Central Retinal Artery Occlusion (CRAO): Diagnosis and Treatment Options

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- No disclosures

Outline

- Background
  - Epidemiology
  - Vascular anatomy
  - Clinical presentation
- Diagnostic work-up and classification
- Acute treatment options
- Etiological work-up
- Secondary prevention
- Long-term prognosis
- Summary and Conclusions

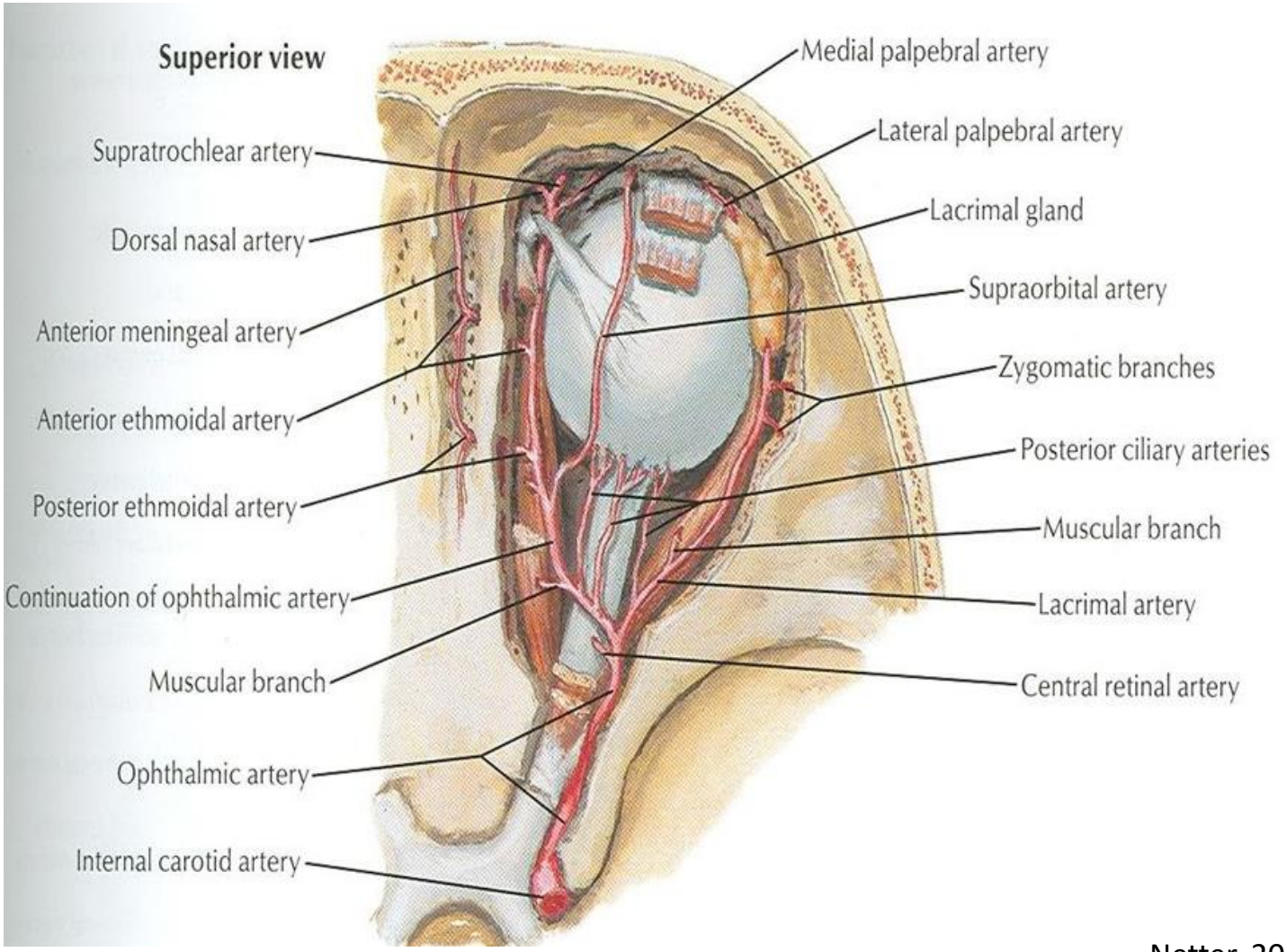
Epidemiology

- Incidence 1 to 10 in 100,000 patients
- Mean age at presentation 60 – 65 years
- More common in men than women
- Co-morbid with hypertension, diabetes and smoking
- < 10% patients experience significant visual improvement
- Higher risk of subsequent stroke

