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Applicability	Erlanger Health - Baroness

Blunt Cerebrovascular Injury and Treatment

1. Guideline statement

Develop a consistent approach for the screening, diagnosis, and treatment of blunt cerebrovascular injury.

2. Scope:

All patients presenting to Erlanger Health Baroness Campus with traumatic injuries

3. Definitions

Blunt Cerebrovascular Injury - BCVI

BCVI - an injury or injuries to the carotid or vertebral artery

4. Procedure

Signs/symptoms of BCVI:

- Arterial hemorrhage
- Cervical bruit
- Expanding cervical hematoma
- Focal neurological deficit
- Neurologic examination unexplained by neuroimaging findings
- Ischemic stroke on secondary Head CT
- Unexplained anisocoria

Risk factors for BCVI (Expanded Denver Criteria):

- Fractures: Lefort II or III, mandible, cervical spine, basilar and complex skull, upper rib.
- Thoracic injuries: thoracic vascular injuries, upper rib injuries, thoracic injuries with TBI.
- Traumatic brain injury (TBI): TBI with thoracic injuries, diffuse axonal injury with Glasgow Coma Scale score < 6
- Unique Trauma Mechanisms: hanging injuries (with or without anoxic brain injury), seatbelt contusion on the neck, scalp degloving
- Any high energy mechanism: including but not limited to MVC, MCC, ATV

Screening Modality:

- 64 slice-CT Angiogram should be performed on all patients who have risk factors for BCVI.
- All patients with an equivocal CT angiogram should have consideration of a formal 4-vessel cerebral arteriogram if treatment is to be withheld.
    - Duplex Ultrasound is **not** sensitive enough to be used as a screening modality
- Consider MRA if CTA is contraindicated and Blunt CVI is suspected

Grading (Biffl injury grading scale):

- Grade I - Intimal irregularity with < 25% narrowing
- Grade II- Dissection or intramural hematoma with > 25% narrowing
- Grade III- Pseudoaneurysm or AV fistula
- Grade IV - Occlusion
- Grade V - Transection with extravasation

Consultation:

- For patients with concomitant severe head injury or complex spine fracture discuss plan of care with a Neurosurgeon prior to initiation of anticoagulation/antiplatelet therapy.
- Consultation of Vascular Surgery should be determined/directed by Trauma Faculty
- Urgent consultation with Interventional Radiology (IR) in highly recommended for the following injuries:
    - BCVI with focal neurologic deficit
    - Patients who are sedated or otherwise unable to provide a neurological examination, with a flow limiting lesion (>50%) in the carotid artery
    - Patients with active extravasation who will not be receiving urgent operative intervention with Vascular Surgery
- Routine consultation with IR will be obtained for asymptomatic patients with flow limiting lesions (>50%) or any Grade III or Grade IV injury.

5. Treatment

Surgical:

- In patients with an early neurologic deficit and an accessible carotid lesion operative or interventional repair should be considered to restore flow.
- In children who have suffered an ischemic neurologic event (INE), aggressive management of resulting intracranial hypertension up to and including resection of ischemic brain tissue has improved outcomes as compared with adults and should be considered supportive management.

Medical: Grade 1 carotid injuries and Grade I-IV vertebral injuries

- Aspirin 325mg PO daily as soon as feasible
- Aspirin 81 mg PO daily can also be considered in patients with high-bleeding risk or pending operative interventions

Medical: Grade II-IV carotid injuries

- Initiate unfractionated Heparin (UFH) weight-based infusion as a bridge to antiplatelet therapy
    - UFH - No bolus dose, 15 u/kg/hr with activated partial thromboplastin time (aPTT) of 40-60 seconds.
    - **FOR PATIENTS WITH INTRACRANIAL HEMORRHAGE**, repeat non-contrasted CT head should be obtained 6 hours after obtaining therapeutic PTT.
    - After 72 hours in the therapeutic range with a heparin drip, repeat cervical CTA and stable patients can be converted to antiplatelet therapy using Aspirin 325mg PO daily.

6. Follow-up

In-Hospital:

- Repeat imaging using CTA with cerebral perfusion should be performed for any change in neurologic status.
- Repeat CTA should be considered in Grade I-III carotid BCVI prior to discharge or at 7 days if there are plans to stop antithrombotic therapy based on imaging results.

Outpatient:

- Patients with resolved vascular injuries on in-hospital follow-up CTA do not need outpatient follow-up for BCVI.
- All patients with carotid injury should be treated with Aspirin 325 PO daily for 3 months followed by repeat CTA.
    - Persistent injuries should be considered for lifelong antiplatelet therapy
    - Resolved injuries can be stopped at this time
- For patients with concomitant spinal fractures, Neurosurgery will arrange for outpatient follow-

up and 3-month CTA.

- For patients with isolated carotid injury, Trauma Services will arrange for outpatient follow-up and 3-month CTA.

References:

Biffl, W. L., Burlew, C. C., & Moore, E. E. (2019, September 5). Blunt cerebrovascular injury: Treatment and outcomes. Retrieved from https://www.uptodate.com/contents/blunt-cerebrovascular-injury-treatment-and-outcomes.

East Practice Management Guidelines Committee. (2007). Blunt Cerebrovascular Injury Practice Management Guidelines. Retrieved from https://www.east.org/Content/documents/practicemanagementguidelines/BluntCVInjury.pdf.

Momic J, Yassin N, Kim MY, Walser E, Smith S, Ball I, Moffat B, Parry N, Vogt K, Antiplatelets versus anticoagulants in the treatment of blunt cerebrovascular injury (BCVI) - A systematic review and meta-analysis. Injury 2024; 55 (111485): 1-14.

Tran A, Fernando SM, Rochwerg B, Hawes H, Hameed MS, Dawe P, Garraway N, Evans DC, Kim, D, Biffl WF, Inaba K, Engels PT, Vogt K, Kubelik D, Petrosoniak A, Joos E. Prognostic factors associated with risk of stroke following blunt cerebrovascular injury: A systematic review and meta-analysis. Injury 2024; 55 (111319: 1-6.

Approval Signatures

Step Description	Approver	Date
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Trauma Services Committee Approval	Stephanie Spain: Trauma Prgm Mgr Adult	07/2025
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Applicability

Erlanger Health - Baroness