Metformin
Social History: non contributory
Ocular Exam:
Visual Acuity: OD 20/30, OS 20/20
All other preliminary tests: Normal
Anterior Segment: 1+ NS, all others were within normal limits
Posterior Exam: blunted foveal reflex, macular pucker and ERM OD, OS WNL.

Differential Diagnosis and Diagnosis

Vitreomacular Traction ((VMT) —diagnosis
Full Thickness hole
Epiretinal Membrane
Diabetic Macular Edema
Central Serous Retinopathy

What is VMT:

Anomalous PVD is defined as partial vitreous detachment with persistent attachment in the macular region featuring an anomalous strength of adhesion to one or more structures in the posterior pole, resulting in tractional deformation of retinal tissue-J. Sebag

Symptoms:

Metamorphopsia
Scotoma

VMT classifications

IVTS definitions

Adhesion vs. Traction

Adhesion- The retina displays no change in contour or morphologic features on OCT, no visual impairment
Traction- Distortion of the foveal surface, intra-retinal structural changes, or elevation of the fovea

Focal vs. Broad

Focal attachment: less than 1500 um foveal attachment
Broad attachment: more than 1500 um foveal attachment

Prognosis factors: unclear if there is a difference.

VMT OCT Criteria

Perifoveal detachment
Macular Attachment within 3mm of fovea
Distortion of the foveal surface, intraretinal structural changes, elevation without RETINAL BREAK

Treatment? a time for choosing

Observation

~32% of patients who were observed improved during 18 months.
~56% of patients remained stable.
~12% worsened

Pharmalogical Vitreolysis

Ocriplasmin for vitreous liquefaction
VMT resolution in ~27% of patients compared to Observation ~32% with resolution without Ocriplasmin
Criteria for administration: No ERM, phakic, focal VMA/VMT, <65 years
Adverse Effects: floaters, photopsia, blurred vision, retinal tear, eye pain

Majority of patients presented with ellipsoid layer disruption and serious retinal fluid
40% with decreased vision
Self limiting and acute, generally resolve by 1 year
Not widely used

Pars Plana Vitrectomy (PPV)

Visual and OCT improvements after PPV
100% resolved
Risks include retinal tear, retinal detachment, intraoperative bleed, decreased vision

Pneumatic-C3F8

Intravitreal injection of expansile gas
minimally invasive alternative to PPV though less success rates (87% vs. 100%
As effective or superior to Ocriplasmin
Beneficial in eyes with less extensive VMT
No complications associated

Our patient treatment

Observation every 8-10 weeks with specialist as patient was symptomatic
No holes yet

What shall I do if i see one:

If you don't have an OCT, refer.
Co-manage if adhesion or traction not big
As for treatment, observation if OK with retina specialist.

<u>Case #3: is it tilted? is it crowded or is it PAPILLEDEMA?!</u>

Case Presentation: 43 year old hispanic female presented with routine screening, no visual or ocular headaches. Denies headaches, nausea or vomiting.

Medical history: weight gain for the past 1 year, early diabetes
Social history: noncontributory
Family history: noncontributory
Medications: none
Ocular exam: VA 20/20 OD/OS, color vision full OD/OS, confrontation FTFC OD/OS, Pupils PERRL without APD OD or OS.
Anterior segment within normal limits
Posterior segment: blurred edge nasally OU, no elevation, no vascular obscuration, (-) SPV, no hemes
Photo and OCT presentation

Differential Diagnosis:

Papilledema
Optic disc drusen
Tilted disc
Crowded discs

Causes of disc edema:

Unilateral: Vascular, Diabetic papillopathy
Bilateral: Toxic, Inflammatory, Infectious, Compressive, IIH

Symptoms to look out for for IIH:

Headaches- >65% of patient
Visual Obscurations- >65% of patients
Tinnitus- 40-65% of patients
Dizziness 40-65% of patients
Backpain and neckpain- 40-65% of patients
Diplopia <30% of patients

Signs to look out for:

The obvious which is: elevation, blurred edges, vascular obscuration, (-) SVP (though in 20-30% of normals this is absent), Patton folds (may not be present in early stage), splinter hemes, enlarged blindspot, loss of color vision
Nasal elevation—look out for this, 80% specificity, especially in early stages

OCT findings of edema:

