

UAMS MEDICAL CENTER
ACS SERVICES MANUAL

SUBJECT: Blunt Cerebrovascular Injury (BCVI) Screening & Treatment

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UPDATED: 6/8/2023

EFFECTIVE: 6/8/2023

RECOMMENDATION(S): J. Margolick, MD

APPROVAL: 6/8/2023

CONCURRENCE(S): Trauma Faculty, Neuro IR Faculty

PURPOSE:

To provide guidelines on the management and treatment of blunt cerebrovascular injury.

GUIDELINE:

Diagnosing a blunt cerebrovascular injury (BCVI) requires a high index of suspicion. The objective is to identify trauma patients at risk for BCVI and make the diagnosis early. BCVIs occur in 1 to 7.6% of blunt trauma patients. If left untreated, up to 40% of patients with a BCVI may eventually suffer a cerebrovascular accident (CVA). Various screening protocols for high-risk patients have allowed providers to identify and treat these injuries accordingly before the onset of potentially devastating CVAs. However, recently the sensitivity of both the extended Denver Criteria (eDC) and Memphis Criteria (MC) for identifying patients at high risk for BCVI have been re-evaluated. A recent study from Virginia Commonwealth University evaluated universal screening for all blunt trauma patients and found that available screening criteria would not have identified 23% of those with a BCVI. A study from the University of Alabama at Birmingham determined that eDC would not have captured 25.3% of patients found with a BCVI, and MC would not have identified 52.7% of patients with a BCVI.² Furthermore, given the high financial cost of CVA, and the ability of therapy to greatly reduce CVA incidence in patients with BCVI, universal screening is cost-effective over both eDC and MC.³ In patients with BCVI who have suffered a stroke, there is a 5-43% mortality rate and a good neurological outcome in only 20-63% of survivors.⁴

Most CVAs occur between 10 and 72 hours of injury.⁴ Therefore, prompt recognition of the injury and early administration of antithrombotic therapy is critical. Antithrombotic therapy has been shown to decrease the risk of stroke and mortality. **For this reason, we recommend universal screening of BCVI for all blunt trauma patients – except those who present as ground-level falls on blood thinners - with CTA head and neck.**

GRADING SCALE:

Grade I – Intimal irregularity < 25% narrowing

Grade II - Intimal irregularity, intramural hematoma, or dissection with > 25% narrowing

Grade III – Pseudoaneurysm

Grade IV – Occlusion

Grade V – Transection

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TREATMENT:

Grade I – ASA 81 mg as soon as clinically possible. Repeat CTA Head and Neck in 1 week to evaluate for resolution or propagation.

Grade II – ASA 81 mg as soon as clinically possible. Repeat CTA Head and Neck in 1 week to evaluate for resolution or propagation/

Grade III to V – Emergent Neuro Interventional Radiology (NIR) consult

- Treatment will be a discussion between the trauma team and NIR attending, which *may* include:
 - o ASA 81 mg daily
 - o 4 Vessel angiography
 - o Heparin infusion to maintain PTT 40 - 60
 - o Embolization
 - o Stenting
 - o Open surgical repair

FOLLOW-UP:

Patients who have not undergone NIR intervention will follow up with the trauma group

- The best evidence at this point suggests indefinite treatment with ASA is warranted
- No surveillance imaging required

Patients who underwent a NIR intervention will follow up with the NIR group.

IMAGING PROTOCOL IN CASE OF CT CONTRAST SHORTAGE OR LIMITED AVAILABILITY:

- Initial imaging in the ER post-trauma will still be with a CT angiogram head and neck.
- Follow-up imaging in 7-10 days:
 - a. For **intracranial vascular injuries**, “MRA time of flight head (without contrast) + MRI brain.”
 - b. For **extracranial internal carotid artery or common carotid artery injuries**, “carotid Duplex US evaluation” – if that doesn’t allow adequate evaluation, move on to the next step, “MRA head and neck with and without contrast + MRI brain.”
 - c. For the **vertebrobasilar system**, “MRA head and neck with and without contrast + MRI brain.”

