

Case Report



Oral Extrusion of a Screw After Anterior Cervical Spine Plating: A Case Report

Dohyun Na and Ki Seong Eom

Department of Neurosurgery, Wonkwang University School of Medicine, Iksan, Korea

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Address for correspondence:

Ki Seong Eom

Department of Neurosurgery, Wonkwang University College of Medicine, 895 Muwang-ro, Iksan 54538, Korea.

Email: kseom@wonkwang.ac.kr

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ORCID iDs

Dohyun Na

<https://orcid.org/0009-0006-4249-7096>

Ki Seong Eom

<https://orcid.org/0000-0002-8354-4024>

Conflict of Interest

The authors have no financial conflicts of interest.

Informed Consent

This study had Institutional Review Board approval, and the need to obtain informed patient consent was waived.

Ethics Approval

This study was approved by the ethics committee of Wonkwang University Hospital (approval No. WKUH 202407004).

ABSTRACT

Although anterior cervical discectomy and fusion (ACDF) is one of the most common surgical procedures performed for the treatment of cervical disease, it is associated with a variety of postoperative complications. Esophageal perforation is a rare but very serious post-ACDF complication, and cases in which screws extrude through the mouth are even rarer. Herein, we present the case of a 61-year-old woman who visited our emergency center with oral extrusion of a screw 6 months after undergoing ACDF. Although diagnostic imaging did not confirm esophageal perforation, the oral extrusion of the screw was clear evidence of the complication. To the best of our knowledge, this is the first reported case of oral screw extrusion without confirmed esophageal injury. This case suggests that screw migration and esophageal perforation can occur depending on the patient's underlying condition, and if the symptoms are mild, conservative treatment alone may be sufficient to treat the perforation.

Keywords: Postoperative complications; Esophageal perforation; Conservative treatment

INTRODUCTION

Anterior cervical discectomy and fusion (ACDF) is currently the gold standard surgical method for the treatment of cervical myelopathy, radiculopathy, neoplasm, spondylitic disease, and trauma.¹⁾ Although ACDF is one of the most commonly performed surgeries for the treatment of cervical disease, there are a variety of potential complications related to ACDF.²⁾ Oral extrusion of a screw is an extremely rare post-ACDF complication. To the best of our knowledge, there have been no reports of screw oral extrusion with no confirmed esophageal injury on radiological and endoscopic examinations. Esophageal perforation is a rare complication of ACDF; however, it is one of the most fatal complications that can occur, and can directly affect a patient's life.³⁾ Therefore, the rapid diagnosis and prompt treatment of esophageal perforation are very important to patient outcomes. Herein, we present a rare case of esophageal perforation in which a good outcome was obtained, through the prompt treatment of a patient whose cervical screw extruded through the mouth post-ACDF.

CASE REPORT

A 61-year-old female was admitted to our hospital with complaints of neck pain, pain in the right shoulder, left wrist, and both hands that began 3 months prior. Cervical spine X-rays and cervical computed tomography (CT) showed that the body of cervical vertebra 4 (C4) had retrolisthesis in relation to C5, severe narrowing of the intervertebral disc space, and sclerotic changes with a posterior bony spur on the endplate (FIGURE 1). These changes resulted in severe central spinal and moderate bilateral foraminal stenosis. Magnetic resonance imaging (MRI) of the cervical spine showed T1 low- and T2 high-signal Modic type I C4/5 endplate change and central canal stenosis at C4/5 with a signal change in the cervical spinal cord (FIGURE 2). The patient underwent ACDF with foraminotomy at the level of C4/5. An anterior

