



Case Report

Delayed esophageal perforation following anterior cervical disc arthroplasty: A case of trauma-induced prosthesis dislocation and hardware failure

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ABSTRACT

Background: Anterior cervical disc arthroplasty (ACDA) may rarely result in esophageal perforation.

Case Description: A 56-year-old male underwent a C5–c6 ACDA for a cervical disc herniation. Three months postoperatively, trauma led to anterior dislocation of the interbody prosthesis, resulting in the acute onset of dysphagia accompanied by wound drainage. The delayed diagnosis of esophageal perforation was established when the cervical computed tomography documented anterior migration of the screws/plates and an air/fluid level in the surgical field. Despite a multidisciplinary approach, including anterior surgical revision followed by posterior stabilization, the patient became septic and expired.

Conclusion: The incidence of esophageal perforation following ACDA ranges from 0.02% to 1.52%, with hardware failure being the leading cause. Prompt recognition and multidisciplinary management are essential for optimizing patient outcomes. Here, trauma-induced prosthesis dislocation warranting circumferential surgery failed to control sepsis, and the patient died.

Keywords: Anterior cervical disc arthroplasty, Cervical trauma, Posterior stabilization, Esophageal perforation, Hardware failure

INTRODUCTION

There are multiple general complications associated with anterior cervical disc arthroplasty (ACDA) that include a 5.3% frequency of dysphagia and 0.2% incidence of esophageal perforation.^[3,5]

Esophageal injury, most commonly attributed to hardware failure, occurs either immediately after surgery or in a delayed fashion and carries a high morbidity/mortality rate (i.e., 19%).^[1] Early diagnosis is crucial for improving patient outcomes. Here, a 56-year-old presented with a delayed esophageal injury attributed to an ACDA performed to address a cervical disc.

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CLINICAL PRESENTATION

In this Institutional Review Board approved study, a 56-year-old male patient presented with neck and left arm pain attributed to a C5–C6 disc herniation [Figures 1a, 1b]. His postoperative course was uneventful, and he was discharged in good condition. However, 3 months later, following a motor vehicle accident, he experienced the sudden onset of quadriplegia. Three days later, he presented with dysphagia accompanied by proximal (4/5) and distal muscle strength (3/5) in the upper, and bilateral lower extremity strength of just 2/5 with bilateral hypoesthesia was below T3.

Radiological studies and surgery

Once the cervical radiographs demonstrated anterior dislocation of the interbody prosthesis, and the magnetic resonance imaging (MRI) confirmed cord compression at tC5–C6 level, the patient underwent revision surgery [Figures 2a, 2b].

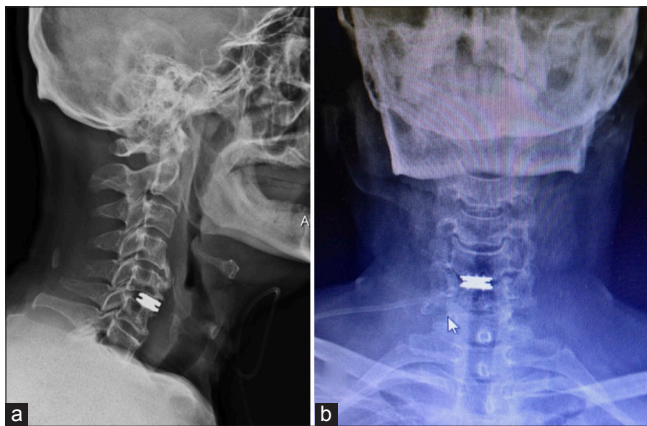


Figure 1: Radiological images of the patient demonstrating the (a) Lateral X-ray image post-anterior cervical disc arthroplasty (ACDA) surgery showing the initial positioning of the prosthesis. (b) Anteroposterior view post-ACDA surgery demonstrating correct placement of the prosthesis (white arrow).

