



# Quadriplegia Following Intrinsic Traumatic Esophageal Perforation: Report of a Rare Case

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## Abstract

An elderly diabetic gentleman developed epidural abscess several days after traumatic esophageal perforation secondary to flexion-extension injury of the cervical spine in a road traffic accident. The patient underwent high-resolution ultrasonography of the neck along with noncontrast computed tomography and magnetic resonance imaging of the cervical spine, which showed collection in soft tissue of the neck region along with epidural abscesses and osteophytes at multiple levels. However, due to the rarity of cervical esophageal perforation due to vertebral osteophytes, esophageal perforation was missed and was only diagnosed during the second admission of the patient, about 1 month later, when he presented with progressive quadriplegia. We present an extremely rare case of cervical esophageal perforation due to a flexion-extension injury.

## Keywords

- ▶ cervical osteophytes
- ▶ epidural abscess
- ▶ esophageal perforation
- ▶ quadriplegia

## Introduction

Esophageal perforation is an uncommon consequence of blunt trauma<sup>1,2</sup> in road traffic accidents and hyperextension-flexion injuries of the cervical spine<sup>3</sup> have proved to be a rarer cause of esophageal perforation. To our knowledge, this is the second reported case of vertebral osteophytes causing traumatic esophageal perforation.<sup>3</sup>

The process may involve the esophagus pressing up against an exostosis or vertebral body edge, or it may involve the esophageal wall becoming trapped between the vertebral bodies when hyperextension transitions to flexion.

Most of the cases reported in literature involving the lower cervical spine are almost always associated with pneumomediastinum and less commonly abscess collection.<sup>4</sup> However, a few case reports of esophageal perforation leading to vertebral body infection<sup>5</sup> and epidural abscess<sup>6</sup> do occur in literature, but these are mostly postradiation esophageal perforations.

We present the first case of traumatic esophageal perforation due to anterior cervical osteophytes which was

complicated by delayed presentation, vertebral osteomyelitis, pneumorrhachis, and epidural abscess.

## Case Report

A 68-year-old diabetic patient had a history of a three-wheeler accident in which he was traveling. The three-wheeler overturned leading to the patient's head striking against the road and going into sudden flexion. Following the incident, the patient had no external injuries and complained of only slight neck pain without any focal neurological deficit. No history of loss of consciousness, vomiting, seizure, and ear, nose, and throat bleed. The patient resumed his daily activities.

Nine days after the incident, the patient developed pain and swelling on the left side of the neck with high-grade fever. The patient was evaluated at a tertiary medical institute, where on evaluation, high-resolution ultrasonography neck showed a 30 × 46 × 44.5 mm (38 mL) collection with multiple air-fluid levels in the posttriangle of the neck on the left side. A computed tomography (CT) scan showed an abscess in paravertebral muscles in the cervical and dorsal regions, marginal and