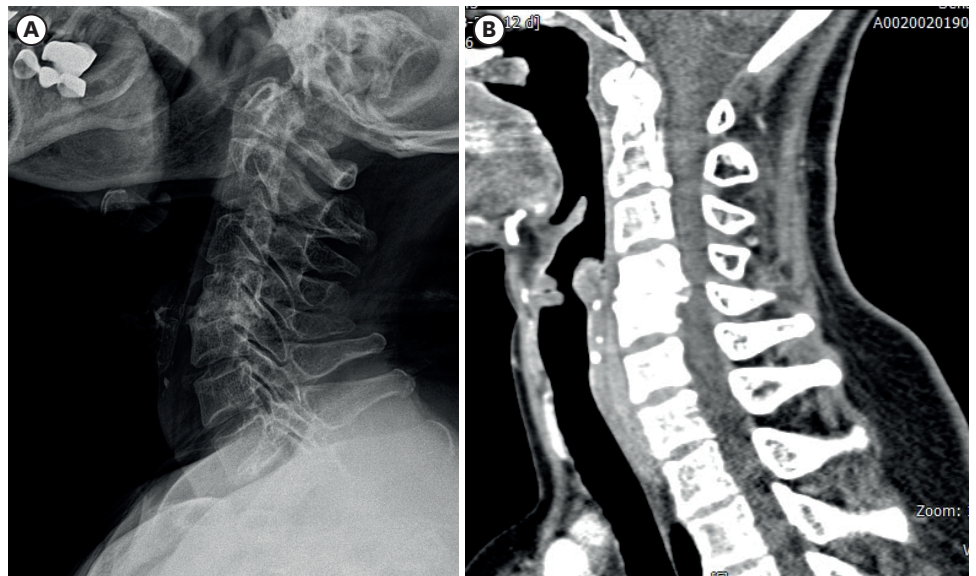


FIGURE 1. Cervical spine view is showing that the body of C4 had retrolisthesis in relation to C5, severe narrowing of the intervertebral disc space, and sclerotic changes with a posterior bony spur on the endplate of C4. (A) X-ray and (B) computed tomography. C4: cervical vertebra 4, C5: cervical vertebra 5.

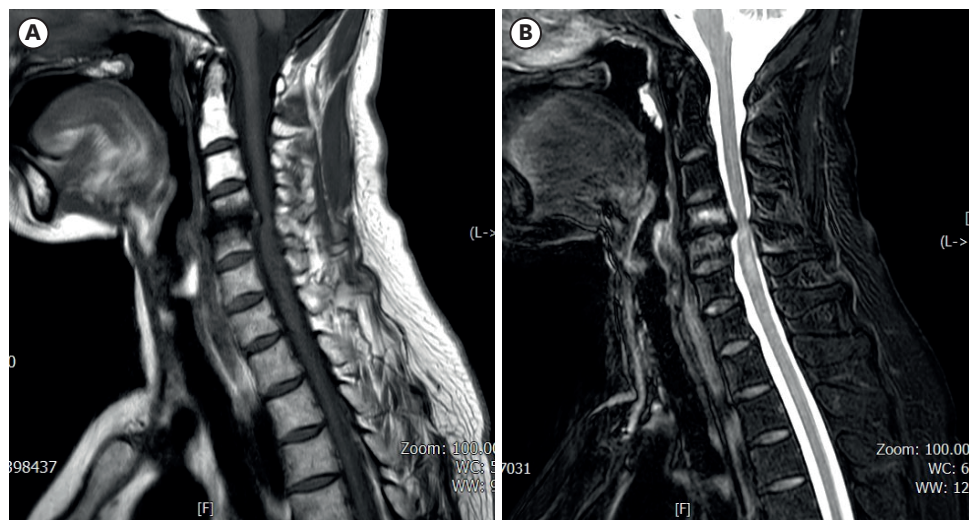


FIGURE 2. MRI of the cervical spine showing T1 low- and T2 high-signal Modic type I C4/5 endplate change and central canal stenosis at C4/5 with signal change of the cervical spinal cord. (A) T1- and (B) T2-weighted MRI. MRI: magnetic resonance imaging, C4: cervical vertebra 4, C5: cervical vertebra 5.

cervical fusion was performed using a ZERO-P spacer (DePuy Synthes Spine, Raynham, MA, USA), filled with demineralized bone matrix, as seen on postoperative cervical X-rays (FIGURE 3). The patient was discharged 5 days after surgery, without neurological deficits, and subsequently underwent outpatient follow-up observation. Six months post-ACDF, the patient was admitted to our emergency room with complaints that a spinal screw came out of her mouth while coughing. Cervical X-rays showed the extrusion of the lower right ZERO-P spacer screw (FIGURE 4). The patient underwent emergency upper gastrointestinal endoscopy, esophagography, and neck CT due to the strong suspicion of oral screw extrusion. Although an esophageal perforation was not clearly identified on the radiographic examinations, the patient underwent a laparoscopic gastrostomy and percutaneous endoscopic gastrostomy tube placement for temporary feeding. Laboratory tests showed signs of inflammation, resulting in the patient receiving a 21-day course of antibiotics. The patient had suffered no apparent

