

EMERGENCY RETINA

Ross Kenamer-Chapman MD
October 22, 2023

1

FINANCIAL DISCLOSURES

- I have no conflicts of interest to disclose.
- All relevant relationships have been mitigated.

2

PRESENTATION GOALS

- Review common emergent/urgent retinal conditions
- Review timeliness of intervention
- Basic understanding of management for different retina emergencies

3

RETINA EMERGENCIES

1. Retinal artery occlusion
2. Endophthalmitis
3. Intraocular foreign body
4. Retinal tear
5. Retinal detachment
6. Vitreous Hemorrhage
7. Submacular hemorrhage

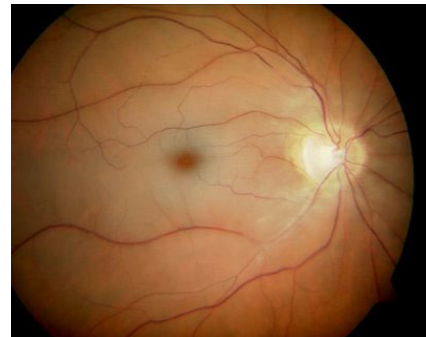
4

ENTITY

- Etiology
- Symptoms
- Signs
- Diagnosis
- Management

5

CENTRAL RETINAL ARTERY OCCLUSION



6

RETINAL ARTERY OCCLUSIONS

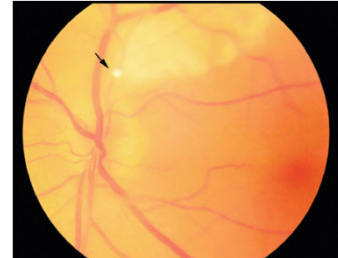
- Result from **embolization** or **thrombosis** of affected vessels
- Emboli
 - Cholesterol (aka Hollenhorst plaque)
 - Carotid arteries
 - Platelet-fibrin emboli
 - Large-vessel arteriosclerosis
 - Calcific emboli arising from diseased carotid valves
 - Other:
 - Cardiac myxoma
 - Fat emboli
 - Septic emboli
 - Talc emboli
- Thrombosis
 - Rupture of atherosclerotic plaque
- Inflammatory
 - Giant cell arteritis
 - Other vasculitis



7

BRANCH RETINAL ARTERY OCCLUSION

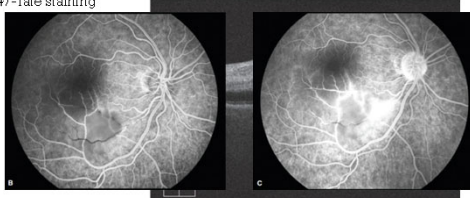
- Symptoms: acute, painless vision loss → scotoma; 10% have a history of amaurosis
- Signs:
 - +/- RAPD
 - Reduced VA
 - +/- plaque
 - Superficial retinal whitening



8

BRANCH RETINAL ARTERY OCCLUSION

- Diagnostics
 - OCT
 - Early: inner retinal edema
 - Late: inner retinal thinning/atrophy
 - FA
 - Delayed arterial and venous filling in area of obstruction
 - +/- late staining



9

CENTRAL RETINAL ARTERY OCCLUSION

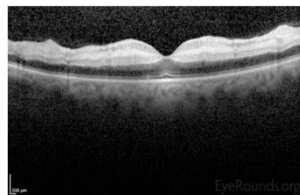
- Symptoms: acute, painless vision loss; 10% have history of amaurosis
- Signs:
 - +RAPD
 - Reduced VA
 - Superficial retinal whitening
 - Cherry red spot



10

CENTRAL RETINAL ARTERY OCCLUSION

- Diagnostics
 - OCT
 - Early: Inner retinal edema
 - Late: inner retinal thinning/atrophy
 - FA
 - Delayed arterial and venous filling



