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There Will Be Blood

The Differential Diagnosis of Retinal Hemorrhage
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Why Will There Be Blood?

Arterial Retinal Circulation
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Guiding Principles

“Common things occur commonly.”
– Unknown

“I suppose it is tempting, if the only tool you have is a hammer, to treat everything as if it were a nail.”

“If it bleeds, we can kill it.”
– Arnold Schwarzenegger, Predator, 1987

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Characteristics

• Size/Shape
  – Aneurysm, flame shaped, dot blot, scaphoid
• Frequency
  – Single, numerous, discreet, clustered
• Location/Distribution
  – Macula, mid periphery, far periphery
  – Along a vessel, respecting raphe, diffuse
• Depth
  – Preretinal, intraretinal, subretinal, choroidal
• Associated anatomy
  – Roth spot, exudate, NV, emboli

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Pathology Type

• Vascular
  – arterial, venous, systemic disease
• Degenerative
  – choroidal, vitreoretinal
• Inflammatory
• Infectious
• Neoplastic
• Traumatic
Ocular Ischemic Syndrome

- Ischemia of inner retina from ICA stenosis.
- Unilateral or Bilateral.
- Men (2:1) age 50-80.
- History of decreased vision, pain, possible amaurosis fugax.
- Ask about cholesterol, HTN, stroke, heart Dz.

Ocular Ischemic Syndrome

- Large peripheral blot hemorrhages not corresponding to particular venous perfusion.
- Scattered hemorrhages simulate CRVO, but there is no retinal venous tortuosity/ON swelling.
- Patients require carotid U/S.
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**Sickle Cell Retinopathy**

- Ocular manifestations of sickle cell disease result from vascular occlusion.
- Constellation of findings:
  - Sclerotic vasculature
  - Venous tortuosity
  - Salmon patch/sunburst
  - Neovascularization (sea fan)
  - VH/TRD
- Order sickle cell prep and Hgb electrophoresis.

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**Blood Dyscrasias**

- Pathologic conditions of the blood marked by abnormal levels of cellular components
  - RBC
  - WBC
  - Platelets
- Often multiple systemic manifestations.
- Frequently ocular manifestations.
- Broad range of overlapping retinal presentation.
- Order complete blood count (CBC) with differential & peripheral blood smear for screening.
Blood Dyscrasias

• Retinal Hemorrhage: dbh and flame shape
• Microaneurysms: typically peripheral
• Hard Exudates
• Retinal Edema
• Cotton Wool Spots
• Vascular Changes: Venous dilation and tortuosity, sheathing, neovascularization.

Purtscher’s Retinopathy

• LOV associated with head/chest trauma, long bone trauma, pancreatitis, child birth.
• Peri-papillary retinal whitening with retinal and/or preretinal hemorrhage, edema, dilated veins.
• History is essential.
• Prognosis is variable.
Anemia

- Reduction in the concentration of hemoglobin or red blood cells in the blood.
- Retinal hemorrhages are common findings.
- In profound anemia, CWS and white-centered hemorrhages may be observed.
- Can present with other dyscrasias.

Polycythemia Vera

- Chronic disorder of bone marrow with increase in the number of RBC and total blood volume.
- Fundus findings include retinal venous dilatation tortuosity, intraretinal hemorrhages.

Leukemia

- Cancer typically originating in the bone marrow with high levels of abnormal white blood cells in the blood.
- Acute and chronic subtypes.
- Ocular findings include intraretinal hemorrhages (flame-shaped, dot-blot, white-centered), microaneurysms, hard exudates, retinal edema, CWS, venous stasis retinopathy, NV.
Blood Dyscrasia Workup

- Complete blood count (CBC) with differential.
- Peripheral blood smear.
- Prothrombin time (PT) and partial prothrombin time (PTT).
Retinal Vein Occlusion
- Glaucma
- DM, HTN, cholesterolemia
- Coagulopathy: Malignancy, Anemia, Hypercoagulable states
  - Antiphospholipid Ab, Protein C/S, Factor V Leiden, Antiphospholipid antibodies
  - Drugs: OCP, diuretics
- Vasculitis: vs. vasculitis, SLE, syphilis

Choroidal Neovascularization
Choroidal Neovascularization

- AMD
- High myopia
- Angioid streaks
- POHS
- Choroidal rupture
- CRS
- Inflammatory CR spots
- Choroidal tumor

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Valsalva Retinopathy

- Abrupt vision loss associated with valsalva maneuver.
- Small/large, uni/bilateral, preretinal heme in macular area.
- History is essential.
- Prognosis is excellent.
Terson Syndrome
- Classic preretinal hemorrhage associated with subarachnoid hemorrhage.
- ± sub/intraretinal hemorrhage, vitreous hemorrhage.
- History is essential.
- Prognosis is good.

Retinal Artery Macroaneurysm (RAMA)
RAMA

• Saccular dilation of artery, often ST macular, ± exudate.
• Sub/intra/preretinal hemorrhage.
• Painless LOV.
• Classically women aged 57–71 years.
• Treat CME with anti-VEGF, focal laser is curative.

Macular Telangiectasia

• Idiopathic juxtafoveal telangiectasia Type II.
• Prevalence as high as 0.1% of population.
• Mean age onset 55, no gender/race predilection.
• Bilateral but asymmetric.
• Presents with decreased VA, c/o metamorphopsia, paracentral scotoma, often more aware while reading.
Macular Telangiectasia

- Fundus findings include parafoveal graying of retina, superficial crystalline deposits, subfoveal cystoid cavities, parafoveal telangiectasias, and right-angle vessels.
Radiation Retinopathy

Infectious

Auto-Immune
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<table>
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<tr>
<th>Shape</th>
<th>Mechanism</th>
<th>Common Associated Conditions</th>
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</table>
| Cutaneous | Radial (deep) capillaries | Diabetes, hypertension, 
| | Radial of superficial capillary \narterioles, small \nveins | systemic \narteriosclerosis, \nstenosis, \naneurysm \nrupture, \narteritis |
| Venous | Radial of deep \nvenules \nand veins | Diabetes, \nstenosis, \naneurysm \nrupture, \narteritis |
| Venous \nHematoma | Radial of deep \nvenules \nand veins | Diabetes, \nstenosis, \naneurysm \nrupture, \narteritis |
| Subcutaneous \nHematoma | Radial of dermal \nvenules \nand veins | Non-related \ntraumatic \nhemorrhage |

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**Coming Attractions**