Management of subclavian artery injury

N. Dayes
KCHC
5/5/2011
Case presentation

• 28 M with no pmhx s/p GSW x2 to the neck (Zone I) 6 hours prior to admission
  – GSW #1 - Left paraspinal muscle at level of C7/T1
  – GSW #2 - Just above mid-clavicle on left side
  – Denied hoarseness, hematemesis, odynophagia, or dysphagia

• Vitals
Physical Exam

- GCS – 15
- Tachycardic
- Good air entry b/l
  - No air – bubbling via wound, no subcutaneous emphysema
- Left UE - no palpable radial pulse, cool, good cap refill, diminished motor and sensory exam
Laboratory Data

• WBC – 17, h/h – 9/29, plt – 274

• Na – 146, K-4.1, CL-115, Co2 – 14, BUN- 12, Cr – 0.8

• ABG – 7.2, 34.7,218,99.2%,13.1, BE - -14
Angiography
Angiography
Angiography
Operative Details I

• Median sternotomy

• Evacuation of left hemothorax

• Incision over the left clavicular line

• Lateral thoracotomy down the third intercostal space
Operative Details II

• Mid portion of the subclavian artery was noted to be completely transected

• Injury to the brachial plexus

• Subclavian artery injury repaired with Gore-Tex interposition graft.

• Return of flow by Doppler exam

• Left UE fasciotomy by orthopedic service
Hospital Course

• POD # 3 – Extubated

• POD # 6 – Fasciotomy sites were closed

• POD #8 – Transferred out of SICU

• POD #10 – Discharged with outpatient physical therapy
Discussion

• Diagnosis and management of subclavian injuries.

• Is there an endovascular treatment option?

• Exposures for operative intervention.
Epidemiology

<table>
<thead>
<tr>
<th></th>
<th>Number of Patients</th>
<th>Subclavian/Axillary Injuries</th>
</tr>
</thead>
<tbody>
<tr>
<td>GSW chest</td>
<td>1668</td>
<td>44 (2.6%)</td>
</tr>
<tr>
<td>SW chest</td>
<td>1264</td>
<td>12 (0.9%)</td>
</tr>
<tr>
<td>GSW neck</td>
<td>432</td>
<td>15 (3.5%)</td>
</tr>
<tr>
<td>SW neck</td>
<td>524</td>
<td>8 (1.5%)</td>
</tr>
</tbody>
</table>

GSW = gunshot wound; SW = stab wound.

D Demetriades. Subclavian and axillary vascular injuries, Surgical Clinics of North America - Volume 81, Issue 6 (December 2001)
Clinical Presentation

• “Hard Signs” of vascular injury
  – Severe bleeding, unexplained shock, expanding hematoma, absent or diminished peripheral pulse, and a bruit.
  – Mandates operative exploration in unstable patient.

• “Soft Signs” of vascular injury
  – Local stable hematoma, small continuous bleeding, mild hypotension or anemia, and a proximity injury
Diagnosis

- **CXR**
  - Associated hemothorax, missiles, or a mediastinal hematoma

- **CTA**
  - Identifies direction of missile tract
  - 85% of patients had satisfactory imaging of the missile tract via CTA, thus avoiding all other diagnostic testing.

Diagnosis

• Conventional angiography
  – Endovascular intervention
  – Planning for operative approach
Management

Long-term results of stent graft treatment of subclavian artery injuries: Management of choice for stable patients?


- Prospective series examining the long term results of subclavian stent placement after trauma

- 57 pts followed for 2 years
  - 53 from stab wounds
  - 4 from gunshots wounds
Long-term results of stent graft treatment of subclavian artery injuries: Management of choice for stable patients?

Table II. Early and late complications

<table>
<thead>
<tr>
<th>Early (&lt;30 days)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Femoral artery puncture site intimal flap requiring surgical repair: 1</td>
<td></td>
</tr>
<tr>
<td>Early stent thromboses: 3</td>
<td></td>
</tr>
<tr>
<td>Death due to multiorgan failure: 1</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Late (&gt;30 days)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>(\geq 50%) stent graft stenosis: 5 (mean 11 months; range 2-25 months)</td>
<td></td>
</tr>
<tr>
<td>Stent graft occlusion: 3 (mean 26 months; age 23-32 months)</td>
<td></td>
</tr>
<tr>
<td>Stabbed to death with stent grafts patent: 2 (13 and 30 months)</td>
<td></td>
</tr>
</tbody>
</table>

Followed every 3-6 months for 2 years
  – Surveillance via Doppler ultrasound
  – 5 pts need re-intervention for stenosis
  – None need conversion to open surgery

Stent placement is a feasible treatment option
Operative Exposures

- **Clavicular incisions** – right subclavian artery, subclavian veins, and distal left subclavian artery
- **Median sternotomy** - origins of the right subclavian, innominate, and proximal left carotid arteries
- **Left anterolateral thoracotomy** - proximal left subclavian artery
Conclusion

• Injuries to subclavian artery are fairly uncommon; need a high index of suspicion.

• Chest CTA is becoming an effective screening tool for diagnosis.

• Endovascular intervention is an acceptable treatment option.
References