11

ACUTE MANAGEMENT OF RETINAL ARTERY OCCLUSIONS

- STAT REFERRAL TO **EMERGENCY ROOM (AT STROKE CENTER)** AS STROKE EQUIVALENT
- Minimum recommended work-up
 - Evaluate for embolic source
 - Carotid ultrasound or CT/MR Angiography
 - Echocardiogram with bubble study
 - Head imaging with CT or MRI
 - Evaluate risk factors for thrombosis
 - Evaluate for inflammatory etiology
 - ESR, CRP (minimum)
 - If young, evaluate for hypercoagulable state
- If diagnosis is unclear → same day retina evaluation

12

ACUTE MANAGEMENT OF RETINAL ARTERY OCCLUSIONS

- Multiple treatment modalities have been proposed to restore blood flow with the hope of improving vision:
 - Digital massage of the globe
 - Anterior chamber paracentesis
 - Hyperbaric oxygen therapy
 - Embolectomy
 - Fibrinolytic therapy*
- No treatments have been proven to work



13

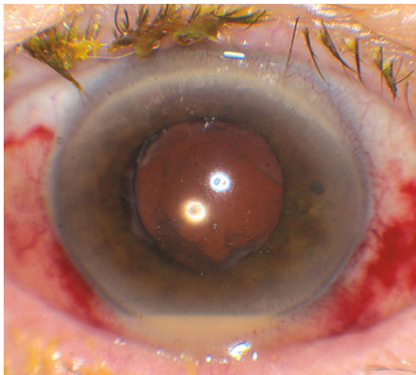
CHRONIC MANAGEMENT OF RETINAL ARTERY OCCLUSIONS

- Poor visual prognosis
 - Typically CF to HM
- Monitor for development of iris or retinal neovascularization
 - Occurs in 18%
 - Typically develops 4-6 weeks after event
 - Treatment with antiVEGF and/or PRP



14

ENDOPHTHALMITIS



15

INFECTIOUS ENDOPHTHALMITIS

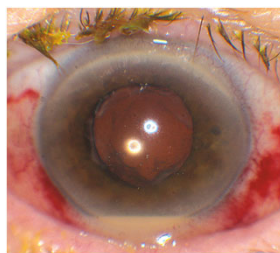
- Infection of internal structures of the eye
- Exogenous
 - Organisms invade through a defect in the outer wall of an eye
 - Postoperative
 - Post-traumatic
- Endogenous
 - Infection of the eye from alternate source in the body
 - Tooth abscess, endocarditis, pneumonia, liver abscess, UTI, sepsis, etc
 - Typically blood-borne
 - Associated with immunocompromised states



16

EXOGENOUS ENDOPHTHALMITIS

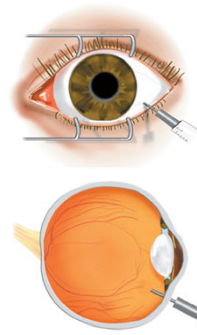
- Symptoms:
 - Decreased vision
 - Eye pain
 - Redness
 - +/- Discharge
- Signs:
 - AC reaction/hypopyon
 - Vitritis
 - +/- eyelid edema
 - +/- corneal edema



17

EXOGENOUS ENDOPHTHALMITIS

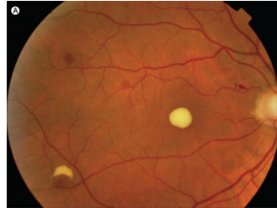
- Diagnostics
 - Clinical diagnosis
 - Vitreous/aqueous cultures
- Management
 - Obtain sample for cultures
 - Vitreous sample preferred
 - Aqueous sample otherwise
 - Inject antibiotics
 - +/- steroids
 - +/- antifungals
 - Close follow-up



18

ENDOGENOUS ENDOPHTHALMITIS

- Symptoms
 - Highly variable: asymptomatic → severe pain, redness, vision loss
- Signs
 - Decreased vision
 - Conjunctival injection
 - Iritis
 - Vitritis
 - white/yellow infiltrate (subretinal)



19

ENDOGENOUS ENDOPHTHALMITIS

- Diagnostics
 - Clinical diagnosis
 - Extensive ROS
- Management
 - Vitreous biopsy
 - +/- intravitreal antibiotics*
 - +/- intravitreal antifungals*
 - Systemic work-up