Etiology

- Carotid artery atherosclerosis
- Cardiogenic embolism
- Small artery disease
- Giant cell arteritis
- Hypercoagulable state
- Rare causes (carotid dissection, orbital pressure during back surgery)

Central Retinal Artery Anatomy



Netter, 2014

Central Retinal Artery Anatomy

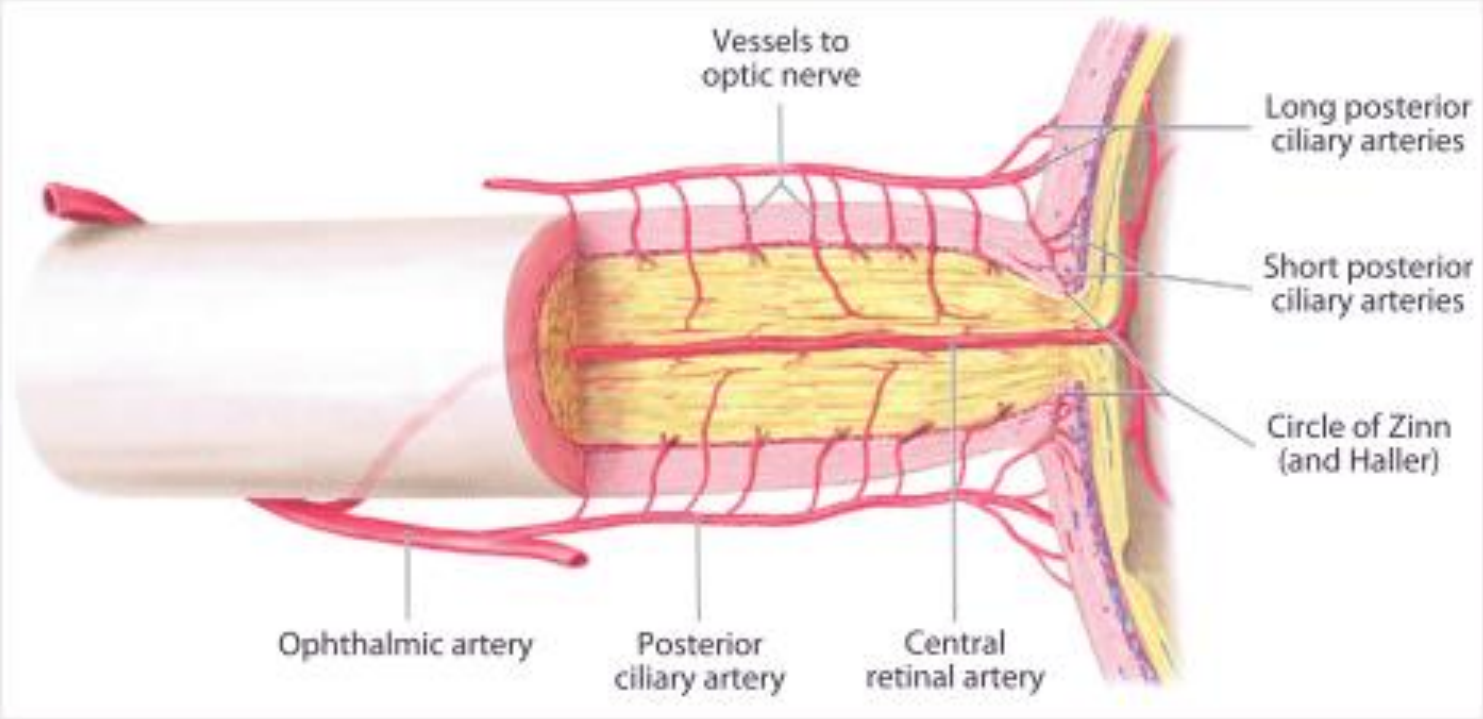
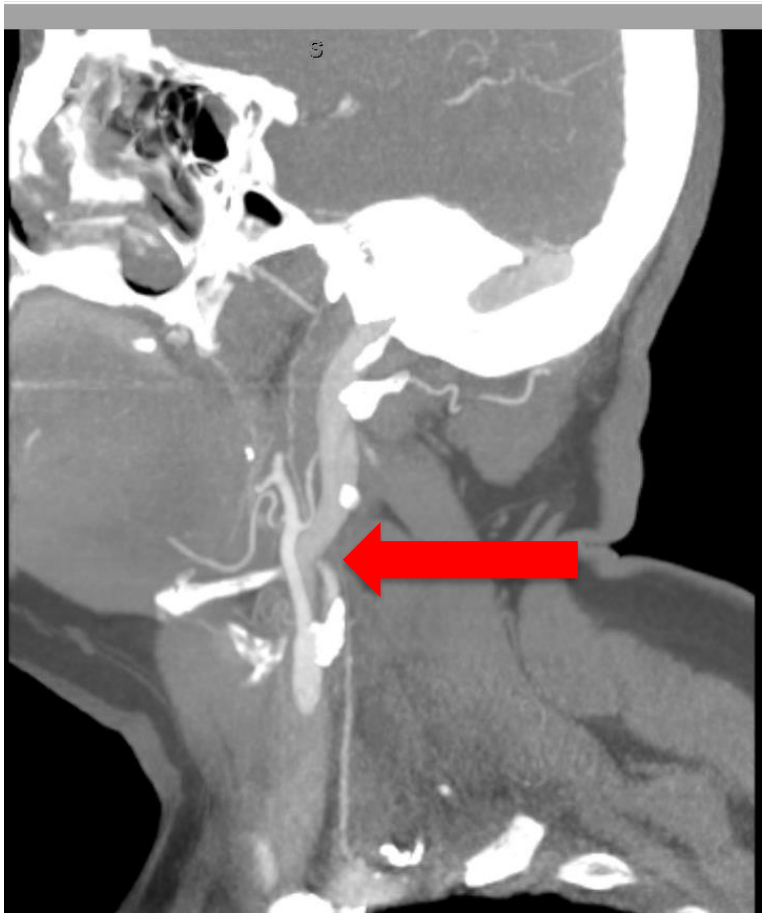