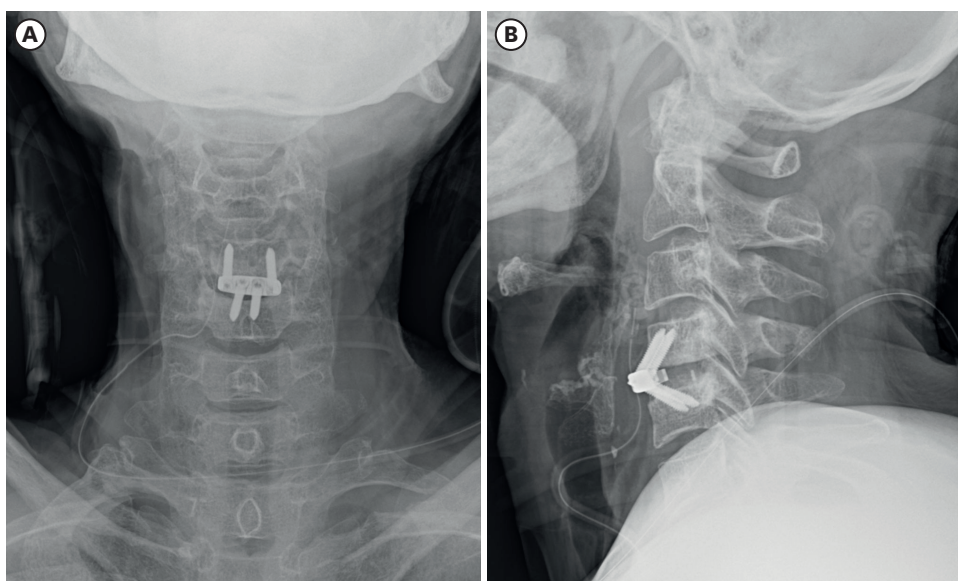


FIGURE 3. Postoperative cervical view is showing C4/5 anterior cervical discectomy and fusion with a ZERO-P spacer. (A) Anteroposterior and (B) lateral X-rays.

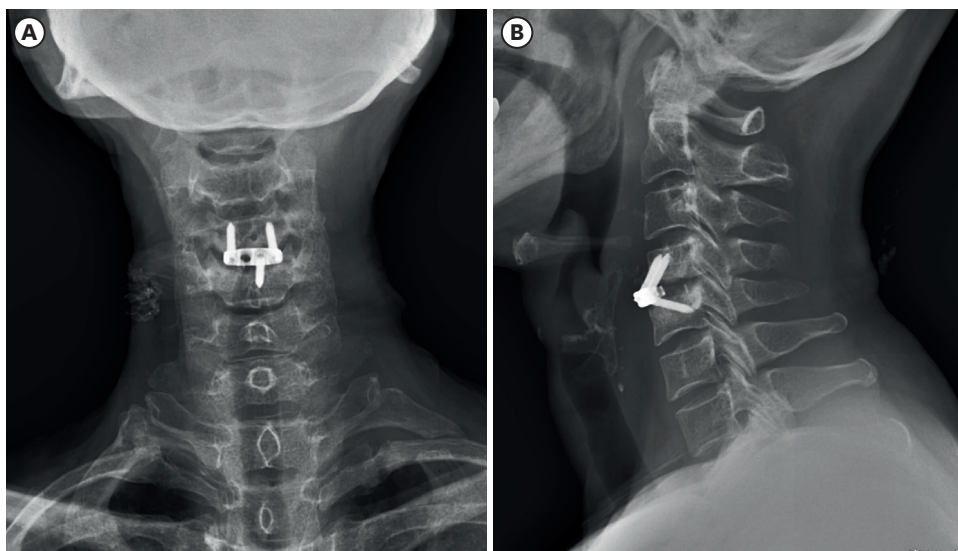


FIGURE 4. Cervical view is showing screw extrusion in the lower right from the ZERO-P spacer. (A) Anteroposterior and (B) lateral X-rays.

neurologic deficits, recovered, and was discharged. She did not, however, obtain regular outpatient follow-up observations. Two years later, the remaining screws and ZERO-P spacer were well-fixed, as observed on X-rays of the cervical spine.

