CRVO

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Regarding CRVO risk factors--may I introduce ‘the Hs.’ You know two already; how about the other three? --Hypertension --Hyperglycemia (ie, DM) --Hyperlipidemia --High IOP (ie, OAG) --Hypercoaguability
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What implication does this have for evaluating a CRVO pt?
It implies that, in addition to determining the glaucoma status of the CRVO eye, you need to consider whether the fellow eye has glaucoma.
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Age. Over % of CRVO pts are older than #
CRVO

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What role does vasculopathy play in the genesis of a CRVO?
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Do CRVO pts tend to be vasculopathies?
Yes. DM and HTN are both risk factors for CRVO.

What role does vasculopathy play in the genesis of a CRVO?
It’s believed that atherosclerotic disease of the central retinal artery causes it (the CRA) to impinge upon/partially compress the adjacent CRV. This compression disrupts blood flow through the CRV as well as damages its endothelial cells, thereby increasing the possibility of stasis and clot formation, with the resulting development of a thrombus.
CRVO

(Not ischemic vs nonischemic—we’ll get to that shortly)
CRVO

Primary/idiopathic

Secondary

CRVO
CRVO

Primary/idiopathic

Secondary

Hyperviscosity syndrome

Vasculitis

Drugs

Carotid occlusive dz

(There are many others)
CRVO

Primary/idiopathic

Secondary

Hyperviscosity syndrome
- Waldenström macroglobulinemia
- Multiple myeloma
- Polycythemia vera
- Hypercoaguuable states

Vasculitis

Drugs

Carotid occlusive dz
What specific conditions may contribute to hypercoaguability?

- Waldenström macroglobulinemia
- Multiple myeloma
- Polycythemia vera

Hypercoaguable states
What specific conditions may contribute to hypercoaguability?

-- Hyperhomocystinemia (yet another 'H')
-- Protein S deficiency
-- Protein C deficiency
CRVO

Primary/idiopathic

Pearl: If a pt presents with bilateral CRVOs, consider hyperviscosity first. (Check electrophoresis, viscosity studies)

Secondary

Hyperviscosity syndrome

- Waldenström macroglobulinemia
- Multiple myeloma
- Polycythemia vera
- Hypercoaguuable states

Vasculitis

Drugs

Carotid occlusive dz
Pearl: If a pt presents with bilateral CRVOs, consider hyperviscosity first. (Check electrophoresis, viscosity studies)
Note: The *Retina* book indicates that hyperviscosity retinopathy is an entity clinically similar to but distinct from CRVO, and that apparent CRVOs stemming from Waldenström’s, multiple myeloma and polycythemia vera should be considered hyperviscosity retinopathy, not CRVO.
CRVO

Primary/idiopathic

Secondary

Hyperviscosity syndrome
  - Waldenström macroglobulinemia
  - Multiple myeloma
  - Polycythemia vera
  - Hypercoaguable states

Vasculitis

Drugs

Carotid occlusive dz
CRVO

Primary/idiopathic

Secondary

Hyperviscosity syndrome
- Waldenström macroglobulinemia
- Multiple myeloma
- Polycythemia vera
- Hypercoaguoble states

Vasculitis

Drugs
- Sarcoid
- SLE (systemic lupus erythematosus)
  - (ditto)

Carotid occlusive dz
CRVO

Primary/idiopathic

Secondary

Hyperviscosity syndrome
- Waldenström macroglobulinemia
- Multiple myeloma
- Polycythemia vera
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Vasculitis
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Drugs

Carotid occlusive dz
CRVO

Primary/idiopathic

CRVO

Secondary

Hyperviscosity syndrome
- Waldenström macroglobulinemia
- Multiple myeloma
- Polycythemia vera
- Hypercoaguable states

Vasculitis
- Sarcoid
- SLE

Drugs
- OCP (oral contraceptive pills)
- Diuretics
- (ditto)

Carotid occlusive dz
CRVO

Secondary

Hyperviscosity syndrome
- Waldenström macroglobulinemia

Vasculitis
- Sarcoid

Drugs
- OCP

Carotid occlusive dz

Primary/idiopathic

Hypercoaguable states

Polycythemia vera

What two things does this imply regarding CRVO in young females?

--

--
What two things does this imply regarding CRVO in young females?
--Always inquire about OCP use in any young female presenting with CRVO
--Likewise, advise female CRVO pts to avoid OCP use
CRVO

Primary/idiopathic

Secondary

Hyperviscosity syndrome
- Waldenström macroglobulinemia
- Multiple myeloma
- Polycythemia
- Hypercoaguable states

Vasculitis
- Sarcoid
- SLE

Drugs
- OCP
- Diuretics

Carotid occlusive dz

The history will be important in picking up on these. If suggestive of vasculitis, order the appropriate labs.
CRVO

Secondary

Hyperviscosity syndrome
- Waldenström macroglobulinemia
- Multiple myeloma
- Polycythemia vera
- Hypercoaguable states

Vasculitis
- Sarcoid
- SLE

Drugs
- OCP

Carotid occlusive dz

Primary/idiopathic

Ocular ischemic syndrome (OIS) can closely mimic CRVO
What aspects of a CRVO case should make you concerned that it is secondary in origin?
What aspects of a CRVO case should make you concerned that it is secondary in origin? --If the pt is not a [general med condition] and the other risk factors (ie, [a risk factor] another) are absent
What aspects of a CRVO case should make you concerned that it is secondary in origin?
--If the pt is not a vasculopath, and the other risk factors (ie, cholesterol, smoking, hyperhomocystinemia) are absent; or
What aspects of a CRVO case should make you concerned that it is secondary in origin?