FIGURE 3-1 Blood supply to the optic nerve.

Illustrative Case

- 73yoW with h/o HLD, smoking, AAA p/w acute, painless R monocular visual loss
- Home meds include ibuprofen, pravastatin
- BP 175/80, HR 80 (reg), Pox 96%
- R pupil is unreactive and partial blindness OS; Neurological exam was otherwise normal
- Glucose 116, Plts 216 and INR 0.9

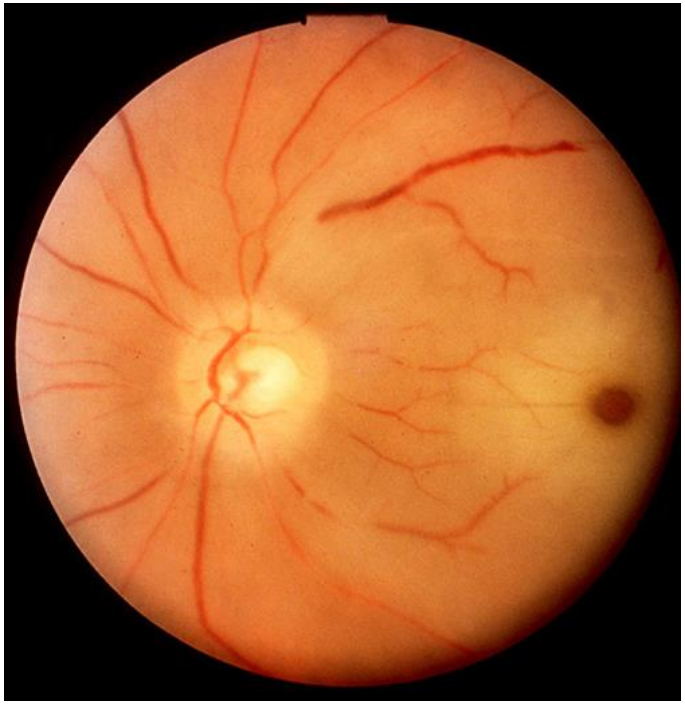
CT/CTA Head and Neck

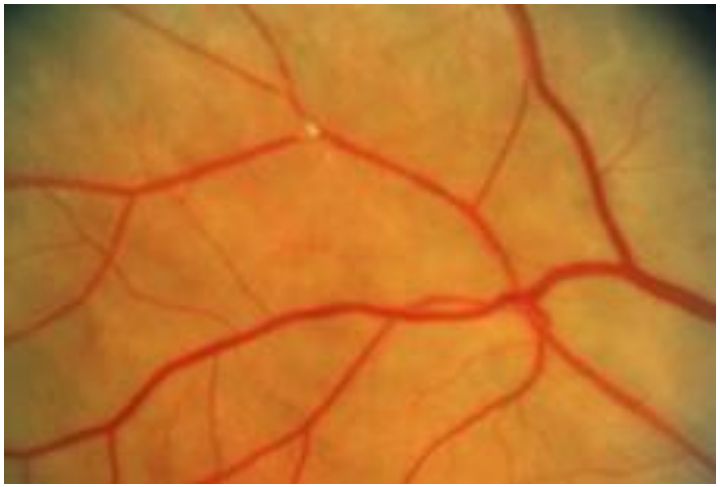


Essentials of diagnosis

- Sudden painless monocular vision loss
- Rarely associated with flashing lights
- Most patients can see only hand motions and rarely can count fingers
- Afferent pupillary defect
- Fundoscopic exam showing acute ischemic retinal whitening and macular “cherry red” spot