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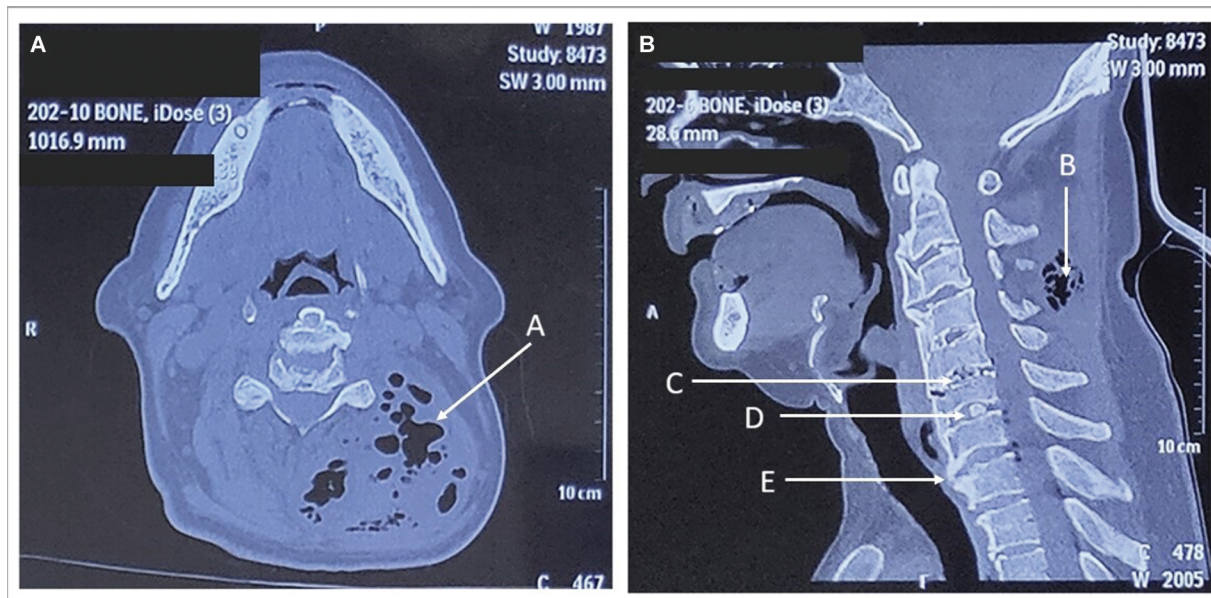
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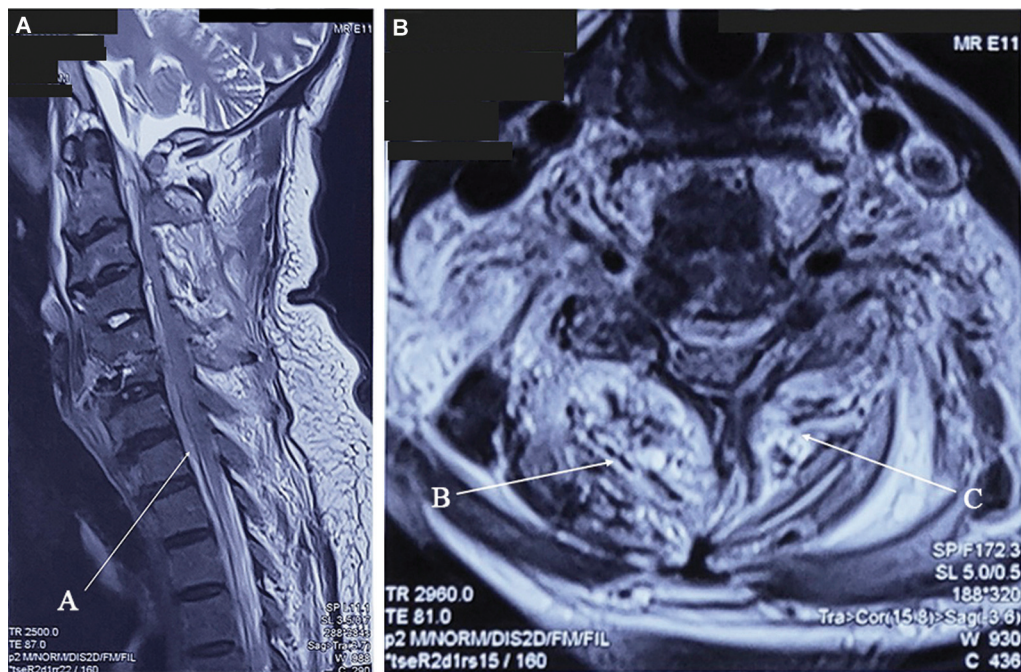
interrupted bridging osteophytes, intervertebral disc calcification and vacuum phenomena, and a fracture of the lower end plate of the C5 vertebra (► Fig. 1). Magnetic resonance imaging (MRI) of the cervical spine at the time showed ill-margined T2/short-tau inversion recovery hyperintense collections into intramuscular and intramuscular planes involving the left paravertebral muscles, left sternocleidomastoid and left scalene muscles in the cervical region, and extension of the collection/inflammatory soft tissue in the pre- and paravertebral regions at the C5, C6, and C7 levels,

extending into the epidural space through bilateral neural foramina at the C5–C6 and C6–C7 levels. Compression was observed over the cord at that level. Inflammatory soft tissue was noted along the C5–C6 intervertebral disc with signal alteration in adjacent end plates (► Fig. 2).

The patient was managed with ultrasound-guided percutaneous drainage of pus and empirical intravenous antibiotics (meropenem and clindamycin) with partial improvement of symptoms. Culture sent from the aspirated pus showed no growth. The patient showed



**Fig. 1** Noncontrast computed tomography (NCCT) cervical spine (A: axial, B: sagittal). (A and B) Abscess in paravertebral muscles at the cervical region. (C) Fracture of lower endplate of C5 vertebra. (D) Intervertebral disc calcification. (E) Anterior osteophytes.