Smooth Contour of elevation vs. the lumpy appearance on drusen
Nasal elevation over 86 um
"Lazy V"—Hyporeflective space adjacent to disc, 90% specificity
Recent data: globe convexity—anteriorly displaced globe due to ICP. anteriorly placed bruchs membrane on EDI

FAF in edema

Normal without hyper-reflectivity. IF YOU HAVE IT, USE IT. It can help highlight drusen, a peace of mind of you- Still refer to get a B-Scan for definitive diagnosis.
If it's deeply buried, it will be difficult to visualize

Clinical pearls:

Papilledema:

Look at all the typical symptoms and signs, vascular obscuration, hyperemia, nasal elevation, blurred edges, (-) SVP
Visual field: enlarged blind spot-can be difficult if patient is myopic
FAF- normal
OCT- nasal elevation and thickened RNFL; lazy V sign, pushed globe
B-scan: normal reflectivity, Cresent shadowing, ONH sheath diameter increased

Buried ONH Drusen:

lumpy appearance, minimal symptoms, (+)SVP
Increased FAF
OCT normal and possibly thinner
B scan-hyper-reflectivity, no cresent shadowing, normal diameter
*Note, 50% of children with optic nerve head druse also presented with IIH

Crowded Discs:

visual field normal, (+) SVP, normal FAF, minimal symptoms
OCT normal
B-scan- Normal reflectively, no cresent shadowing, diameter decreased

Back to our patient:

Overweight female without any neurological symptoms
OCT with slightly elevated RNFL, no Lazy V sign
FAF without any hyper-reflectivity
Referred to ophthalmology within 1-2 weeks for second opinion
What if it was Papilledema? well…enough data supported that it wasn't.
if you are remotely unsure, assume emergency and refer out STAT

Conclusion:

Knowing when to refer based on presentation, symptoms, office technology
Importance of OCTA in diagnosis subclinical CNV in ordinary diagnosis for early detection and treatment
CSC patients that don't fit typical criteria should get a second opinion to rule out CNV
When it comes to following VMT, better a hole in "their" hands than in your hands
ERM patients with decreased vision should be followed with OCT to rule out VMT
Don't assume an optic nerve is just crowded, tilted, or drusenoid without having strong evidence, especially in absence of symptoms

References:

- Tuğcu B, Özdemir H. Imaging Methods in the Diagnosis of Optic Disc Drusen. *Turk J Ophthalmol*. 2016;46(5):232–236. doi:10.4274/tjo.66564
- Bhosale A, Shah VM, Shah PK. Accuracy of crescent sign on ocular ultrasound in diagnosing papilledema. *World J Methodol*. 2017;7(3):108–111. Published 2017 Sep 26. doi:10.5662/wjm.v7.i3.108
- Br J Ophthalmol. 2016 Apr;100(4):505-9. doi: 10.1136/bjophthalmol-2015-307043. Epub 2015 Aug 12. Anatomic and visual function outcomes in paediatric idiopathic intracranial hypertension. Gospe SM 3rd1, Bhatti MT2, El-Dairi MA1
- Evaluation and management of adult idiopathic intracranial hypertension
- Susan P Mollan,1,2 Catherine Hornby,1,3 James Mitchell,1,3,4 Alexandra J Sinclair1,2,3,4
- Carta A, Mora P, Aldigeri R, et al. Optical coherence tomography is a useful tool in the differentiation between true edema and pseudoedema of the optic disc. *PLoS One*. 2018;13(11):e0208145. Published 2018 Nov 29. doi:10.1371/journal.pone.0208145
- \Abouammoh MA. Advances in the treatment of central serous retinopathy. Saudi J Ophthalmol 2015; 29: 278-286.
- Bousquet E et al. Mineralocorticoid receptor antagonism in the treatment of chronic central serous chorioretinopathy: a pilot study. Retina 2013; 33: 2096-2102.
- Bousquet E et al. Spironolactone for nonresolving central serous chorioretinopathy: a randomized controlled crossover study. Retina 2015; 35: 2505-2515.
- Bonini Filho MA et al. Association of choroidal neovascularization and central serous chorioretinopathy with optical coherence tomography angiography. JAMA Ophthalmol 2015; 133: 899-906.
- Chen JC et al. Central serous chorioretinopathy and bullous retinal detachment: a rare association. Clin Exp Optom 2005; 88: 248-252.
- Daruich A et al. Central serous retinopathy: recent findings and new physiopathology hypothesis. Prog Retin Eye Res 2015; 48: 82-118.
- Gass JD. Central serous chorioretinopathy and white subretinal exudation during pregnancy. Arch Ophthalmol 1991; 109: 677-681.
- Iida T et al. Leopard-spot pattern of yellowish subretinal deposits in central serous chorioretinopathy. Arch Ophthalmol 2002; 120: 37-42.