REFERENCES:

1. Leichter SW, Banerjee D, Schrader R, et al., Blunt cerebrovascular injury: The case for universal screening. J Trauma Acute Care Surg, 89(5), 2020, 880-886.
2. Back J, Abraham PJ, Abraham MN, et al., Universal screening for blunt cerebrovascular injury. J Trauma Acute Care Surg, 90(2), 2020, 224-231.
3. Ali A, Broome JM, Tatum D, et al., Cost-effectiveness of universal screening for blunt cerebrovascular injury: A markov analysis. J. Am. Coll. Surg, 236(3), 2023, 468-475.
4. Ku JC, Priola SM, Mathieu F, et al., Antithrombotic choice in blunt cerebrovascular injuries: Experience at a tertiary trauma center, systematic review and meta-analysis. J Trauma Acute Care

These guidelines were prepared by the UAMS ACS Division. They are intended to serve only as a guideline based on current review of the medical literature and practice. They are neither policies nor protocols. Their use is at the discretion of the managing physician.

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- Surg, 2020, 91(1), e1-e12.
5. Kim DY, Biffi W, Bokhari F, et al., Evaluation and management of blunt cerebrovascular injury: A practice management guidelines from the Eastern Association for the Surgery of Trauma. J Trauma Acute Care Surg, 2020, 88(6), 875-887.
 6. Esposito EC, Kufera JA, Wolff TW, et al., Factors associated with stroke formation in blunt cerebrovascular injury: An East multicenter study. J Trauma Acute Care Surg, 2022, 92(2), 347-353.
 7. Miller PR, Fabian TC, Croce MA, Cagiannos C. Prospective screening for blunt cerebrovascular injuries: analysis of diagnostic modalities and outcomes. Annals of Surgery, 2002, 236(2), 386-395.
 8. Stein DM, Boswell S, Sliker CW, et al. Blunt Cerebrovascular Injuries: Does Treatment Always Matter? The Journal of Trauma: Injury, Infection, and Critical Care. 2009;66(1):132-144.
 9. Cothren CC, Biffi WL, Moore EE, et al. Treatment for blunt cerebrovascular injuries: equivalence of anticoagulation and antiplatelet agents. Arch Surg. 2009;144(7):685-690.
 10. Paulus EM, Fabian TC, Savage SA, et al. Blunt cerebrovascular injury screening with 64-channel multidetector computed tomography: More slices finally cut it. J Trauma Acute Care Surg. 2014;76(2):279-285.
 11. Burlew CC, Biffi WL, Moore EE, et al. Blunt cerebrovascular injuries: redefining screening criteria in the era of noninvasive diagnosis. J Trauma Acute Care Surg. 2012;72(2):330-5- discussion 336-7.
 12. Biffi WL, Cothren CC, Moore EE, et al. Western Trauma Association Critical Decisions in Trauma: Screening for and Treatment of Blunt Cerebrovascular Injuries. The Journal of Trauma: Injury, Infection, and Critical Care. 2009;67(6):1150-1153.
 13. Cothren CC, Moore EE, Biffi WL, et al. Anticoagulation Is the Gold Standard Therapy for Blunt Carotid Injuries to Reduce Stroke Rate. Arch Surg. 2004;139(5):540-546.
 14. Emmett KP, Fabian TC, DiCocco JM, et al. Improving the screening criteria for blunt cerebrovascular injury: the appropriate role for computed tomography angiography. J Trauma. 2011;70(5):1058-63- discussion 1063-5.
 15. Bruns BR, Tesoriero R, Kufera J, et al. Blunt cerebrovascular injury screening guidelines. Journal of Trauma and Acute Care Surgery. 2014;76(3):691-695.
 16. Bromberg WJ, Collier BC, Diebel LN, et al. Blunt cerebrovascular injury practice management guidelines: The Eastern Association for the Surgery of Trauma. J Trauma. 2010; 68(2): 471-477.