

## PRACTICE GUIDELINE

Effective Date: **30 April 2010**

Manual Reference: **Deaconess Trauma Services**

**TITLE: BLUNT CEREBROVASCULAR INJURY (BCVI)**  
**Practice management guidelines**  
**For extracranial or intracranial cerebrovascular injuries**  
**Cerebrovascular injuries (carotid and vertebral basilar vasculature)**

### **PURPOSE:**

1. To define screening for blunt cerebrovascular injury (BCVI).
2. To define the appropriate modality for the screening and diagnosis of BCVI.
3. To define the mechanism of treatment of BCVI.
4. To defined the duration of treatment for BCVI.
5. To define the mechanism of monitoring the response to treatment.

**GOAL:** Early recognition and management of extracranial blunt carotid injury, extracranial blunt vertebral artery injury, and intracranial vascular injury.

**GUIDELINES FOR DIAGNOSTIC STUDIES (USING RISK FACTORS AND SIGNS):**  
**All patients with these signs or risk factors should consider a cervical CTA. Pediatric trauma patients should be evaluated using the same criteria as the adult population.**

### **1. The risk factors for extracranial or intracranial BCVI**

- A. Seatbelt abrasion or other soft tissue injury of the anterior neck resulting in significant swelling or altered mental status
- B. LeFort II or III fracture
- C. Cervical spine fracture patterns:
  - i. Subluxation
  - ii. Fracture extending into the transverse foramen (foramen transversarium)
  - iii. Fractures of C 1-3
- D. Basilar skull fracture
  - i. Carotid canal involvement
  - ii. Petrous bone fracture
  - iii. Fracture clivus
- E. Diffuse axonal injury with a Glasgow Coma Scale  $\leq 8$
- F. Near hanging with an anoxic brain injury

### **2. The signs of BCVI are:**

- A. Arterial hemorrhage
  - i. Cervical (hematoma)
  - ii. Oropharyngeal
  - iii. Epistaxis

- B. Cervical bruit
- C. Expanding cervical hematoma
- D. Focal neurologic defect
- E. Neurologic examination incongruous with CT scan findings
- F. Ischemic stroke on secondary CT scan

**3. Screening and diagnostic procedures for BCVI are**

- A. Diagnostic four vessel cerebral angiography (DFVCA) remains the gold standard.
- B. CT angiography (multi-slice multi-detector) has adequate sensitivity and specificity for diagnostic screening for BCVI (**and has become the accepted procedure**).
- C. Duplex ultrasonography is **not** adequate for screening for BCVI.

**4. Cervical CTA should be performed on all patients that meet the risks and signs listed in 1. and 2. above.**

**5. All CAT I trauma patients who receive CT examinations with contrast and a cervical CT automatically receive CTA neck. All CAT II trauma patients who are activated before going to CT, who receive CT examinations with contrast and a cervical CT will automatically receive CTA neck.**

**6. Treatment for BCVI seen on screening**

- A. Consult Vascular Surgery
- B. **Grade I** (intimal irregularity with <25% narrowing) **and II injuries** (dissection or intramural hematoma with >25% narrowing) should be treated with anti-thrombotic agents, such as aspirin, or with heparin as per vascular surgeon recommendations.
  - i. If heparin is selected for treatment, the infusion should be started without a bolus and titrated to partial thromboplastin time (PTT) of 50-60 seconds.
  - ii. In patients in whom anticoagulant therapy is chosen, conversion to warfarin titrated to prothrombin time/international normalized ratio (PT/INR) of 2-3 for 3-6 months is recommended
- C. **Grade III injuries** (pseudoaneurysm) rarely resolve with observation or anticoagulant therapy, and invasive therapy (surgery or angio-interventional) should be considered. *N.B.* Carotid stents placed without subsequent antiplatelet therapy have been noted to have a high rate of thrombosis in this population.
- D. **Grade IV** (occlusion) **and Grade IV injuries** (transection with extravasation) warrant operative intervention

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<b>REVIEWED DATE</b>	<b>REVISED DATE</b>
OCT 2011	JUL 2016
JAN 214	MAR 2017
AUG 2014	MAR 2018
JUL 2016	
JAN 2019	
AUG 2020	
JUNE 2021	