- Nicholson B et al. Central serous retinopathy: update on pathophysiology and treatment. Surv Ophthalmol 2013; 58: 103-126.
- Nudleman E et al. Central serous chorioretinopathy in patients receiving exogenous testosterone therapy. Retina 2014; 34: 2128-2132.
- Wong et al. Central serous retinopathy: what we have learnt so far. Acta Ophthalmologica 2015; 94: 321-325.
- Yannuzzi LA. Type-A behavior and central serous retinopathy. Retina 1987; 7: 111-131.
- Yannuzzi NA. A central hyporeflective subretinal lucency correlates with a region of focal leakage on fluorescein angiography in eyes with central serous retinopathy. OSLI 2015; 46: 832-836.
- Zhao M et al. The neuroretina is a novel mineralocorticoid target: aldosterone upregulates ion and water channels in Muller glial cells. The FASEB Journal 2010; 24: 3405-3415.
- John V, Flynn HW, Smiddy WE, et al. Clinical course of vitreomacular adhesion managed by initial observation. Retina. 2014 Mar;34(3):442-6.
- Rodrigues IA, Stangos AN, McHugh DA, Jackson TL. Intravitreal injection of expansile perfluoropropane (C3F8)for the treatment of vitreomacular traction. Am J Ophthalmol 2013 Feb; 155(2):270-276.
- Duker JS, Kaiser PK, Binder S, de Smet MD, Gaudric A, Reichel E, Sadda SR, Sebag J, Spaide RF. The
- International Vitreomacular Traction Study Group Classification of Vitreomacular Adhesion, Traction, and
- Macular Hole. Ophthalmology 2013 Dec;120(12):2611-2619.
- Stalmans P, Benz MS, Gandorfer A, Kampik A, Girach A, Pakola S, Haller JA (MIVI-TRUST Study Group).
- Enzymatic vitreolysis with ocriplasmin for vitreomacular traction and macular holes. NEJM
- Aug;367(7):606-615.
- Freund KB, Shah SA, Shah VP. Correlation of transient vision loss with outer retinal disruption following
- intravitreal ocriplasmin. Eye 2013;23:773-774.
- Davis RP, Smiddy WE, Flynn HW Jr, Puliafito CA. Surgical management of vitreofoveal tractionsyndrome:
- Optical coherence tomographic evaluation and clinical outcomes. OSLI 2010;41(2):150-156.
- Tzu JH, John VJ, Flynn HW Jr, Smiddy WE, Jackson JR, Isernhagen BA, Carver A, Leonard R, Tabandeh H, Boyer
- DS, Berrocal MH, Suzuki M, Freund KB, Gross JG. Clinical Course of Vitreomacular Traction Managed Initially by Observation. Ophthalmic Surg Lasers Imaging Retina. 2015 May;46(5):571-6.
- Gonzalez MA, Flynn HW Jr, Bokman CM, Feuer W, Smiddy WE. Outcomes of Pars Plana Vitrectomy for
- Patients With Vitreomacular Traction. Ophthalmic Surg Lasers Imaging Retina. 2015 Jul-Aug;46(7): 708-14.
- Sebag J. Anomalous posterior vitreous detachment: a unifying concept in vitreo-retinal disease. Graefes Arch Clin Exp Ophthalmolo 2004; 242: 690-8
- Haller JA, Stalmans P, Benz MS, Gandorfer A, Pakola SJ, Girach A, Kampik A, Jaffe GJ, Toth CA; MIVI-TRUST
- Study Group. Efficacy of intravitreal ocriplasmin for treatment of vitreomacular adhesion: subgroup analyses
- from two randomized trials. Ophthalmology. 2015 Jan;122(1):117-22