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Case Report

Traumatic cervical fusion hardware displacement presenting with dysphagia and dysphonia

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ABSTRACT

Surgery for degenerative cervical myelopathy has been increasing in incidence. Almost 20% of patients have complications related to their surgery, although hardware extrusion is rare and generally reported in the first post-operative month. We report the case of a woman with new dysphagia and hoarseness secondary to traumatic screw dislodgement into her pre-vertebral space 5 months after cervical discectomy.

1. Case

A 49-year-old female presented to the Emergency Department (ED) with a one day history of posterior neck pain after a fall. The patient stated she had been eating "beef chunks" when she started to choke. The patient attempted to give herself the Heimlich maneuver but was unable to dislodge the food. She ran out into her yard to seek assistance and lost consciousness, falling to the ground. The patient awoke shortly thereafter and noted a beef cube lying next to her on the grass. Since that event she had posterior midline neck pain which wrapped along the right side of her neck and was made worse with movement. She had also developed difficulty swallowing solids and worsening hoarseness of her voice. She denied any numbness, tingling, weakness, or gait dysfunction. She had not noted change in her ability to range her neck, and denied head pain or other injury sustained in the fall.

The patient's past medical history was remarkable for a of C5–C6 and C6–C7 cervical discectomy with fixation and fusion as well as C6–C7 posterior decompression 5 months prior for chronic neck pain secondary to cervical spinal stenosis. The remainder of her medical history was non-contributory.

On physical exam, the patient was awake and alert with normal vital signs. The patient's voice was hoarse, but there was no stridor. She was able to swallow her secretions. She had no signs of trauma to the head or neck. The patient's trachea was midline. She did not have midline cervical tenderness or any palpable step-offs, but had pain with flexion, extension and rotation of her neck. The patient had no appreciable abnormalities on oropharyngeal exam, and she had a normal neurologic exam. The patient's lungs were clear bilaterally and her cardiovascular exam was normal.

The patient had unremarkable laboratory studies and chest radiography. She had plain films of her cervical spine performed which are shown in Figs. 1 and 2, demonstrating displacement of the left upper anterior plate and screw. The screw had become embedded in the soft tissue along the lateral upper margin of the anterior endplate in the prevertebral space, accounting for her dysphagia and hoarseness.

Neurosurgery was consulted, and the patient underwent foreign body retrieval and repair of her cervical hardware. She was discharged on post-operative day one with improvement in her symptoms.

2. Discussion

Degenerative cervical myelopathy, of which spinal stenosis is a subset, is the most common cause of acquired spinal cord compromise [1]. The incidence of myelopathy from degeneration in the United States is 41 per million, with a prevalence of 605 per million [1]. Degenerative changes secondary to longstanding axial load result in loss of vertebral disc height and osteophyte formation over time, often resulting in radicular symptoms secondary to narrowing at the site of the lesion [2]. In a Mayo clinic study of patients with cervical radiculopathy, the mean age of diagnosis was 48, with a slight male preponderance [3]. C7 and C6 radiculopathies were most common, with approximately 20% requiring surgery [4].

Degeneration progresses with time, resulting in an increase in incidence and prevalence of degenerative cervical myelopathy as our population ages [1]. Additionally, surgical treatment is becoming more common, with upward trends in the mean age of patients as well as overall patient comorbidities [4]. Therefore, it is important for the emergency provider to be familiar with complications related to these procedures.

There is some debate as to the best surgical approach for degenerative surgical myelopathy. There are two main approaches to surgery, Anterior Cervical Discectomy (ACD) or Posterior Laminoforaminotomy

