

# Delayed Vertebrobasilar Stroke Following Anterior Cervical Discectomy and Fusion: A Case Report and Review of Vascular Complications



Jacob Chaisson, BS<sup>1</sup>; Katherine Dong, MD<sup>2</sup>; Amit Bhandutia, MD<sup>3</sup>

<sup>1</sup>Louisiana State University Health Sciences Center, School of Medicine, New Orleans, LA;

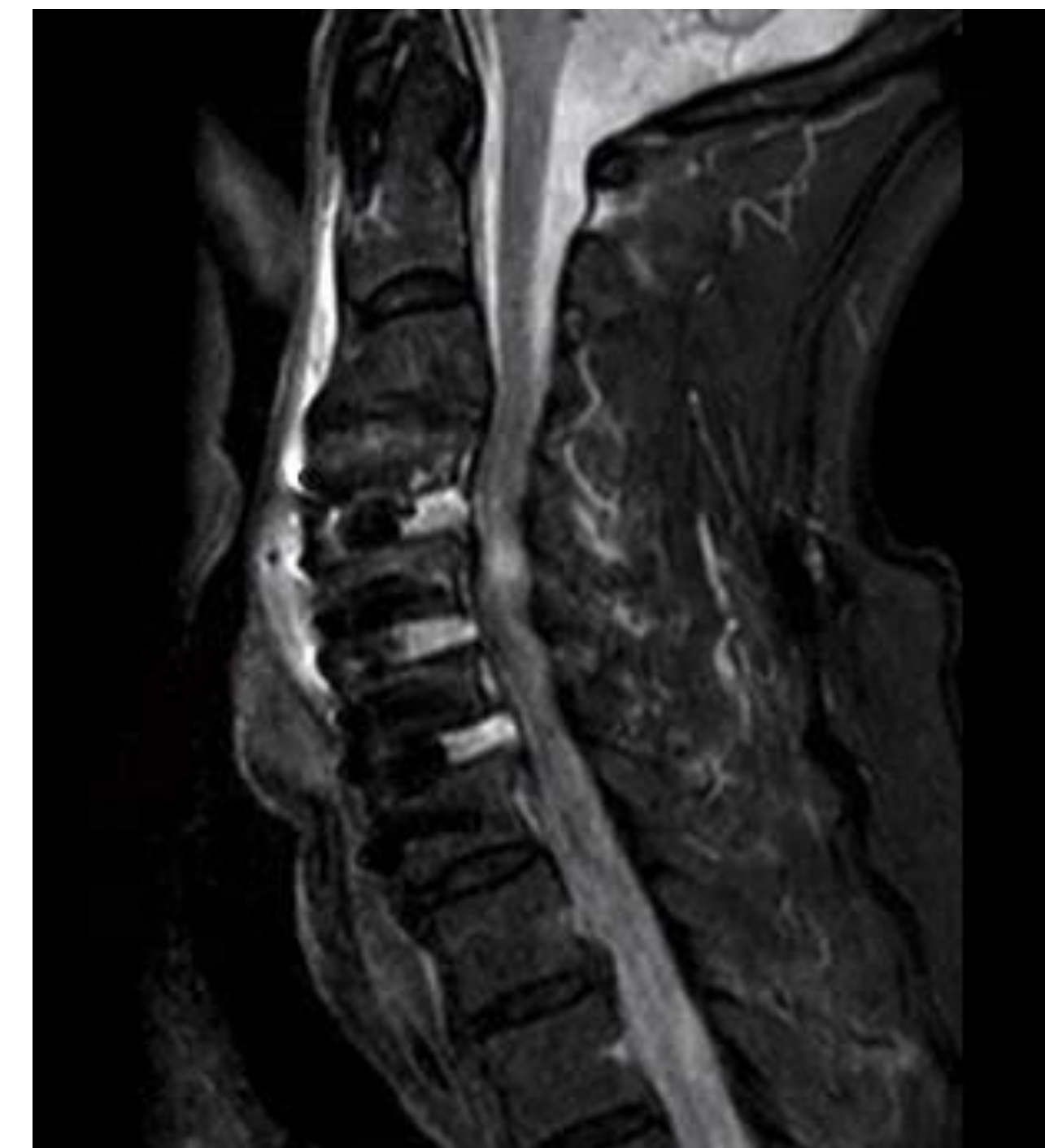
<sup>2</sup>Louisiana State University Health Sciences Center, Department of Orthopaedic Surgery, New Orleans, LA