Fundoscopic exam findings





Acute diagnostic work-up

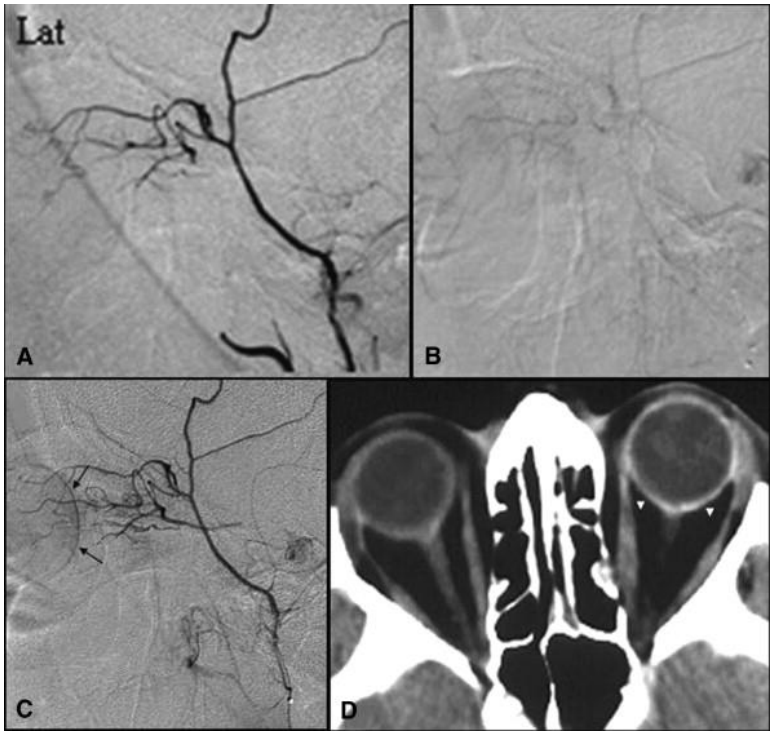
- CBC, BMP, ESR / CRP and INR / PTT
- Non-contrast CT Head and CTA Head / Neck
- Alternatives to CTA:
  - Carotid duplex US
  - MR angiography
- Cerebral angiogram if severe carotid stenosis