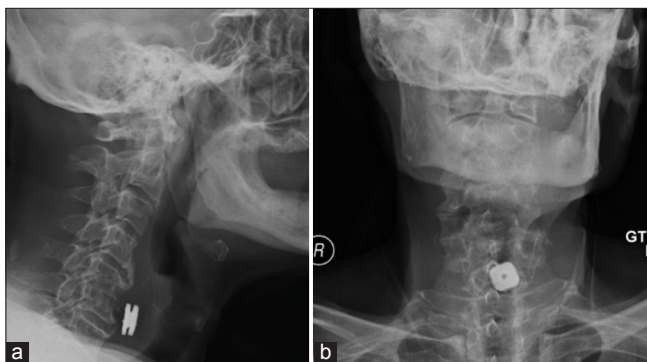


Figure 2: (a) Lateral and (b) anteroposterior X-ray showing the anterior dislocation of the prosthesis after the trauma.

Anteriorly, the dislocated prosthesis was removed and replaced with a C5–C6 polyetheretherketone (PEEK) cage/plate placement [Figures 3a, 3b]. On the second postoperative day, the patient developed dysphagia, and by the 3rd day, wound drainage was noted [Figures 4a–g]. A cervical computed tomography (CT) scan revealed a C5–C6 air/fluid level with anterior migration of the screws/plate and C5–C6 spondylolisthesis [Figures 5a–f]. The wound was reopened and copiously irrigated. An intraoperative general surgical consultation resulted in the administration of methylene blue to locate any potential esophageal defect; they determined that the defect was minimal and did not require repair. A nasogastric feeding tube was placed, and the patient kept nil per os or nothing by mouth (NPO). A percutaneous endoscopic gastrostomy was later inserted for nutritional support after confirming the presence of an esophageal injury utilizing a contrast esophagogram.

Further delayed management of esophageal injury by an interdisciplinary team

The multidisciplinary team (i.e., including ear, nose, and throat, general surgery, infectious diseases, radiology, physical therapy, and neurosurgery) closely monitored the patient, administering antibiotic therapy and performing serial chest radiographs looking for mediastinitis. One month postoperatively, when the neck pain intensified, both a cervical CT and MRI were performed [Figures 6a–f]. The patient subsequently underwent posterior C4–C6 lateral mass and C7 transpedicular screw fusion [Figures 7a, b]. Nevertheless, the patient's condition deteriorated to the point where he developed a lung infection, sepsis, and, ultimately, death.

DISCUSSION

ACDA is a widely accepted surgical procedure with favorable outcomes. However, as in this case, trauma-induced prosthesis dislocation can lead to significant complications. One key consideration in such cases is the risk of esophageal perforation, which is a significant complication following ACDA, especially

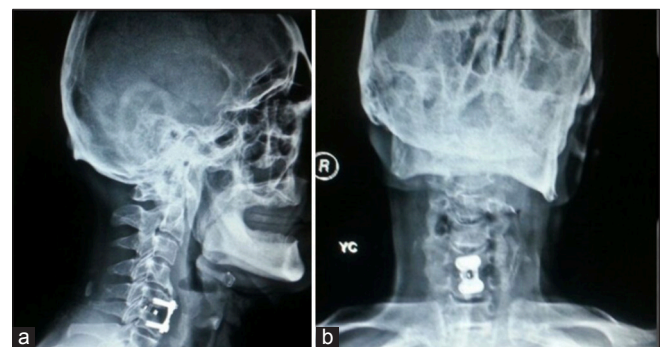


Figure 3: (a) Lateral and (b) anteroposterior X-ray post-ACDF and plate fixation surgery. ACDF: Anterior cervical discectomy and fusion