**Fig. 2** Magnetic resonance imaging (MRI) T2-weighted image (T2WI) of the cervical spine region (A: sagittal, B: axial). (A) Collection at epidural space at the cervical region along with compression of cord at the C5–C6 level. (B and C) Collection at intermuscular and intramuscular planes.

partial improvement of symptoms following percutaneous drainage and empirical antibiotics and was discharged.

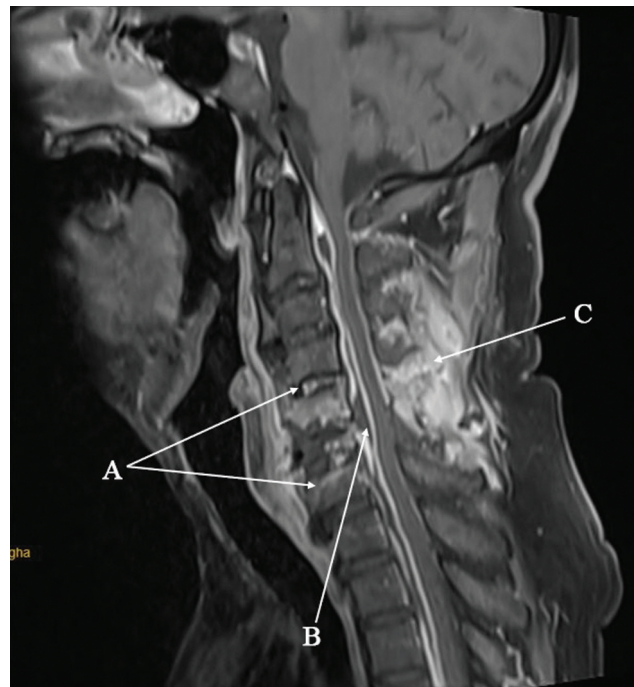
The patient developed progressive quadriplegia and urinary retention over a period of 1 month and reported to our hospital with a power of 3/5 bilaterally at the shoulder and elbow joint and 0% hand grip bilaterally, while power in the bilateral lower limb was 0/5 at the hip, knee, and ankle joint. Deep tendon jerks were reduced bilaterally in both the upper and lower limbs.

The patient underwent contrast-enhanced MRI, which showed features suggestive of active infective spondylodiscitis at the C5, C6, and C7 levels, causing collapse of C6. An extensive epidural abscess was seen, involving the entire spinal canal from C2 up to S1 and S2 in the lumbosacral spine and causing compression of the cervical spinal cord. Extensive inflammatory change was observed involving all visualized paravertebral muscles and paraspinal muscles of the cervical spine with multiple small intramuscular abscesses (► Fig. 3). Noncontrast CT of the cervical spine showed collapse of the C6 vertebra with bone destruction involving the C5 and C6 vertebrae and intervertebral discs suggestive of infective spondylodiscitis with broken anterior osteophytes within the esophageal wall. Multiple tiny gas pockets within the epidural abscess were seen (► Fig. 4).