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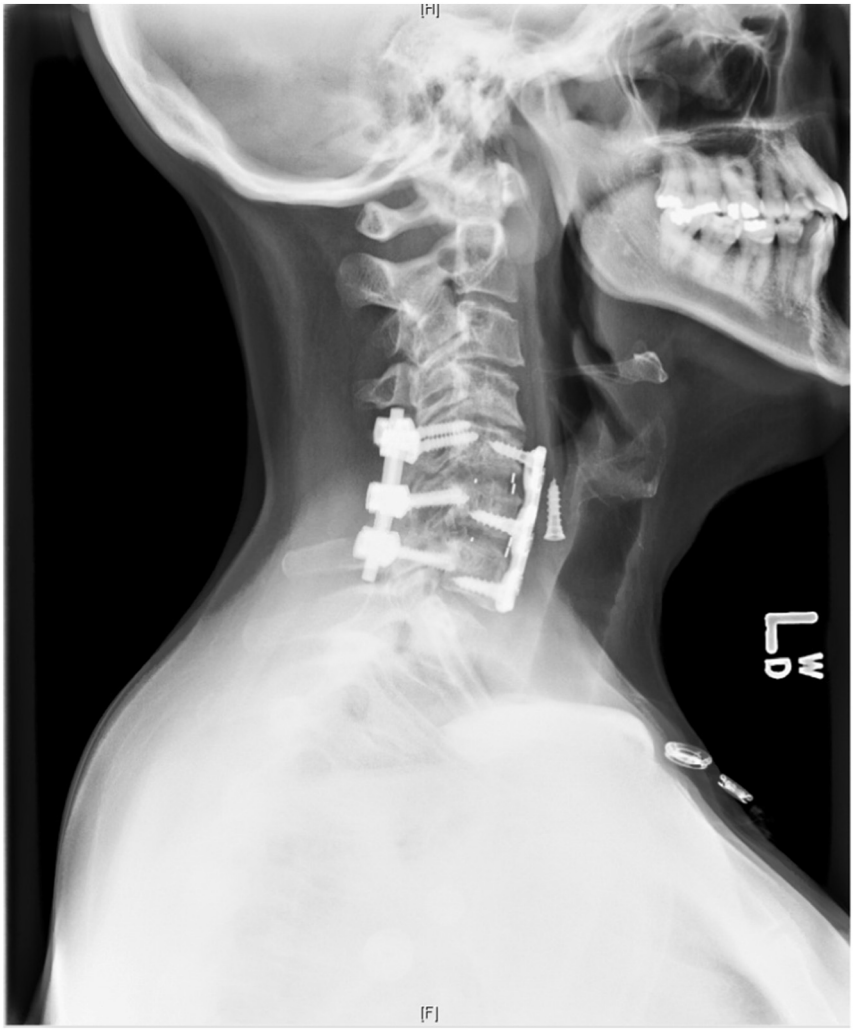

Fig. 1. Screw dislodgment in prevertebral space.

(PLF). ACD is the most common procedure, usually accompanied by fusion (ACDF). The anterior approach begins with a lateral neck incision with dissection to the anterior/lateral portion of the diseased level. Based on the source of the patient's symptoms dissection of the disc, osteophytes, or facet joints are performed. If there is extensive disease (two or more levels) a fusion is frequently performed due to the volume of disc removed [5]. The anterior approach is used for multilevel disease but has the advantage of being able to repair both midline and lateral disc herniation and osteophytes. ACDF has a higher reoperation and complication rate than PLF as it involves manipulation of the anterior neck and soft tissue structures. The surgical approach puts the carotid artery, recurrent laryngeal nerve, trachea, and esophagus at risk, but has the benefit of improved postoperative neural function [6].

The posterior approach involves making a posterior midline incision and then dissection of the lamina at the diseased level or facet joint manipulation and shaving [5]. This approach does not allow for anterior midline repair, but does allow access to lateral segments of the spinal column. The complication rate from PLF is relatively low, and the operative time is less when compared to ACD.

A recent meta-analysis found the complication rate to an ACD (with or without plating) to be 19.3%, with only 1 mortality in their 1015 case series (0.1%) [7]. The most common complication post operatively was dysphagia (9.5%) with most patients having spontaneous resolution within one week [7]. Other complications included hematoma formation in the pre-vertebral space, dural perforation, recurrent laryngeal nerve palsy, and esophageal perforation (the sole mortality in this series) [7]. A very rare complication of ACD is implant extrusion, when a portion of a cervical implant loosens and migrates from its position. In a multi-institutional retrospective case series spanning 21 surgical centers, 8887 ACDs were performed over a 6 year study interval [8]. Of those surgeries, 11 patients (0.12%) had a complication of implant extrusion within 30 days [8]. All of these cases were complex, spanning at least three cervical levels. It was hypothesized that these complications occurred because the initial surgical evaluation underestimated the sheer stresses on the neck resulting in biomechanical failure of the implant [8]. None of the cases had trauma as a cause of their implant extrusion, although the study was limited by only having 30 days of follow-up.

PLF is a newer technique with low complication rates. Based on a case series, complications occur in 4.3% of patients and include CSF leaks, hematoma formation, and radiculitis [9]. There is a risk of nerve damage including paresthesias or paralysis, however rates of these complications are currently unknown. Re-operation rates for PLF failure are thought to be in the 5% range with revision performed as an ACD or ACDF [10].

