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Worsening weakness after posterior cervical decompression and fusion; the challenge in diagnosis

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Worsening weakness after posterior cervical decompression and fusion; the challenge in diagnosis.

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Introduction

- Sudden quadriparesis after cervical decompression and fusion can be explained by epidural hematoma and AV malformation along with hyperintensity on T2 MRI, previously reported as “White Cord Syndrome.”
- Mechanism is thought to be due to reperfusion injury of the spinal cord: the sudden decompression of spinal cord leads to rapid cord expansion and increased blood supply, resulting in disruption of blood-spinal cord barrier and leading to reperfusion injury.
- The incidence of epidural hematoma following spinal surgery is estimated to affect 0.2% of patients [1].

Case Summary

- History - 43 year old male patient who underwent posterior C3-C7 decompression and fusion was found to have sudden onset quadriparesis and lack of pain and temperature sense and more prominent upper extremity weakness a few days following the procedure.
- Investigative studies – MRI of the cervical spine demonstrated a large fluid collection along the posterior cervical paraspinous soft tissue consistent with an acute epidural hematoma (Fig. 1). There was significant displacement and compression of the spinal cord with complete effacement of the CSF space (Fig. 2)
- Patient Progress - Patient was sent to OR for emergency revision and evacuation. Initially, patient symptoms improved but began to worsen a few days post evacuation with more prominent weakness in the upper extremities.
- Repeat cervical imaging demonstrated recurrent spinal epidural hematoma with hyperacute hyperdensity in T3-4 region (Fig. 3A/B).
- Intraoperative exploration revealed a C7-T5 dural arteriovenous fistula which was resected.
- Patient’s lower extremity symptoms improved immediately post-op but was having continued upper extremity weakness. He was given steroids and transferred to the acute rehabilitation unit.
- MRI was obtained ~2 days after the second decompression and AVM resection revealing a hyperintensity of the center cord (Fig. 4A/B).
- Outcome – Patient was discharged home with mother after a 28-day inpatient rehabilitation course.

Images

Fig. 1: MRI T2 of cervical spine

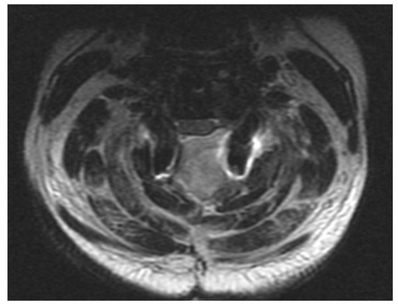

Fig. 2: MRI T2 of cervical spine

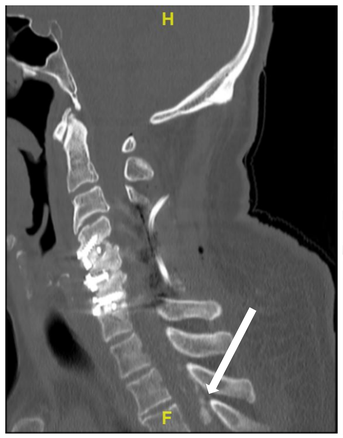

Fig. 3A: CT of cervical spine

Fig. 3B: CT of cervical spine

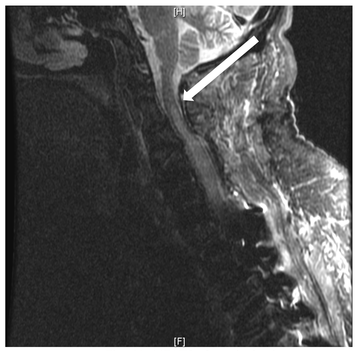

Fig. 4A: MRI T2 of cervical spine

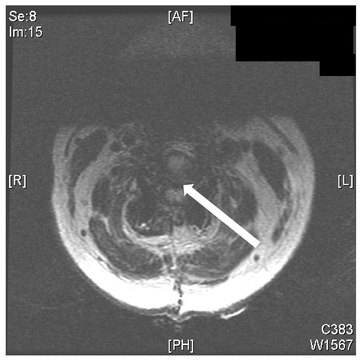

Fig. 4B: MRI T2 of cervical spine

Discussion

- Hardware made visualization of anatomical structures pertinent to this case very difficult to appreciate with MRI.
- Classically, “white cord” syndrome presents with a focal hyperintensity on T2-weighted images in the center of the spinal cord which are appreciated in fig 4A/B.
- Post decompressions and AVM resection, patient presented with significantly worse weakness in his upper extremities compared to his lower extremities which is consistent with white cord syndrome.
- Hardware from fusion surgeries can obscure some imaging.
- Although the most common location for dural AV fistula is at the thoracolumbar junction, it can exist else ware along the spine.
- Despite having an incidence of only 0.2%, dural AV fistulas are labeled as the most commonly encountered vascular malformation in spinal cord that cause progressive para-/tetra- plegia[2].

Conclusion

- Dural AV fistulas are a common vascular cause of progressive para-/tetra- plegia see post spinal surgery.
- Dural AV fistulas exist most commonly at the thoracolumbar junction but also at cervicothoracic junction
- Weakness that is worse in the upper extremities compared to the lower after cervical decompression surgery may be a result of White Cord Syndrome.

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