## Introduction

- Anterior cervical discectomy and fusion (ACDF) is a commonly performed and generally safe procedure for cervical myelopathy and radiculopathy.
- However, cerebrovascular complications, though rare, can be devastating. Vascular injuries during ACDF typically involve the carotid or vertebral arteries and may result in pseudoaneurysm, thrombosis, dissection, or cerebral ischemia<sup>1-3</sup>.
- The vertebral artery is particularly vulnerable due to its anatomical proximity to the surgical field, and congenital anomalies may increase this risk<sup>4</sup>. Atherosclerotic disease, particularly in patients with hyperlipidemia, may predispose to embolic events via plaque disruption during manipulation<sup>1,5</sup>.
- While vertebral artery dissection (VAD) is classically considered a non-atherosclerotic arteriopathy, vascular disease may elevate the risk of embolic or thrombotic events<sup>9</sup>. Notably, VAD-related strokes may present in a delayed fashion, sometimes occurring days after the inciting event<sup>6-8</sup>.

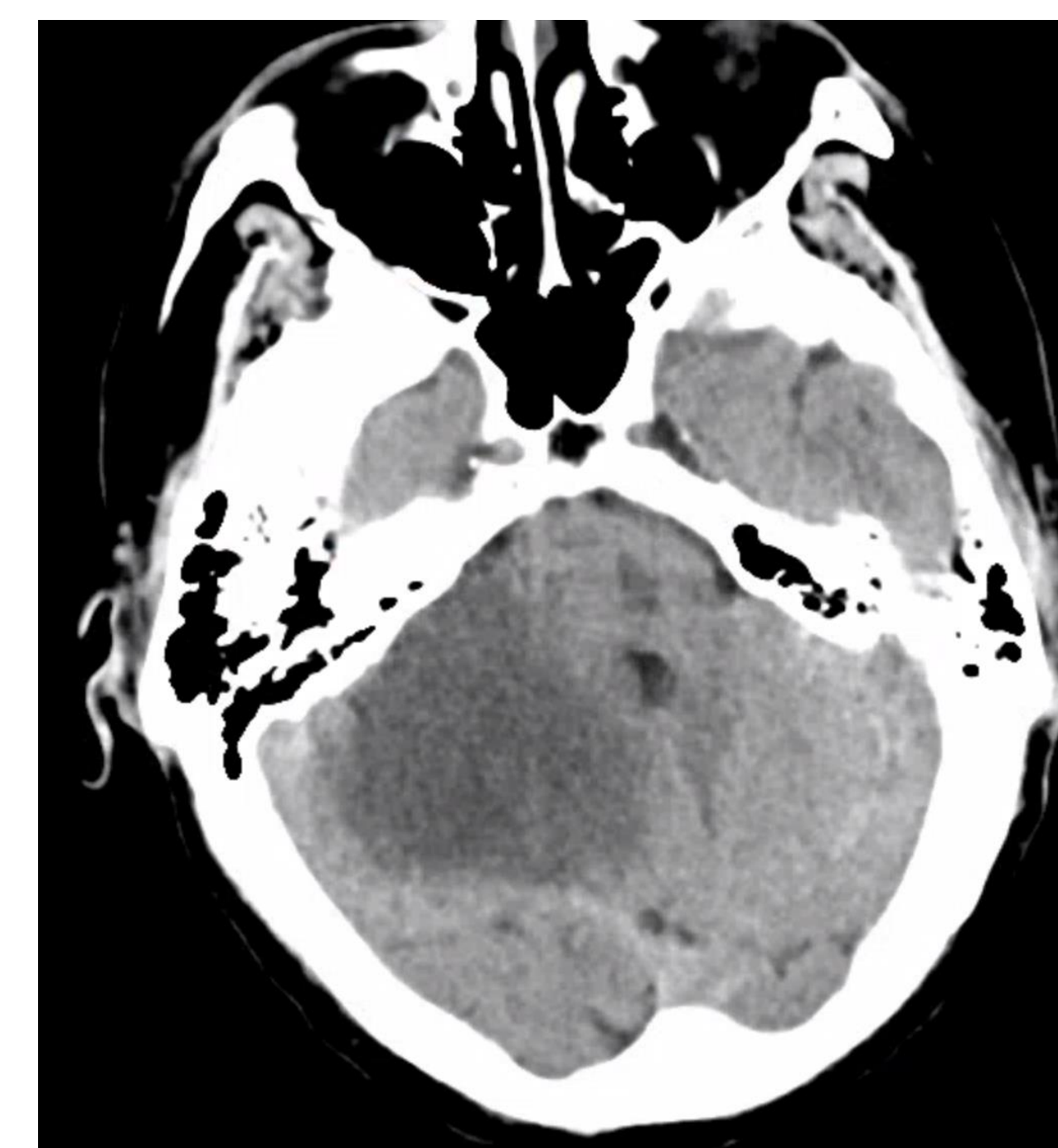
## Case

- A 61-year-old male with degenerative cervical myelopathy underwent elective multilevel ACDF at C4-5, C5-6, and C6-7. (**Figure 1 & 3**)
- Approximately 30 minutes after placement of the first interbody cage, intraoperative neuromonitoring (IONM) detected transient attenuation in the right upper and lower extremity signals. The surgeon was notified, and interventions included reducing anesthetic depth and confirming proper positioning. Signals returned to baseline within 20 minutes and remained stable for the rest of the procedure.
- No immediate postoperative deficits were noted.
- On postoperative day 1, the patient developed sudden-onset dysarthria, right facial droop, right-sided weakness, and hoarseness (NIH Stroke Scale: 7). CT with contrast (**Figure 2**) showed a right vertebral artery occlusion, likely due to dissection.
- MRI revealed acute infarcts in the right cerebellum, left cerebellum, and left pons.
- Thrombolysis was contraindicated, so the patient was managed with aspirin and later transitioned to heparin in the neurocritical care unit. His course was complicated by dysphagia requiring PEG and respiratory compromise requiring tracheostomy.
- He enrolled in intensive inpatient rehabilitation and made a substantial functional recovery over one year, ultimately regaining full motor strength and returning home with family support.
- Follow-up X-ray 11 months post-op (**Figure 3**) shows strong hardware integrity and partial cervical fusion at C4-C7 levels.