--If the pt is not a vasculopath, and the other risk factors (ie, cholesterol, smoking, hyperhomocysteinemia) are absent; or
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--If CRVO presents
What aspects of a CRVO case should make you concerned that it is secondary in origin?

--If the pt is not a vasculopath, and the other risk factors (ie, cholesterol, smoking, hyperhomocystinemia) are absent; or
--If the pt is less than 50 years of age; or
--If CRVO presents bilaterally
The more traditional way to divvy them up
CRVO

Ischemic  Nonischemic

(We’ll define ischemic and nonischemic shortly)
What if, for whatever reason, a CRVO’s ischemia-status cannot be determined?
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What if, for whatever reason, a CRVO’s ischemia-status cannot be determined? Such a CRVO is classified as indeterminate.

What is the natural history of indeterminate CRVOs?
What if, for whatever reason, a CRVO’s ischemia-status cannot be determined? Such a CRVO is classified as indeterminate.

What is the natural history of indeterminate CRVOs? A big % of them turn out to be ischemic, you got a 50:50 shot...
What if, for whatever reason, a CRVO’s ischemia-status cannot be determined? Such a CRVO is classified as *indeterminate*.

What is the natural history of indeterminate CRVOs? ~80% of them turn out to be ischemic.
If a CRVO’s ischemia-status cannot be determined, it is classified as 'indeterminate'.

- Approximately 80% of indeterminate CRVOs turn out to be ischemic.

As an (important) aside: A number of CRVOs initially classified as nonischemic will ‘convert’ to ischemic. About a third will do so by 36 months post-event.
What if, for whatever reason, a CRVO’s ischemia-status cannot be determined? Such a CRVO is classified as indeterminate.

What is the natural history of indeterminate CRVOs? ~80% of them turn out to be ischemic.

As an (important) aside: A number of CRVOs initially classified as nonischemic will ‘convert’ to ischemic. What depressingly-high percentage will do so by 36 months post-event? About a third.
What test must be run to determine whether a CRVO is ischemic or nonischemic?
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What test must be run to determine whether a CRVO is ischemic or nonischemic? Fluorescein angiography
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What test must be run to determine whether a CRVO is ischemic or nonischemic? **Fluorescein angiography**

What FA finding is common to both ischemic and nonischemic subtypes? **Prolonged retinal circulation time**

What FA finding defines an ischemic CRVO? **10+ disc diameters of capillary nonperfusion**

What is the classic description of the fundus in CRVO? **Blood and thunder**

How are such CRVOs classified? **As indeterminate, as mentioned previously**

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10+ disc diameters of capillary nonperfusion
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What does CVOS stand for?

(neovascularization of the iris)
Re NVI after CRVO: According to the CVOS...

What does CVOS stand for? Central Vein Occlusion Study
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For many reasons, not least of which is the fact that many CRVO pts have glaucoma.

In addition to checking IOP, what other examination maneuvers should be performed?
Gonioscopy, on more than one visit

What are you checking for via gonioscopy?
First is a basic assessment of the occludability of the angle. After that is an ongoing evaluation for the development of NVA.

Assuming no PRP or other treatment (a subject we’ll get to shortly), how frequently should a CRVO pt be re-evaluated, and for how long?
Monthly for at least 6 months

What are the main sequelae you’re looking to catch on these visits?
The development of neovascularization (NVI/NVA)—or worse, neovascular glaucoma

Is anterior-segment neovascularization common after ischemic CRVO?
Very—over 50% of cases will develop it

How long after the event does NVG typically appear?
Somewhere in the 3-4 month range

3-4 months later…This explains the name by which post-CRVO NVG is known. What is that name?
‘One-hundred-day glaucoma’
CVOS recs re macular edema after CRVO…

- Wait ___ for spontaneous resolution
- Perform grid macular laser (GML) if:
  - VA is ___ to ___ , and
  - FA reveals ___
- Per CVOS, patients treated with GML are:
  - twice as likely to ___ , and
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Trick question! The CVOS demonstrated that GML improved macular edema angiographically, but did not improve vision.
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**Q**

How do results compare when intravitreal steroids are delivered via an implant as opposed to periodic injections?

They were essentially identical at the 6 month mark.

What about complications, ie, rates of increased IOP and/or cataract formation, when an implant is used? Were these better, worse or the same?

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There were no significant issues.

A third new treatment modality, the dexamethasone intravitreal implant (the Ozurdex), has recently received FDA approval for the treatment of macular edema after C/BRVO. So that would have been an OK answer too.

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**How do results compare when intravitreal steroids are delivered via an implant as opposed to periodic injections?**

They were essentially identical at the 6 month mark.

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