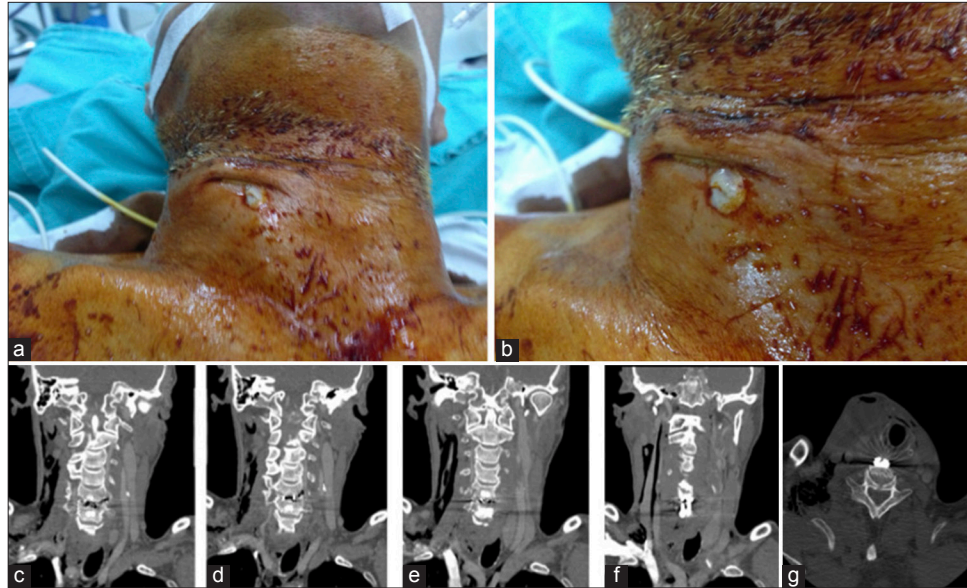


Figure 4: Inspection of the patient shows (a, b) drainage of the collection from the incision site. (c-g) Cervical spinal computed tomography sections of the patient show air images and collection in the surgical site.

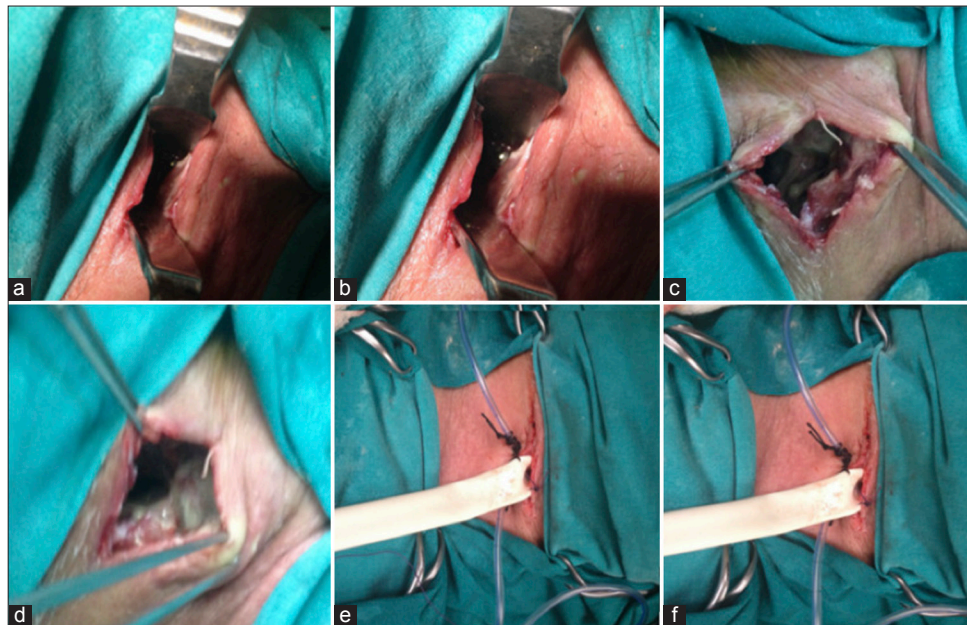


Figure 5: (a-f) Irrigation of the surgical site and placement of a Penrose drain.

in the setting of hardware failure. The incidence of esophageal perforation ranges from 0.02% to 1.52%, with mortality rates as high as 19%.^[1] In our case, the esophageal perforation most likely occurred due to the hardware misplacement, as wound drainage was also noted. Therefore, when anterior instrumentation migrates, the risk of damage to nearby anatomical structures, such as the esophagus, increases significantly. The size of the esophageal perforation plays a critical role in determining the appropriate treatment. Perforations smaller than 1 cm are typically managed conservatively with medical treatment,

while larger perforations or those with signs of local infection require surgical intervention.^[4] The goals of surgery are to close the perforation, revise the hardware, and drain any abscesses if present. In cases where primary suturing is not feasible, muscle flaps such as the sternocleidomastoid or pectoralis major may be utilized to cover the defect.^[2]

In patients who undergo multiple surgeries and experience instrumentation failure, careful evaluation for esophageal perforation is crucial. Although no iatrogenic perforation

