### 16-Channel Multidetector-row Computed Tomographic Angiography to Diagnose BCVI

<table>
<thead>
<tr>
<th>Author</th>
<th>Reference</th>
<th>Data Class</th>
<th>Conclusions/Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Berne JD, et al.</td>
<td>Sixteen-slice multi-detector computed tomographic angiography improves the accuracy of screening for blunt cerebrovascular injury. J Trauma 2006; 60:1204-1210.</td>
<td>II</td>
<td><strong>Design:</strong>&lt;br&gt;1. Prospective screening 435 patients with CTA&lt;br&gt;2. Angiography to study those with abnormal or equivocal CTA results&lt;br&gt;3. Patients with normal CTA followed <em>clinically</em>&lt;br&gt;&lt;br&gt;<strong>Findings:</strong>&lt;br&gt;1. 24 patients with 25 injuries&lt;br&gt;2. Patients with normal CTA did not manifest ischemic complications during clinical follow-up&lt;br&gt;&lt;br&gt;<strong>Comments:</strong>&lt;br&gt;Cannot assess true sensitivity or NPV compared to reference standard (i.e. – angiography)</td>
</tr>
<tr>
<td>Biffl WL, et al.</td>
<td>Sixteen-slice computed tomographic angiography is a reliable noninvasive screening test for clinically significant blunt cerebrovascular injuries. J Trauma 2006; 60:745-752.</td>
<td>II</td>
<td><strong>Design:</strong>&lt;br&gt;1. Prospective screening 331 patients with CTA&lt;br&gt;2. Angiography to study those with abnormal or equivocal CTA results&lt;br&gt;3. Patients with normal CTA followed <em>clinically</em>&lt;br&gt;&lt;br&gt;<strong>Findings:</strong>&lt;br&gt;1. 17 patients with BCVI imaged with both CTA and angiography met screening criteria&lt;br&gt;2. Patients with normal CTA did not manifest ischemic complications during clinical follow-up&lt;br&gt;&lt;br&gt;<strong>Comments:</strong>&lt;br&gt;Cannot assess true sensitivity or NPV compared to reference standard (i.e. – angiography)</td>
</tr>
<tr>
<td>Eastman AL, et al.</td>
<td>Computed tomographic angiography for the diagnosis of blunt cervical vascular injury: is it ready for primetime? J Trauma</td>
<td>II</td>
<td><strong>Design:</strong>&lt;br&gt;1. Prospective blinded observational&lt;br&gt;2. Screened for BCVI with CTA&lt;br&gt;3. 146 patients followed with angiography (both positive and negative CTA results)</td>
</tr>
</tbody>
</table>
### 16-Channel Multidetector-row Computed Tomographic Angiography to Diagnose BCVI

| 2006; 60:925-929. | **Findings:**  
1. 43 patients with 46 BCVIs  
2. BCVI sensitivity 98%, specificity 100%, PPV 100%, NPV 99%  
3. Carotid artery injury sensitivity and specificity 100%  
4. Vertebral artery injury sensitivity 96%, specificity 100%  

**Comments:**  
1. Small number of patients with more than one injured vessel  
A. Literature reports frequency of 18%-32%  

| Malhotra AK, et al. | **Design:**  
1. Prospective observational study.  
2. Patients at-risk for BCVI based on institutional screening criteria.  
3. 92 patients studied with both CTA and DSA over 40-month period.  

**Findings:**  
1. 23 patients with 26 BCVIs  
2. Sensitivity 74%, NPV 90%  
   A. 1st half of study: sensitivity 67%, NPV 70%  
   B. 2nd half of study: sensitivity 100%, NPV 100%  
3. Specificity 84%, PPV 63%  
   A. 1st half of study: specificity 78%, PPV 75%  
   B. 2nd half of study: specificity 86%, PPV 65%  
4. False positive CTAs: most were “Grade I” injuries  
   A. Carotid art: 3 of 4  
   B. Vertebral art: 6 of 7  
5. False negative CTAs:  
   A. Carotid art: 4 injuries (grade I, n = 2, grade II, n = 1, grade III, n = 1)  
   B. Vertebral art: 3 injuries (all grade I)  

**Comments:**  
1. Results based on imaging reports  
   A. No re-assessment to counter the “learning curve”  
2. Small number of patients with more than one injured vessel  
   A. Literature reports frequency of 18%-32%  

---

| Sliker CW, et al. | Diagnosis of Blunt Cerebrovascular Injuries with 16-channel Multidetector Computed Tomography: Accuracy of Whole-body MDCT Compared to Neck MD-CTA. AJR (In Press, accepted for publication - 2007). | III | **Design:**  
1. Two patient subsets  
   A. One retrospectively identified through review of radiology reporting system  
   B. One identified through prospective observation  
2. Neck CTA vs. whole-body MDCT with angiography reference  
   A. CTAs reviewed retrospectively to account for “learning curve”  
   B. Angiography reports utilized  
3. Angiography techniques not standardized  
   A. Four-vessel exams not routine  
   B. Exam of all segments within given vessel not routine  

**Findings:**  
1. BCVI in 83 out of 108 patients  
   A. 25 out 83 patients with more than one injury (30%)  
2. Neck MD-CTA and whole-body MDCT results statistically comparable results for diagnosing BCVI  
3. Carotid artery cervical segments  
   A. Neck MD-CTA sensitivity 64%, specificity 94%  
   B. Whole-body MDCT sensitivity 69%, specificity 82%  
4. Vertebral artery cervical segments  
   A. Neck MD-CTA sensitivity 68%, specificity 100%  
   B. Whole-body MDCT sensitivity 74%, 91%  

**Comments:**  
1. Injuries not graded

**Design:**
1. Literature Review
2. Two studies discussing blunt trauma
3. Two studies penetrating trauma
4. 39 studies atherosclerosis or other (i.e. – dissection)

**Findings:**
1. CTA sensitivity for atherosclerotic stenoses > 30% is 95%
2. CTA specificity for atherosclerotic stenoses > 30% is 98%-100%

**Comments:**
1. Many traumatic lesions are either small intimal flaps, injuries with stenosis < 30 %, or pseudoaneurysms
   A. AVF less common but important
2. Studies concerned with trauma based on older scanners