20

INTRAOCULAR FOREIGN BODY (IOFB)

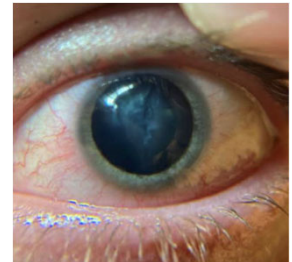
- Occur in penetrating ocular injuries, often construction or explosive related
- Damage occurs from initially injury and can occur subsequently based on the composition of the IOFB
 - Iron → siderosis
 - Copper → chalcosis
 - glass, plastic and stone are typically inert and cause less long-term damage
 - Organic matter is highly contaminated and high risk of endophthalmitis
- Prognosis is better for foreign bodies entering the anterior segment than posterior segment



21

INTRAOCULAR FOREIGN BODY

- Symptoms
 - Typically antecedent trauma followed by vision loss
 - If retained for extended period may be asymptomatic
- Signs
 - Hypotony
 - Penetrating eye wound (may self-seal)
 - IOFB may be visible on exam
 - +/- vitreous hemorrhage
 - +/- retinal detachment
 - Special attention to the vitreous base



22

INTRAOCULAR FOREIGN BODY

- Diagnostics
 - Ultrasound (gently)
- Management
 - If acute → ER for CT imaging, tetanus prophylaxis, and globe exploration/closure
 - If chronic, inert → non-urgent removal vs. close observation
 - If signs of endophthalmitis or organic source → immediate vitrectomy and IOFB removal
 - If no signs of infection → removal typically within 1 week*



23

RETINAL BREAKS

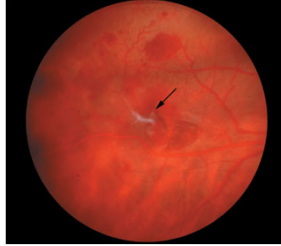
- Full thickness defect in the neurosensory retina
- Allow liquified vitreous to enter potential space between the sensory retina and the RPE
- In general, tears result from vitreoretinal traction while holes result from localized retinal atrophy
- May be classified as the following:
 - Horseshoe tears (aka flap tears)
 - Giant retinal tears
 - Operculated holes
 - Dialyses
 - Atrophic retinal holes
- Symptoms:
 - Commonly asymptomatic
 - Flashes
 - Floaters



24

HORSHOE TEAR

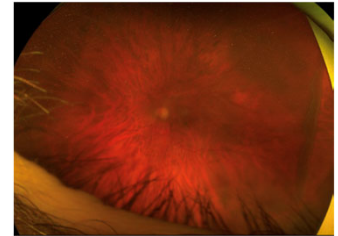
- Management:
 - If symptomatic there is 30-50% chance of retinal detachment
 - Retinopexy (typically within 24-72 hours)
 - If asymptomatic, 5% risk of retinal detachment
 - No clear guidelines
 - Consider observation if chronic, demarcated by pigmentation, and not associated with contralateral pathology or high myopia



25

GIANT RETINAL TEAR

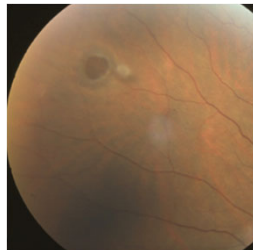
- Retinal tear of more than 90 degree circumferential extent
- Management:
 - If no retinal detachment → retinopexy
 - If detachment → surgical repair



26

OPERCULATED HOLE

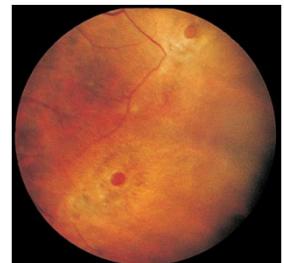
- Full thickness retinal hole with operculum
- Typically associated with complete release of vitreous traction
- Management:
 - No agreed upon management
 - How I practice:
 - If evidence of persistent vitreoretinal traction → retinopexy
 - If asymptomatic and no traction → observe