If a patient with prior cervical spine surgery presents with new cervical injury or symptoms referable to their surgical site, the patient should be immobilized. A careful airway assessment should be performed, as patients with neurologic compromise from cervical injury often require airway support. Intubation, when necessary, should be performed with in-line stabilization [11]. Video-assisted laryngoscopy takes more time compared to direct laryngoscopy in immobilized

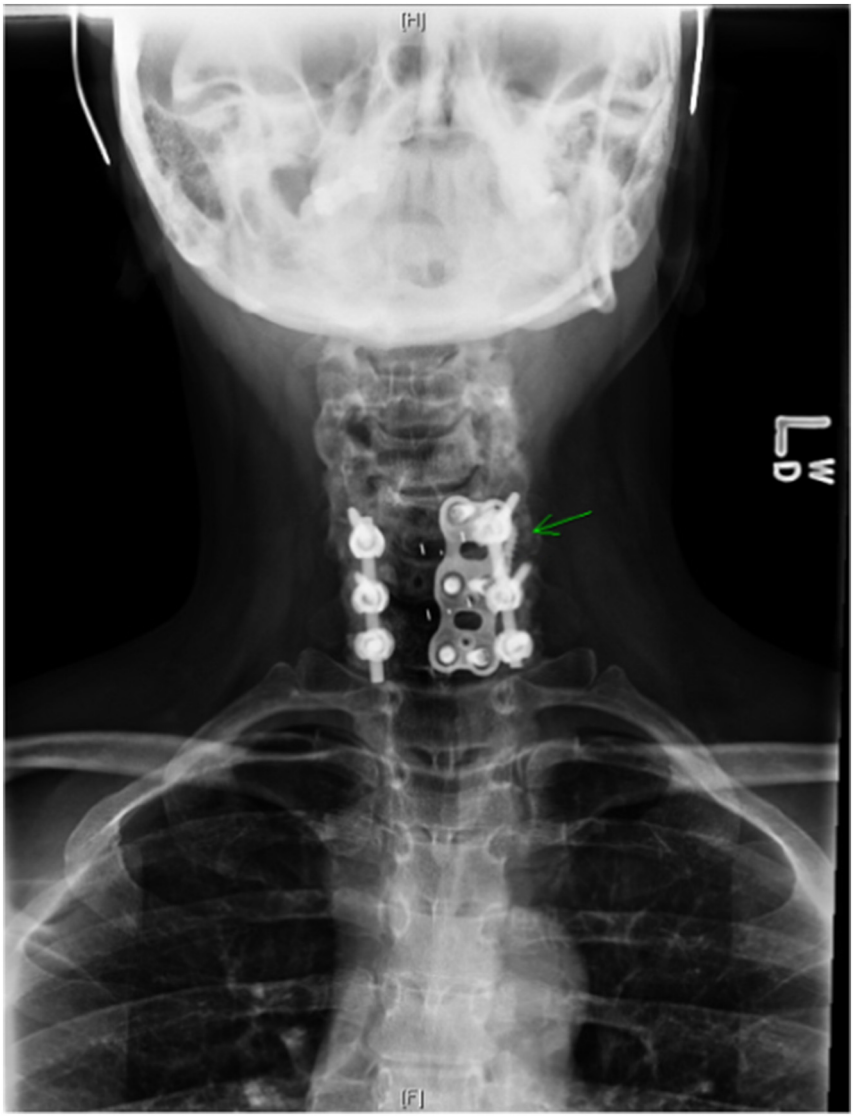

Fig. 2. PA view of hardware malpositioning.

patients, but has a higher success rate. There is no evidence that one method is superior to the other in terms of manipulation of the cervical spine [12,13]. Given that anatomy may be distorted and there may be prevertebral swelling, the provider should be prepared for the possibility of a surgical airway. Hemodynamics should be monitored closely, as patients with cervical injury are at high risk for hypotension and bradycardia.

In stable patients in whom the emergency provider is concerned for a complication related to surgery, he/she should perform neuroimaging based on the patient's clinical picture. There are no current decision rules or guidance available for imaging the postoperative patient, as neither NEXUS nor the Canadian C-Spine rules specifically address the patient population that has had prior cervical surgery, nor were these rules established to evaluate for atraumatic postoperative complications. Given that these patients have abnormal underlying anatomy, we recommend CT scan as the best initial imaging test, to provide detailed information about boney changes as well as hardware location. In patients with neurologic findings or in whom the provider is concerned for vascular injury, MRI is the superior study. MRI is also useful in determining acuity of boney abnormalities seen on other studies [14]. In the setting of misplaced hardware with new symptoms, the patient should be maintained in cervical immobilization on a monitored bed until evaluated by a neurosurgical team.

Conclusion: Although almost 20% of cervical spine surgery results in complications, hardware extrusion and malpositioning is exceedingly rare. Patients with concern of complications regarding their surgeries should undergo spinal immobilization, attention to ABCs, appropriate diagnostic imaging, and early neurosurgical consultation for optimal care.

Conflict of interest

No authors have conflicts of interest to report.

All authors have read and agree with the manuscript and its conclusions.

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