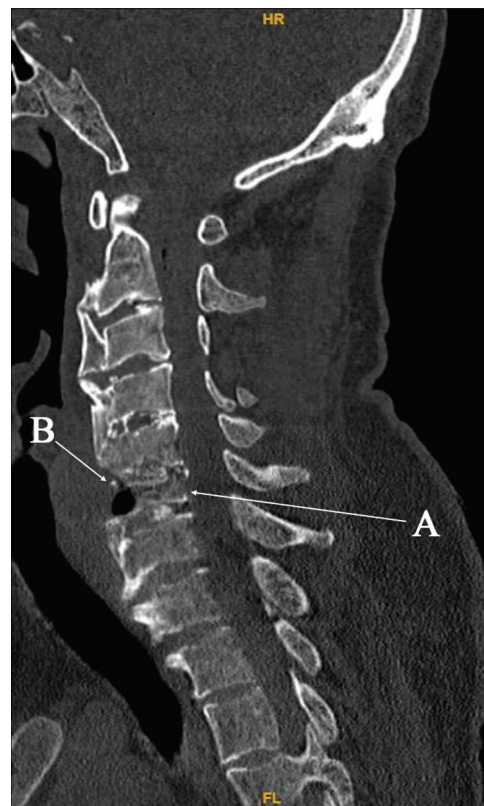
Soluble barium swallow showed a small tear, of 41 mm in the craniocaudal direction and 43 mm in the transverse direction, in the posterior esophagus at the level of the C5–C6 vertebrae (► Fig. 5). Upper gastrointestinal endoscopy also revealed a small perforation at the level of the upper esophageal sphincter, which, however, could not be closed. Mid and distal esophagus were normal. A nasogastric tube was placed, and tube feeding was started. The patient underwent C-arm-guided aspiration of pus from L2/L3 and was sent for analysis. Meanwhile, the patient was started on empirical antibiotics (meropenem and clindamycin), which were changed to culture-specific antibiotics (levofloxacin). The patient improved, became afebrile, power improved to 3/5 in bilateral shoulder and elbow joints, and improved hand grip to 40% in the right and 20% in the left. Bilateral lower limb power improved to 2/5 in the hip, knee, and ankle. The patient was discharged with culture-specific intravenous antibiotics for 4 weeks with a plan of reassessment for further management and continuing Ryle's tube feeding. The patient underwent CT cervical spine plain and oral contrast after 1 month, which showed no evidence of leakage of orally administered contrast from the esophagus along with fragmentation of the C6 vertebral body with retropulsion of posterior cortex causing severe canal stenosis at the C5–C6 level. Ryle's tube was removed and the patient was started on oral diet. Presently, patient has power of 3/5 in the bilateral upper limb with power of 2/5 in the bilateral lower limb.

## Discussion

Anterior cervical osteophytes causing esophageal perforation are extremely rare and can only be diagnosed by following a high degree of suspicion, especially in the elderly population



**Fig. 3** Contrast-enhanced magnetic resonance imaging (CE-MRI) of cervical spine sagittal view. (A) Spondylodiscitis at the C5–C7 level and collapse of C6 vertebral body. (B) Epidural abscess noted at the cervical region extending cranially from C2 below downwards. (C) Inflammatory changes involving the paravertebral and paraspinal muscles.



**Fig. 4** Noncontrast computed tomography (NCCT) cervical spine sagittal view. (A) Collapse of C6 vertebral body with bony destruction of C5 body. (B) Broken anterior osteophyte at the C6 body level along with air pocket.



**Fig. 5** Barium swallow study. Arrow pointing toward the small esophageal perforation at the C5–C6 level.

where irregular vertebral osteophytes are common. A thorough understanding of the history and temporal profile of the subsequent complaints is key to “catching the culprit.”

The mechanism by which the esophagus is ruptured may be by trapping and pinching of the posterior esophageal wall as the anteroposterior ligament ruptures and the vertebral bodies separate, then snap back as flexion occurs,<sup>6</sup> or impingement on the sharp edge of one of the separated vertebral bodies.

With early diagnosis and treatment, the catastrophic effects of epidural abscess, a rare disorder,<sup>7</sup> can be averted. With late intervention, paraplegia, quadriplegia, and even death can happen. The reversible neurological deficit is linked to early diagnosis and spinal cord decompression, particularly in the first 24 hours. Rarely, characteristic triad of low back pain, fever, and neurological dysfunction occur in cases of spinal epidural abscess. Our patient presented with all three symptoms. Risk factors described in the literature are diabetes mellitus, intravenous drug use, human immunodeficiency virus infection, degenerative joint disease, recent trauma, and surgery.<sup>7</sup> Our patient had two of these risk factors in the form of diabetes mellitus and

recent trauma with flexion-extension neck injury. Our patient had a history of road traffic accident with abrupt, forced flexion of the neck. During his first admission the patient had intermuscular, intramuscular, and epidural collection with air-fluid levels in the cervical region. In absence of any external injury, with history of trauma in an old individual, who usually have cervical osteophytes, there is a possibility of esophageal injury which should be evaluated, but is generally missed in current practice due to rarity of the disease. Usually, monobacterial pathogen is seen in epidural abscesses with *Staphylococcus aureus* being the most common but in our case the causative organism was *Acinetobacter lwoffii*.

## Conclusion

Esophageal perforation after closed neck trauma due anterior cervical osteophyte is rare. With scarce literature, management is controversial and a nonsurgical option can be considered if detected earlier. Clinicians should have a high index of suspicion for esophageal perforation in elderly patients with closed neck injury.

**Conflict of Interest**

None declared.

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