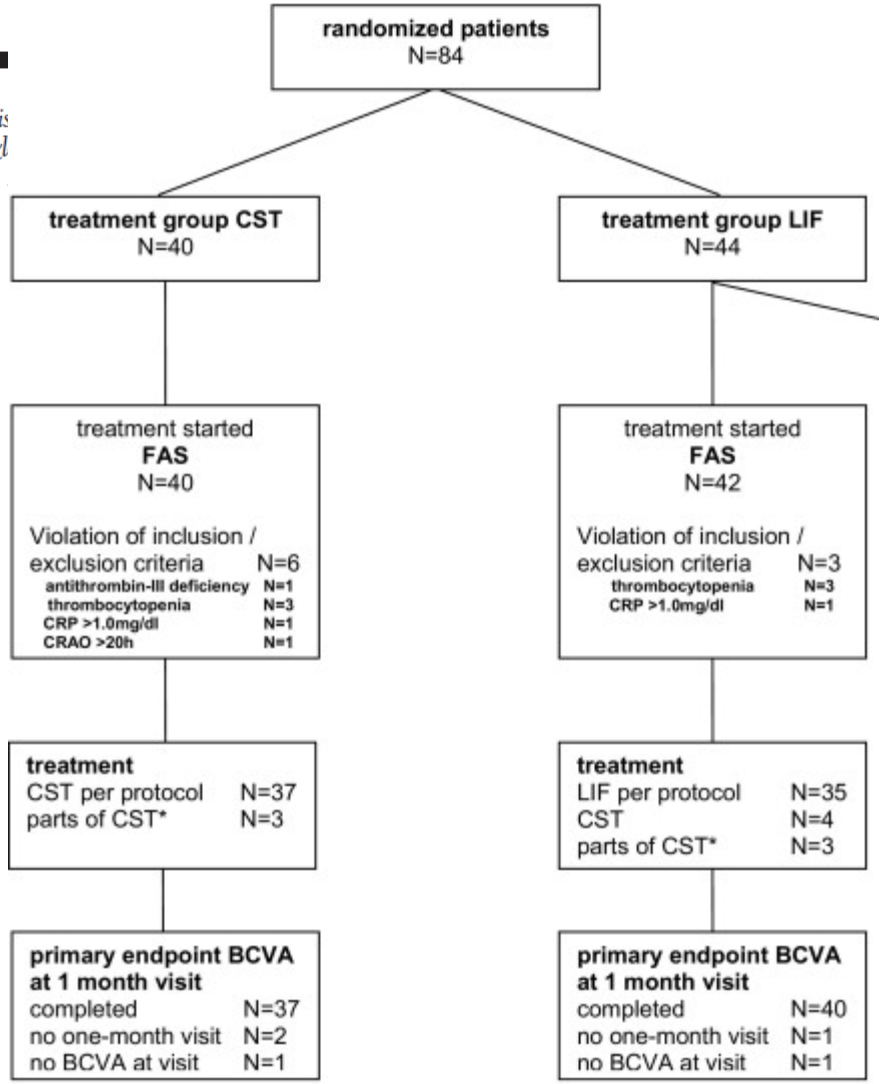
Acute management options

- Conservative therapies
  - Reduction of intra-ocular pressure
  - Vasodilatation
  - Ocular massage
- Off-label reperfusion therapies
  - Intra-arterial thrombolysis
  - IV thrombolysis

Central Retinal Artery Occlusion: Local Intra-arterial Fibrinolysis versus Conservative Treatment, a Multicenter Randomized Trial

Martin Schumacher, MD,[1] Dieter Schmidt, MD,[2] Bernhard Jurklies, MD,[5] Chris
Isabel Wanke, MD,[4] Claudia Schmoor, PhD,[3] Herbert Maier-Lenz, PhD,[1] Laszl
Hartmut Brueckmann, MD,[7] Aljoscha S. Neubauer, MD,[8] Armin Wolf, MD,[8]
*EAGLE-Study Group**





Central Retinal Artery Occlusion: Local Intra-arterial Fibrinolysis versus Conservative Treatment, a Multicenter Randomized Trial

