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Traumatic vertebral artery AV fistula

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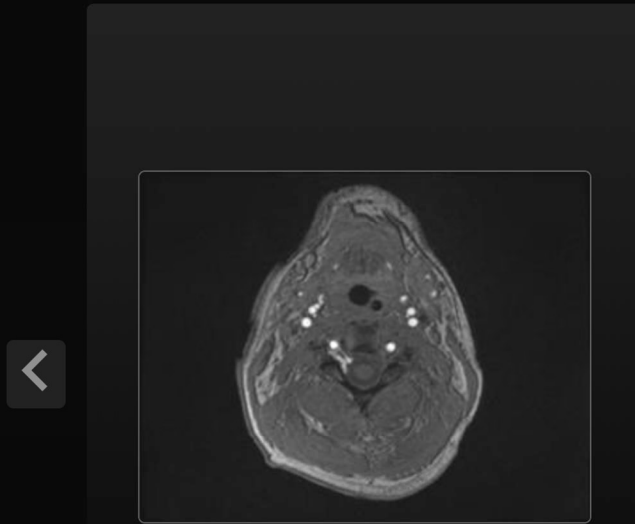


Image details
Figure legend: Axial MRA neck without contrast along with coronal and oblique TOF MRA MIP images of the neck showing R vertebral artery injury with AV shunting, confirming AV fistula.

+ Clinical information

- Diagnosis

- Keywords:** AV fistula, blunt force vertebral artery injury, blunt cerebrovascular injury, Traumatic AV fistula, Hangman's fracture, Traumatic vertebral AV fistula, Cervical angiography, blunt force trauma, MRA neck, coil embolization

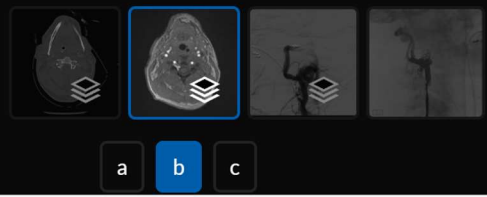
Final diagnosis: Traumatic R vertebral artery AV fistula.
Differential diagnoses: Pseudoaneurysm, Artifact, Vascular variant, Atherosclerotic plaque
Differences between final and differential: Disruption of the R vertebral artery in the setting of multiple cervical spine fractures and

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Final diagnosis: Traumatic R vertebral artery AV fistula.

Differential diagnoses: Pseudoaneurysm, Artifact, Vascular variant, Atherosclerotic plaque

Differences between final and differential: Disruption of the R vertebral artery in the setting of multiple cervical spine fractures and early filling of cervical venous plexus is pathognomonic for AV fistula in the setting of trauma. There is no focal outpouching of the vessels to indicate pseudoaneurysm formation. Although there are many vascular variations, this would not explain all the exam findings for this patient with significant trauma. No significant atherosclerotic disease is present. Confirmation of findings across multiple modalities is inconsistent with artifact.

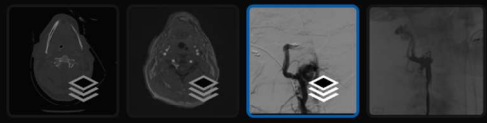
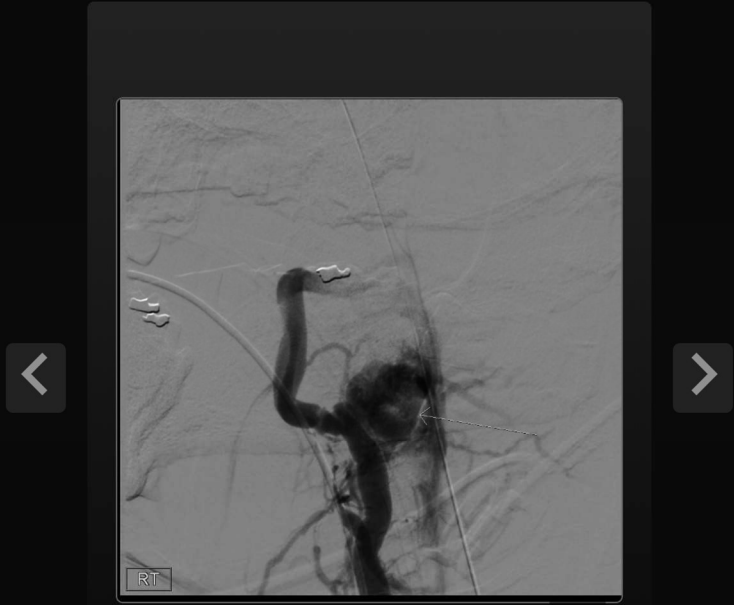
+ Discussion

+ References

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Image details

Figure legend: Digital subtraction RAO and lateral angiographic images of the R vertebral artery re-demonstrating the AV fistula.