27

ATROPHIC RETINAL HOLE

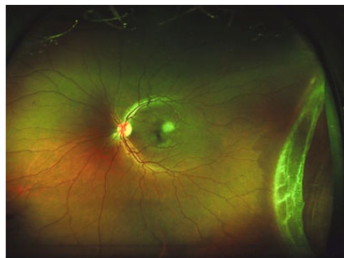
- Result from chronic atrophy of the retina
- Not induced by vitreous traction
- May be associated with lattice degeneration
- Management
 - Observation
 - If fellow eye with hx of RD → consider retinopexy



28

RETINAL DIALYSIS

- Circumferential tear in retina away from insertion at ora
- Often associated with trauma
- Typically inferotemporal quadrant
- Management:
 - Laser retinopexy if no detachment
 - Surgery if detachment



29

RHEGMATOGENOUS RETINAL DETACHMENT

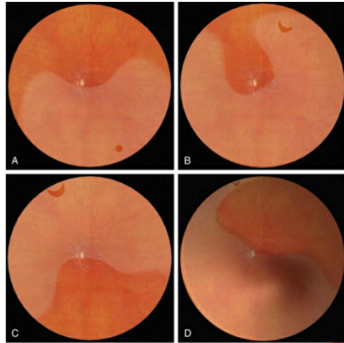
- Etiology
 - Retinal break allows liquified vitreous to move through the hole and separate retina from underlying RPE
- Symptoms:
 - Flashes
 - Floaters
 - Curtain/shadow
 - Peripheral and/or central vision loss



30

RHEGMATOGENOUS RETINAL DETACHMENT

- Management
 - Examination to localize detachment and breaks

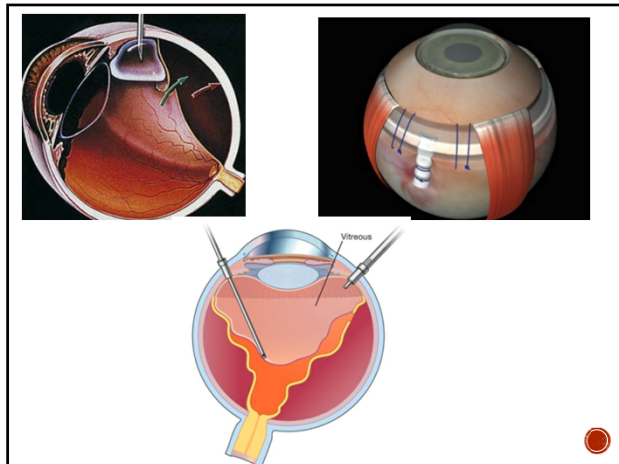


31

RHEGMATOGENOUS RETINAL DETACHMENT

- Management
 - Multiple different techniques can be used to effectively managed RRDs:
 - Retinopexy if subclinical/localized
 - Pneumatic retinopexy
 - Vitrectomy
 - Scleral buckle
 - Vitrectomy + buckle
 - Timing of repair:
 - Macula sparing retinal detachment: 24-48 hours*
 - Macula involving retinal detachment: within 1 week*

32



33

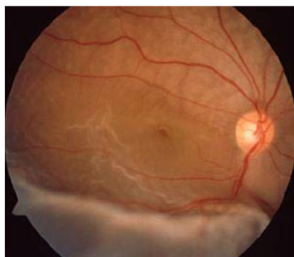
RHEGMATOGENOUS RETINAL DETACHMENT MASQUERADERS

- Exudative retinal detachment
- Schisis
- Choroidal effusion

34

EXUDATIVE RETINAL DETACHMENT

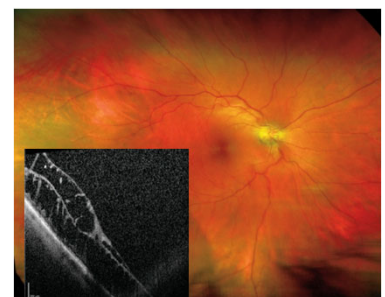
- Accumulation of fluid between retina and RPE due to inflammation, loss of BRB, and/or diminished outflow of choroid
- Symptoms
 - Variable depending on location
- Signs
 - Shifting, smooth subretinal fluid
 - Absence of retinal beaks
- Diagnostics
 - B-scan to rule out mass
 - FA can help assess inflammation
- Management: depending on etiology