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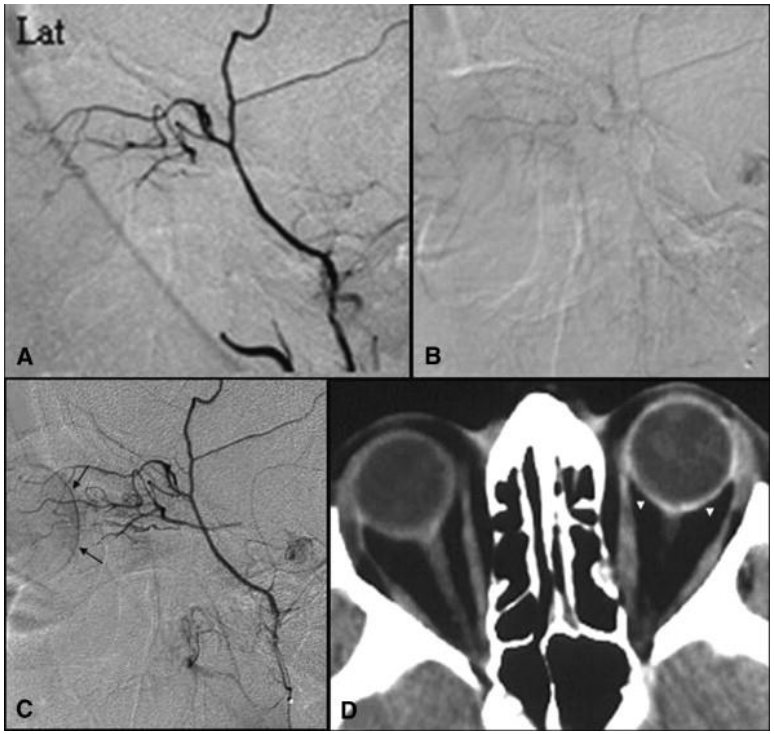