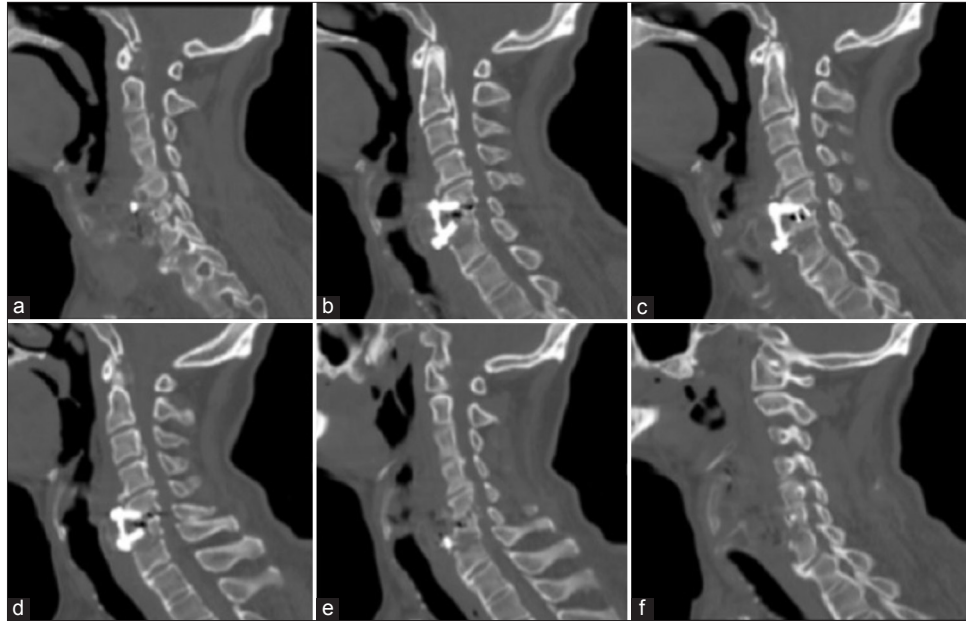


Figure 6: (a-f) Pseudoarthrosis and malposition of the screw and plate observed in the area where the C5–C6 anterior polyetheretherketone (PEEK) cage and plate were applied.

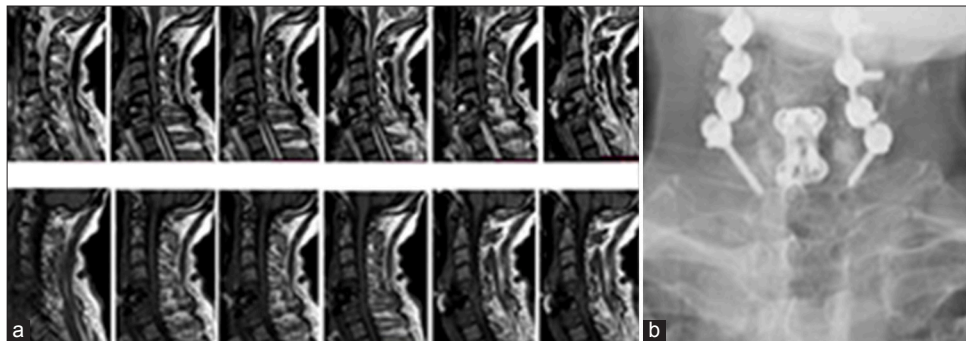


Figure 7: (a) Sagittal sections of the patient's cervical spinal magnetic resonance imaging showing signs of osteomyelitis at the surgical site, along with cervical spinal canal stenosis at the same levels. (b) Stabilization was achieved with posterior bilateral C7 pedicle screws and C4–C6 lateral mass screws.

was observed intraoperatively in our case, nasogastric feeding was initiated. In this case, the patient experienced prosthesis malposition due to trauma, leading to esophageal perforation. Intraoperative general surgical consultation revealed no esophageal perforation, and the patient's oral intake was withheld, with nasogastric feeding initiated for conservative management.

CONCLUSION

As esophageal injury is a rare but serious complication of ACDA that may result in mediastinitis, sepsis, and death. Early diagnosis, hardware revision, and perforation repair are crucial to favorable clinical outcomes.

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