Diagnosis and Management of Blunt Cerebrovascular Injuries

Signs/Symptoms of BCVI

- Potential arterial hemorrhage from neck/nose/mouth
- Cervical bruit in pt < 50 yrs old
- Expanding cervical hematoma
- Focal neurologic defect: TIA, hemiparesis, vertebrobasilar symptoms, Horner's Syndrome
- Neurologic deficit inconsistent with head CT
- Stroke on CT or MRI

No

Risk Factors for BCVI

- High energy transfer mechanism associated with:
- Displaced mid-face fracture (e.g., LeFort II or III)
- Complex skull fracture/basilar skull fracture/occipital condyle fracture
- Traumatic Brain Injury (TBI) with GCS < 6 in field
- Cervical vertebral body or transverse foramen fracture, subluxation or ligamentous injury at any level*
- Near hanging with anoxic brain injury
- Clothesline type injury or seat belt abrasion with significant swelling, pain, or altered MS
- TBI with thoracic injuries
- Scalp degloving
- Thoracic vascular injuries

*Excluding isolated transverse process or spinous process fxs

No

STOP

Yes

Yes

Multi-Slice CTA[A]

Equivocal Finding or High Clinical Suspicion → [C] Consider Arteriogram vs Interval Repeat CTA

Negative → [B] STOP

Positive

- Grade I Injury
- [D] Grade II-IV Injury
- Grade V Injury

Surgically Accessible? → No → Endovascular Treatment

Surgically Accessible? → Yes → Operative Repair**

Grade II-IV Injury → Yes → Surgically Accessible?

Surgically Accessible? → No

[e] Antithrombotic Therapy: Heparin (PTT 40-50 sec) or Antiplatelet Therapy

Repeat CTA in 7-10 days → Injury Healed?

Injury Healed? → Yes → Discontinue Antithrombotics

Injury Healed? → No

Antithrombotics for 3-6 months and re-image

Consider endovascular stenting for severe luminal narrowing or expanding pseudoaneurysm

[A] CT angiography with multidetector-row CT, 16-channel or higher. If fewer than 16 channels, interpret CTA with caution.

[B] If signs/symptoms or high clinical suspicion and (-) CTA consider digital subtraction arteriography as gold standard.

[C] Empiric heparin or antiplatelet Tx, planned interval CTA vs arteriography as the gold standard or if relative contra-indication to treatment.

[D] Grade II-IV, pursue operative repair if surgically accessible with clear distal endpoint.

[E] Heparin preferred in the acute setting. Antiplatelet therapy = ASA 325 mg daily. Use heparin if ASA contraindicated, or if potential need to reverse.

[F] Endovascular stenting in acute setting is limited by need for concurrent anticoagulation / antithrombotic therapy. Consider stenting for

Biffl et al J Trauma 2009 WTA
Geddes, Burlew CC et al, Am J Surg. 2016
Updated July 2017, E. Peltz, F. Wright