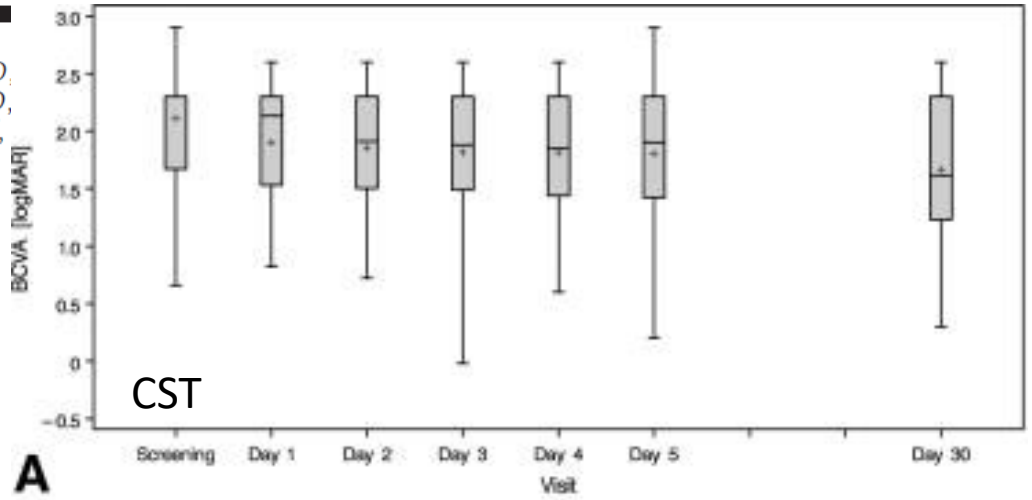
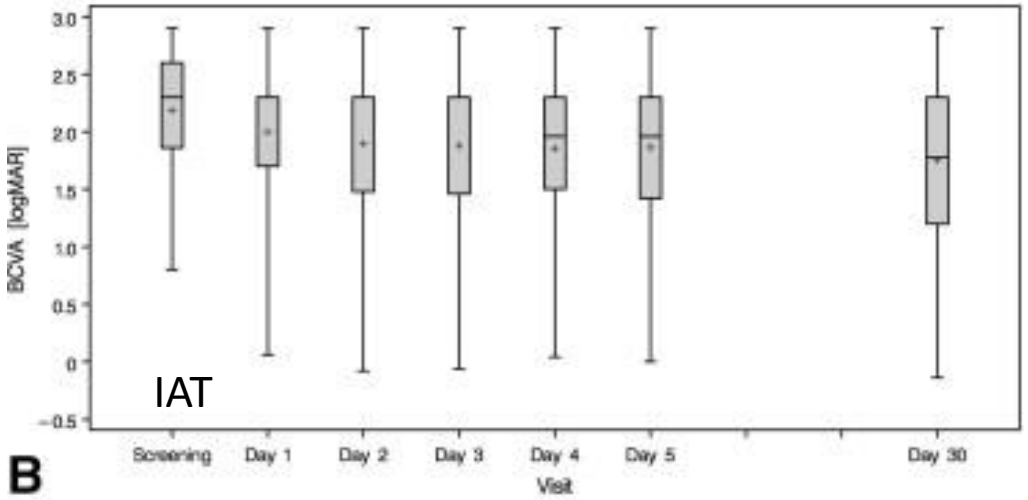
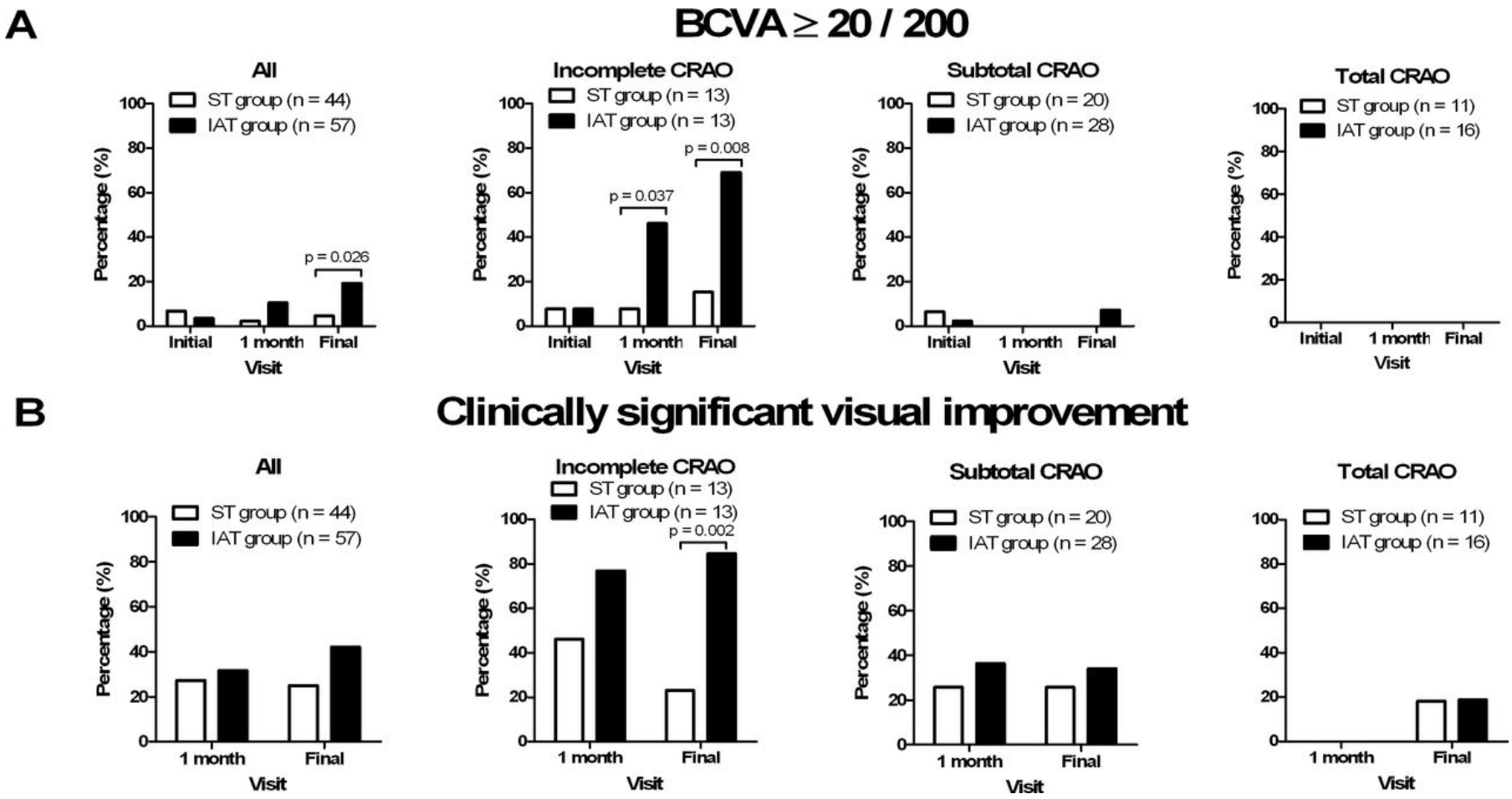