- + Clinical information
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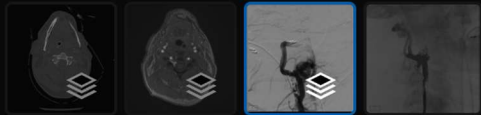
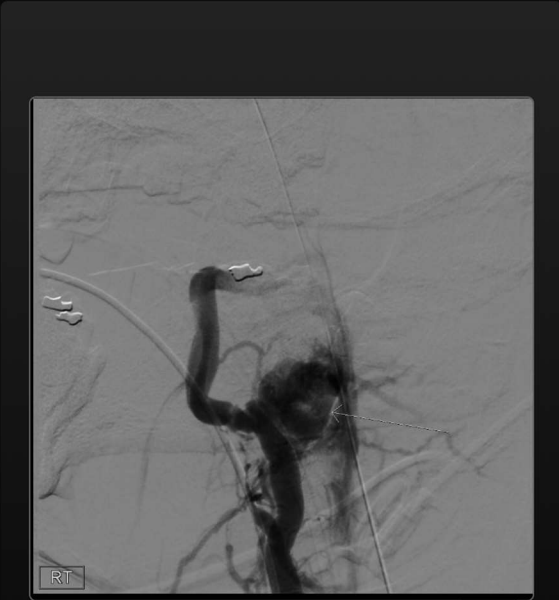
Clinical presentation & general epidemiology: Cerebrovascular arteriovenous (AV) fistulas are an uncommon traumatic injury. They are often asymptomatic and can be easily overlooked on trauma imaging, especially with the presence of multiple injuries. AV fistulas are rarely seen. Most patients with this injury are unlikely to survive long enough to receive definitive care. Suspicion of vascular injury should be increased when cervical trauma is evident and in patients with a high injury score. Cervical spine fractures, subluxations, and ligamentous injuries are especially high risk and careful evaluation of the vasculature is needed.

Imaging features: CTA of the neck shows irregularity of the right vertebral artery with early filling of adjacent venous plexus, suggestive of an AV fistula. These findings were confirmed on the cervical MRA showing right vertebral artery injury at the C2 level

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ligamentous injuries are especially high risk and careful evaluation of the vasculature is needed.

Imaging features: CTA of the neck shows irregularity of the right vertebral artery with early filling of adjacent venous plexus, suggestive of an AV fistula. These findings were confirmed on the cervical MRA showing right vertebral artery injury at the C2 level with AV shunting. Subsequent digital subtraction angiogram localized the AV fistula and demonstrates successful embolization of the fistula with maintenance of the posterior circulation.

Prognosis, treatment or therapeutic options: Although most blunt cerebrovascular injuries are asymptomatic, early identification is key in reducing morbidity and mortality from stroke. A new focal or lateralizing neurologic deficit should raise suspicion for cerebrovascular injury and prompt imaging evaluation/re-evaluation. Low-grade injuries are generally managed with anti-thrombotic therapy. Some studies have suggested aspirin is as effective as heparin for stroke prevention. Higher-grade vascular injuries or in patients with anti-thrombotic contraindications have been treated with embolization, stent placement, and surgical treatment with success. Carotid artery injury has a higher complication rate than vertebral artery injuries. In general, prognosis is dependent upon grade of injury and when therapy/treatment was initiated. Early treatment has been shown to decrease stroke risk from over 50% to less than 6.8% for carotid and 2.6% for vertebral artery injuries.

The view(s) expressed herein are those of the author(s) and do not reflect the official policy or position of Brooke Army Medical Center, the U.S. Army Medical Department, the U.S. Army Office of the Surgeon General, the Department of the Army, the Department of the Air Force and Department of Defense or the U.S. Government.

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Figure legend: Digital subtraction lateral post-embolization angiographic image of the R vertebral artery with occlusion of the AV fistula.

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- References

- o Rutman AM, Vranic JE, Mossa-Basha M Imaging and Management of Blunt Cerebrovascular Injury. Radiographics 2018;38 (2):542-563
- o Catapano JS, Israr S, Whiting AC, Hussain OM, Snyder LA, Albuquerque FC, Ducruet AF, Nakaji P, Lawton MT, Weinberg JA, Zabramski JM Management of Extracranial Blunt Cerebrovascular Injuries: Experience with an Aspirin-Based Approach. World Neurosurg 2020;133:e385-e390
- o Gupta A, Murumkar V, Peer S Endovascular Management of Traumatic Vertebral Artery Pseudoaneurysm Associated with Vertebral Arteriovenous Fistula Using a Covered Stent. Cureus 2019;11 (9):e5716

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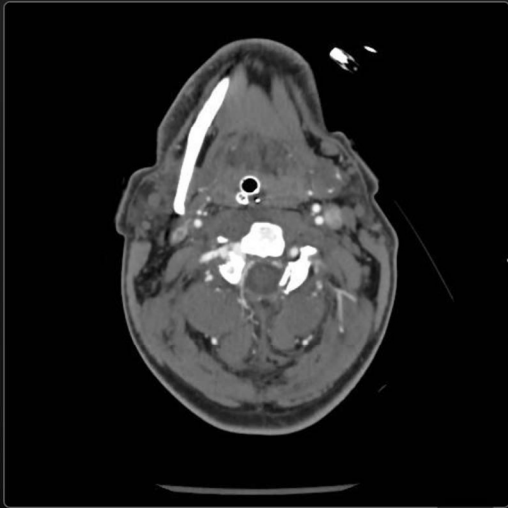


Image details

Figure legend: Axial IV-enhanced CTA neck through the level of C2 in bone and soft-tissue windows showing a C2 Hangman's fracture and associated disruption of R vertebral artery with prominence of adjacent venous plexus.

Clinical information

Age and gender: 50 year old male

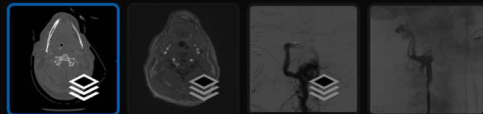
Clinical history & presentation: 50 yom restrained driver was found down in a single vehicle collision with unknown time of incident. He was extracted from vehicle with an initial GCS of 5.

Physical exam: Physical exam findings included a 6 cm laceration to posterior scalp and significant midface swelling with blood in bilateral nares.

Other diagnostic testing: Stable H&H of 14.7/43.8.

+ Diagnosis

+ Discussion



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