**Figure 1.** Pre-operative cervical MRI indicating cord compression at the C4-C7 level. The patient initially presented with upper extremity paresthesia and motor dysfunction. This prompted the imaging and surgical planning for the 3-level ACDF at C4-5, C5-6, and C6-7. Surgery was scheduled and performed approximately 1 week after imaging and consultation.

**Figure 2.** Initial post-stroke CT head with contrast following onset of dysarthria, right facial droop, hemiparesis, and hoarseness. Acute infarcts are visible in the right cerebellum, left cerebellum, and left pons. Subsequent CTA revealed a thrombus in the V2 segment of the right vertebral artery. The pontine infarct reflects basilar artery involvement.



**Figure 3.** 11-month follow-up x-ray of the cervical spine. Radiograph indicates no hardware complication or loose screws and partial cervical fusion from C4-C7.

## Discussion and Conclusion

- This case highlights a rare but serious postoperative complication of ACDF: vertebral and basilar artery territory infarction, likely from dissection or embolism.
- The transient intraoperative neuromonitoring changes, which resolved with appropriate interventions, underscore the value of IONM in detecting potential neurologic or vascular compromise<sup>8</sup>.
- Although these changes did not result in immediate deficits, the subsequent delayed stroke emphasizes the need for vigilance postoperatively.
- While VAD is typically non-atherosclerotic, underlying vascular disease may predispose to embolic complications, particularly during surgical manipulation<sup>5,9</sup>.
- This case underscores the importance of comprehensive preoperative risk assessment and intraoperative monitoring to reduce vascular risk.
- In cases of postoperative neurological decline, prompt recognition and coordinated multidisciplinary care—including neurology, neurocritical care, speech-language pathology, and rehabilitation—are essential for optimal recovery<sup>7</sup>.
- Given the rarity of vertebrobasilar infarction following ACDF, this case also contributes to the growing body of literature highlighting the need to better define perioperative risk stratification for vascular events in cervical spine surgery. Enhanced imaging protocols or vascular screening in high-risk patients may be warranted, especially in those with known atherosclerotic disease or anatomic variants.
- Further research is warranted to investigate whether intraoperative neuromonitoring changes—especially when transient and non-specific—may correlate with postoperative vascular events. Prospective multicenter studies or case series may help clarify early indicators of stroke risk in ACDF procedures.

## Limitation and Future Direction

- **Limitations**
  - Single case report; findings may not be generalizable.
  - No intraoperative imaging to confirm timing or mechanism of vertebral artery injury.
  - Vertebral artery dissection not definitively proven—diagnosis based on clinical course and imaging.
- **Future Directions**
  - Consider vascular imaging (e.g., CTA or MRA) preoperatively in patients with vascular risk factors.
  - Develop criteria to guide vascular screening in elective ACDF patients.
  - Investigate whether transient intraoperative neuromonitoring changes may predict postoperative vascular events.
  - Encourage multicenter case series to characterize the incidence and outcomes of vertebral artery stroke after ACDF.

## References

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