8. Vascular Trauma

Educational materials and pathways regarding the evaluation and management of vascular injuries.

- Management of Blunt Cerebrovascular Injuries (BCVI)
- Mangled Extremity Management

Management of Blunt Cerebrovascular Injuries (BCVI)

Management of Blunt Extra – Cranial Carotid and Vertebral Artery Injury in Adults (BCVI)

PURPOSE:
To define guidelines in caring for the trauma patient with diagnosis of blunt extra – cranial carotid and vertebral artery injuries (BCVI)

GUIDELINE:
Screening (Denver Criteria)
Signs/Symptoms

- Potential arterial hemorrhage from neck/nose/mouth
- Cervical bruit (<50 years 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

Risk Factors for BCVI

- High-energy transfer mechanism
- Displaced midface fracture (Lefort II or III)
- Mandible Fracture
- Complex skull fracture/basilar skull fracture/occipital condyle fracture
- Severe TBI with GCS <6
- Cervical spine 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 mental status
- TBI with thoracic injuries
- Scalp degloving
- Thoracic vascular injuries
- Blunt cardiac rupture
- Upper rib fracture

Screening Modality

High quality CT Angiography of the neck is an acceptable modality.
Digital subtraction 4-vessel angiography may be required if metallic foreign bodies prevent adequate visualization on CTA
Duplex Ultrasound is *not* adequate for screening for BCVI.

*** If CTA is ordered to screen for BCVI, a TEG needs to be drawn***

Grading Scale

Grade 1 – Intimal irregularity with < 25% narrowing.
Grade 2 – Dissection or intramural hematoma with > 25% narrowing
Grade 3 – Pseudoaneurysm
Grade 4 – Occlusion
Grade 5 – Transection with extravasation

Treatment

Patients with extracranial carotid and vertebral artery injuries should be treated as outlined below unless: Arterial transection with active hemorrhage is present and/or risk of bleeding from other traumatic injuries prohibits the use of anticoagulation.

Recommendation based on injury grade

Grade 1 and 2

- 81 mg Aspirin

Grade 3

- 81 mg Aspirin
- Neurosurgeon and/or Neuro Interventionalist consultation
- Unlikely to resolve spontaneously with antithrombotic therapy alone. Close follow-up needed.
- Stenting should be avoided due to increased risk for stent thrombosis.

Grade 4

- 81 mg Aspirin
- Neurosurgeon and/or Neuro Interventionalist consultation
- Goal to prevent propagation of thrombus

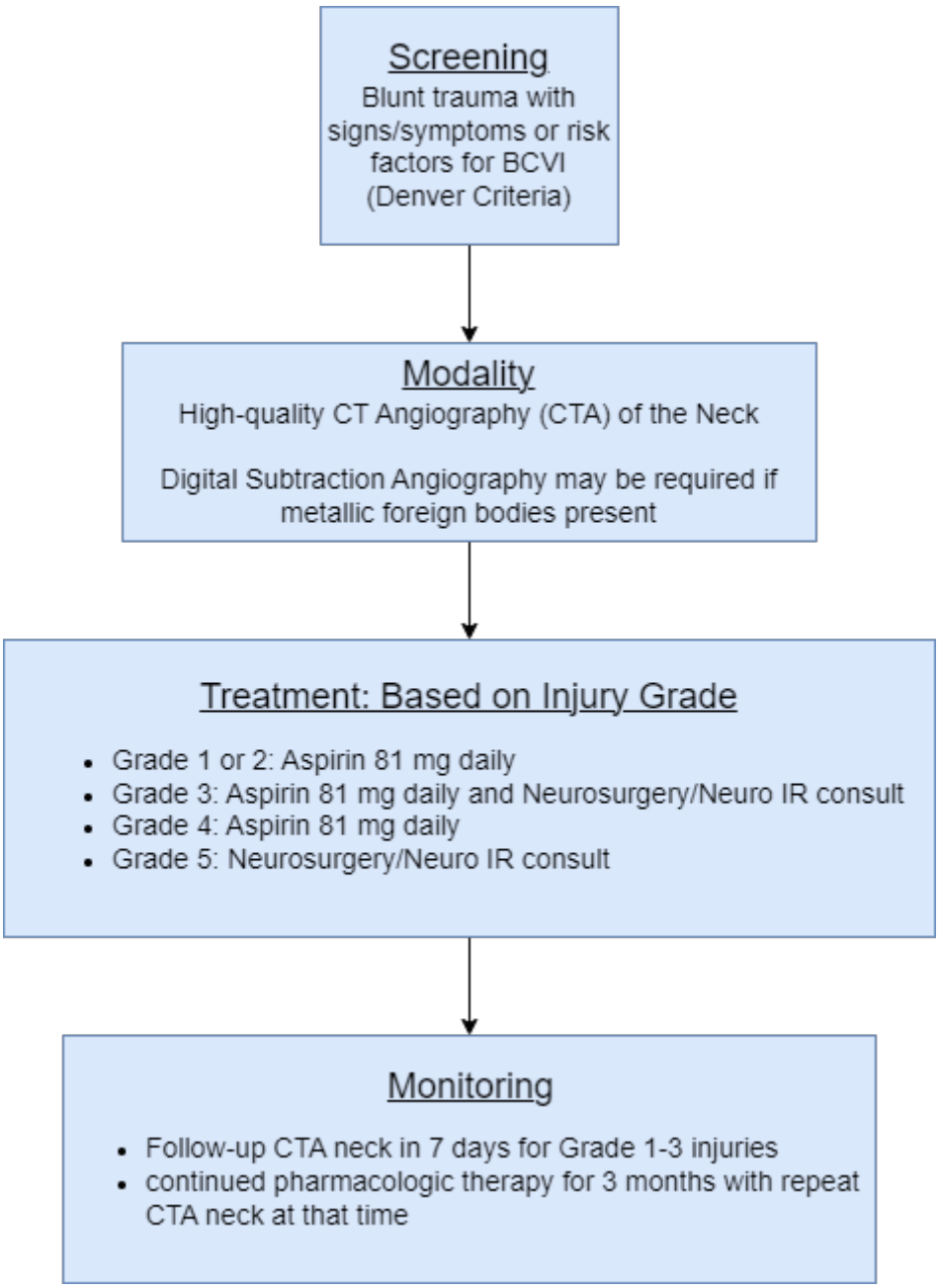
Grade 5

- Neurosurgeon and/or Neuro Interventionalist consultation
- Endovascular intervention depending on clinical picture:
    - Cerebral ischemic events despite the use of anticoagulation or antiplatelet therapy.
    - Progressing luminal stenosis despite adequate antithrombotic therapy
    - Clinical or radiographic evidence of cerebral perfusion failure due to inadequate collateral blood flow.
    - Vertebral artery pseudoaneurysms, as they can rupture into the spinal canal producing epidural and subarachnoid hemorrhage
    - Carotid pseudoaneurysms do not require *urgent* endovascular therapy, as they pose no significant risk of bleeding.

Should results of TEG reveal a hypercoagulable state in the setting of BCVI (MA >63 or angle > 77), strong consideration for early initiation of antithrombotic therapy should be made despite competing risk factors due to increased risk for CVA

Monitoring

- Repeat CTA at 7-days post injury for injury grades 1-3 to assess for resolution of injury and monitor for any progression of luminal stenosis despite antithrombotic therapy, which may benefit from endovascular intervention
- Continued aspirin for 3 months
- CTA is recommended at 3 months to determine the status of the BCVI and the need for further medical or endovascular therapy.



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Approval Date: 1/12/2022

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Mangled Extremity Management

Please see full page under orthopedic trauma section