

3. CRANIOFACIAL, NECK & SPINE
C. Blunt Cerebrovascular Injuries

OBJECTIVE: To define the diagnosis and the management of blunt cerebrovascular injuries.

GUIDELINE: Blunt injuries to the carotid and vertebral vessels (BCVI) are diagnosed in approximately one of 1000 (0.1%) patients hospitalized for trauma. The majority of these injuries are diagnosed after the development of symptoms secondary to central nervous system ischemia resulting in a neurologic morbidity of 80% and an associated mortality of 40%. If appropriate screening for BCVI is done, then the incidence rises to approximately 1% of all blunt trauma patients and up to 2.7% in patients with an ISS $\geq$ 16.

Patients with one or more the following criteria should undergo evaluation for BCVI via Neck CTA:

1. Neurologic abnormality that is not explained by the diagnosed injury
2. Epistaxis from a suspected arterial source after maxillofacial trauma
3. Expanding cervical hematoma
4. Stroke on CT scan
5. Near hanging with anoxia
6. Asymptomatic patients with significant blunt head trauma defined by:
 - GCS $\leq$ 8
 - Closed head injury with diffuse axonal injury
 - Fracture of the petrous bone
 - Basilar skull fracture extending into carotid foramen, occipital condyle fractures
 - Cervical spine fracture, subluxation, or ligamentous injury at any level with/ without fracture extending to the foramen transversarium
 - Severe Facial Trauma, including Le Fort II and III facial fractures
 - Near hanging with concern for hypoxic-ischemic brain injury
 - Neck soft tissue injury (seatbelt sign, hanging, or hematoma)

The following grading system should be used (Denver Grading System⁴):

- Grade I: Intimal irregularity or dissection or intramural hematoma $<$ 25% narrowing
- Grade II: Dissection or intramural thrombus, hematoma with $\geq$ 25% narrowing
- Grade III: Pseudoaneurysm
- Grade IV: Occlusion
- Grade V: Transection with extravasation

Management of BCVI:

All patients with BCVI need a neurosurgery consult

Unless there are specific contraindications, treatment of any grade BCVI will be Aspirin 81- 325 mg daily as early as safely possible, after injury identification, to be initiated by trauma team.

CTA is repeated in one week to assess the evolution of the injury and subsequently as an outpatient as directed by Neurosurgical recommendation. Grade 3 and above injuries may require intervention via formal angiogram/ endovascular technique with interventional neurosurgery.

3. CRANIOFACIAL, NECK & SPINE
C. Blunt Cerebrovascular Injuries

References

1. Kim, Dennis Y. MD; Biffl, Walter MD; Bokhari, Faran MD; Brakenridge, Scott MD; Chao, Edward MD; Claridge, Jeffrey A. MD, MS; Fraser, Douglas MD; Jawa, Randeep MD; Kasotakis, George MD, MPH; Kerwin, Andy MD; Khan, Uzer MD; Kurek, Stan MD; Plurad, David MD; Robinson, Bryce R.H. MD, MS; Stassen, Nicole MD; Tesoriero, Ron MD; Yorkgitis, Brian DO; Como, John J. MD, MPH. Evaluation and management of blunt cerebrovascular injury: A practice management guideline from the Eastern Association for the Surgery of Trauma. *Journal of Trauma and Acute Care Surgery* 88(6):p 875-887, June 2020.
2. Biffl WL et al. The unrecognized epidemic of blunt carotid arterial injuries: early diagnosis improves neurologic outcome. *Ann Surg.* 1998; 228:462– 470.
3. Biffl WL et al. Noninvasive diagnosis of blunt cerebrovascular injuries: a preliminary report. *J Trauma.* 2002; 53:850–856.
4. Biffl WL et al. Treatment-related outcomes from blunt cerebrovascular injuries: importance of routine follow-up arteriography. *Ann Surg.* 2002; 235:699 –706; discussion 706–707. *Are*
5. Mutze S et al. Blunt cerebrovascular injury in patients with blunt multiple trauma: diagnostic accuracy of duplex Doppler US and early CT angiography. *Radiology* 2005; 237: 884–892.
6. Biffl WL et al. Blunt carotid arterial injuries: implications of a new grading scale. *J Trauma.* 1999; 47:845– 853.

Approved Date: 04/30/2013

Last Revised 12/20/2023

Date:

To be Reviewed: 12/2026