ARVO JOURNALS

From: Efficacy and Safety of Intra-Arterial Thrombolysis in Central Retinal Artery Occlusion
Invest. Ophthalmol. Vis. Sci.. 2013;54(12):7746-7755. doi:10.1167/iovs.13-12952

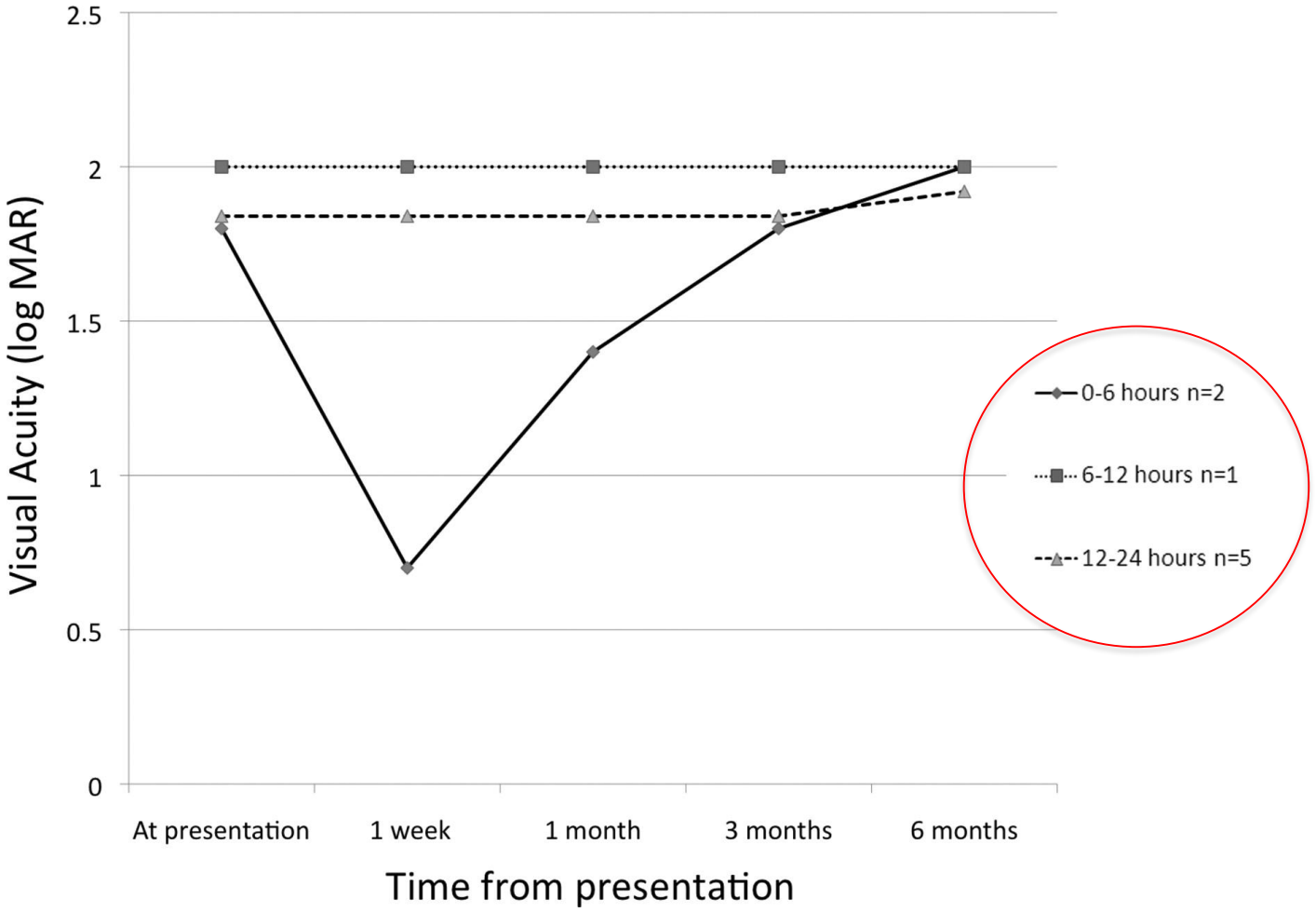


Ahn et. al, 2013

Efficacy of Intravenous Tissue-Type Plasminogen Activator in Central Retinal Artery Occlusion

Report From a Randomized, Controlled Trial

Celia S. Chen, MBBS, PhD, FRANZCO; Andrew W. Lee, MBBS, MPH, FRACP; Bruce Campbell, MBBS, FRACP; Tien Lee, MBBS; Mark Paine, MBBS, FRACP; Clare Fraser, MBBS; John Grigg, MBBS, FRANZCO; Romesh Markus, MBBS, PhD, FRACP



Illustrative case (continued)

- En route to PUH, the Pt becomes dysarthric, w/ left hemiparesis and neglect
- She is transferred directly to the angio suite for MT and R ICA stenting

- She has significant neurological exam improvement without complications but has persistent R visual loss

Etiological work-up

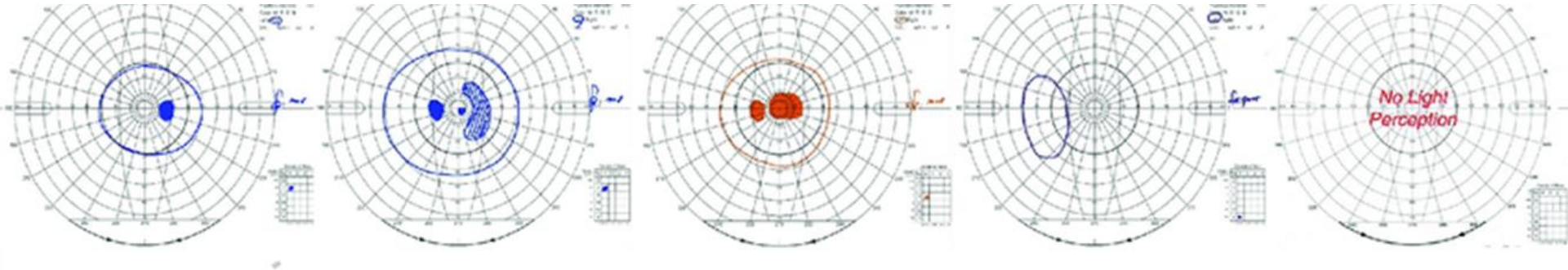
- Vessel imaging
- Exclusion of giant cell arteritis
- Cardiac evaluation
  - Echocardiogram
  - Holter monitoring
- Hypercoagulable testing in select cases

Secondary stroke prevention

- Carotid revascularization
- Atherosclerosis risk factor modification
- Anticoagulation for cardioembolic source or hypercoagulable state
- Steroid treatment in GCA

Clinical course and Long-term prognosis

- Low rate of spontaneous improvement
- Visual acuity at presentation correlates with final visual outcomes
- Late ocular complications (neovascular glaucoma or vitreous hemorrhage)



Kim et al., PLOSone 2019

Summary and Conclusions

- CRAO presents with acute painless monocular vision loss and is a neuro-ophthalmological emergency
- CRAO has a poor prognosis for spontaneous recovery
- Future randomized clinical trials are needed to prove net clinical benefit of thrombolytic therapies in CRAO
- Urgent etiological work-up should be completed for secondary stroke prevention
- Close follow-up for management of late ocular complications and stroke prevention are indicated