DISCUSSION

Potential complications of ACDF are well known, can occur intraoperatively or postoperatively, and include the following: postoperative hematoma, recurrent laryngeal nerve palsy, cerebrospinal fluid leakage, esophageal perforation, Horner's syndrome, instrumentation failure, non-fusion, and dysphagia.⁶⁾ The incidence of pharyngeal of esophageal perforation is reported to be 0.1%–2.0%, and although rare, perforation is a dangerous and potentially life-threatening complications.^{3,5,6)} There are a variety of causes of esophageal perforation, including intraoperative factors, hardware failure, and chronic erosion at the site of the hardware.⁵⁾ In a systematic review, Halani et al.³⁾ reported 75 cases of esophageal injury after ACDF, including 31 cases of hardware failure, 14 intraoperative injuries, and 23 cases of chronic erosion at the site of the hardware. Kahaer et al.⁴⁾ performed a systemic review comparing ZERO-P implants vs. conventional cage-plates, and found that both implants have similar efficacy in terms of postoperative Visual Analogue Scale, Neck Disability Index, length of stay, fusion rate, segmental Cobb angle, cervical Cobb angle, prevertebral soft tissue thickness, 36-Item Short Form Health Survey, cage subsidence, implant failure, and hoarseness. Tong et al.⁷⁾ also reported that both devices had similar efficacy in improving the functional and radiographic outcomes. As the likelihood of screw migration occurring due to differences in implants is low, our patient, who showed Modic type 1 C4/5 endplate changes on preoperative MRI, may have experienced screw migration due to poor bone quality resulting from degenerative changes. Furthermore, the patient underwent total tonsillectomy and radiotherapy for tonsil cancer ten years prior to the ACDF; therefore, the weakening of the esophageal wall due to radiotherapy toxicity may have led to the post-ACDF perforation.¹⁾ Although some authors have reported migration of blade or screw displacement after application of a ZERO-P, locking screw pull-out after ACDF is not a common complication since the use of locking mechanism.^{4,8)} In this case, postoperative images showed that the ZERO-P was fixed in a slightly less inserted state, suggesting that the screw was not sufficiently anchored within the body. Suboptimal initial placement of the anterior instrumentation is one of the potential causes of screw pull-out after ACDF. This case showed that there is a risk of screw pull-out even when using locking screws of ZERO-P. The patient should have been carefully follow-up with radiographic evaluations detect any screw pull-out of ZERO-P after the initial ACDF.

Esophageal perforation is diagnosed based on a combination of various symptoms and imaging tests. In systemic review of pharyngo-esophageal perforations, Moletta et al.⁵⁾ reported that common symptoms included dysphagia, fever, cervical swelling, and odynophagia. Occasionally, a foreign material may extrude while coughing, and patients may even experience sepsis or mediastinitis. Diagnostic imaging studies that may show esophageal perforations include fluoroscopic swallow studies, CT, endoscopy, X-ray, and MRI. Moletta et al.⁵⁾ reported that fluoroscopic swallow studies detected a pharyngo-esophageal leak in 11/12 cases (91.7%), while endoscopy detected 6/7 cases (85.7%). In addition to the screw extruding while coughing, the patient presented herein experienced dysphagia and fever; however, her fluoroscopic swallow study, X-rays, neck CT, and endoscopy were all negative for esophageal perforation. However, postoperative images showed that the anterior margin of cage was exposed above the

intervertebral space, it might be occurred the chronic erosion between the esophagus and the cage. As the oral extrusion of a spinal screw is anatomically impossible without a patient experiencing an esophageal perforation, we presumed that in the case presented herein, the perforation healed naturally.

Treatment options for esophageal perforation include primary closure, muscle flap, and conservative treatment. While surgical treatment is the primary method for most cases of esophageal perforation, in some cases of delayed esophageal perforation, healing without surgery is possible. Therefore, in stable patients with a low output fistula and no abscess, a conservative approach including antibiotic therapy and parenteral nutrition can be considered.²⁾ In the case presented herein, the patient had clear evidence of a perforation, as the screw extruded through the mouth; however, there was no evidence of leakage or abscess on her diagnostic imaging tests. Given the lack of a visible perforation, a regimen of antibiotics and parenteral nutrition was administered. The patient's symptoms subsequently improved, and her inflammatory markers returned to within normal limits.

CONCLUSION

Although there are a variety of potential complications related to ACDF, oral extrusion of a screw after ACDF is an extremely rare complication. To the best of our knowledge, this is the first case of screw oral extrusion with no confirmed esophageal injury. We reported herein a rare case of post-ACDF oral screw extrusion, suggesting that screw migration and esophageal perforation can occur, depending on the patient's underlying condition. Additionally, if the symptoms are mild, conservative treatment alone may be sufficient to treat esophageal perforation.

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