35

RETINOSCHISIS

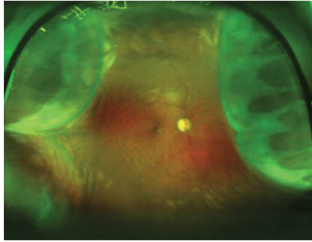
- Splitting of retinal layers (degenerative)
- Symptoms: None
- Signs:
 - Thin and smooth elevation of peripheral retina
 - Usually inferotemporal
- Diagnostics
 - OCT
 - +/- laser photocoagulation
- Management: observe



36

CHOROIDAL EFFUSION

- Fluid or blood in the space between choroid and sclera
- Symptoms:
 - Reduced VA
 - Peripheral field loss
- Signs:
 - AC shallowing
 - IOP changes
 - Smooth, lobed appearance
- Diagnostics
 - B-scan
- Management:
 - Depending on etiology



37

VITREOUS HEMORRHAGE

- Etiology:
 - Proliferative diabetic retinopathy**
 - Posterior vitreous detachment**
 - Retinal break**
 - Trauma**
- Symptoms:
 - Floaters (black spots, cobwebs, haze, etc)
 - Vision loss
- Retinal detachment
 - Vein occlusion
 - Neovascular AMD
 - Sickle cell disease
 - Terson Syndrome*
 - other



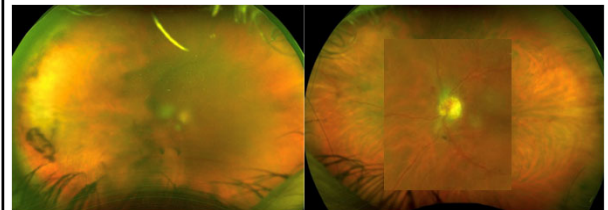
38

VITREOUS HEMORRHAGE

- Management
 - Ultrasound if peripheral view limited
- Examine fellow eye
 - Lattice degeneration
 - High myopia
 - Diabetic retinopathy
 - Hypertensive retinopathy
 - Sickle cell retinopathy
- Treat underlying cause if possible
- +/- Surgery



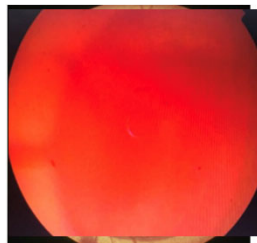
39



40

BE AWARE: Terson SYNDROME

- Patients with unilateral or bilateral intraocular hemorrhage with neurologic symptoms
- intraocular hemorrhage is associated with subarachnoid hemorrhage
- Hemorrhage can be subretinal, intraretinal, preretinal and intravitreal
- Pathogenesis not entirely understood
 - Intracranial hemorrhage increases ICP → transmitted within optic nerve sheath to obstruct the venous drainage from the eye → acute rise in venous pressure causes rupture of retinal capillaries
- EMERGENT ER EVALUATION



41

SUBMACULAR HEMORRHAGE

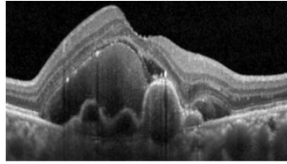
- Etiology
 - CNVM**
 - AMD, POHS, pathologic myopia
 - PCV**
 - Trauma (choroidal rupture)**
 - RAM
 - Valsalva
 - Coagulopathies
- Symptoms
 - Painless vision loss typically
 - May be associated with antecedent trauma



42

SUBMACULAR HEMORRHAGE

- Diagnostics
 - OCT
- Management
 - Observation
 - Anti-VEGF
 - Intravitreal tPA + pneumatic displacement
 - Vitrectomy with subretinal tPA with pneumatic displacement



43

END



44