



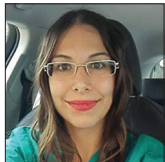
Case Report

Delayed postoperative erosion of hypopharynx after anterior hardware extrusion: A case report

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ABSTRACT

Background: Esophageal breach or pharynx perforations are serious and potentially fatal complications of anterior cervical corpectomy/fusion (ACF). They are either recognized intraoperatively or are diagnosed within several postoperative days. Here, a 76-year-old male presented with the retropharyngeal extrusion of an anterior cervical expandable cage that occurred two years postoperatively.

Case Description: A 76-year-old male with a history of an anterior corpectomy/fusion (C3–C6, corpectomy C4, C5) performed two years ago presented with persistent dysphagia for three months. Cervical X-rays showed anterior migration of the expandable cage and that was also confirmed by computed tomography (CT) scans. During intubation, the anesthesiologist observed that the cage had directly penetrated the hypopharynx. Following routine removal of the cage, ENT could not identify (using the operating microscope) any direct perforation of the esophagus or hypopharynx; presumably, the esophageal breach was small, and the esophageal wall spontaneously closed the gap following cage excision.

Conclusion: Pharyngeal perforation after ACF is typically associated with significant morbidity and mortality. Stringent preoperative assessment, utilizing X-rays, magnetic resonance/CT studies, and ENT specialists to perform indirect laryngoscopy, may optimize postoperative outcomes.

Keywords: anterior cervical corpectomy/fusion (ACF), Cage migration, Esophageal perforation, Pharynx erosion

INTRODUCTION

Anterior cervical corpectomy and fusion (ACF C3–C6 with C4, C5, corpectomy) may rarely result in esophageal breaches, hypopharynx perforations, trachea injuries, carotid ruptures, and/or recurrent laryngeal nerve damage.^[1,7,8] Typically, esophageal/pharyngeal injuries are either recognized intraoperatively or within a few postoperative days and immediately addressed to minimize the risks of mediastinitis, dysphagia, aspiration pneumonia, sepsis, and death (4%).^[3] Here, we report a 2-year delayed perforation of the esophagus/hypopharynx attributed to an ACF cage.^[8]

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Table 1: Data summary of the studies enclosed.

Studies included	Number of patients	Sex	Mean age (years)	Symptoms	Clinical findings	Surgical treatment of cervical spine	Surgical treatment of esophageal injury
Gaudinez <i>et al.</i> (2000)	44	Males	33	Pain, dysphagia/odynophagia, cough, aspiration, and vocal changes	Fever, induration, weight loss, tachycardia, crepitus, hematemesis, and expectoration-bone/hardware	42 patients	42 patients
Halani <i>et al.</i> (2016)	153	82 Males 71 Females	44.7	Dysphagia and odynophagia	Fever, neck swelling, and wound leakage	-	53 patients
Lee <i>et al.</i> (2008)	1	Male	68	Foreign body sensation	-	-	-
Park (2020)	4	3 Males 1 Female	46	Foreign body sensation, dysphagia, dyspnea, and chest pain	Pain in the right leg and numbness in bilateral hands	1 patient	1 patient
Prusick <i>et al.</i> (2020)	1	Female	51	Dysphagia and trouble swallowing	-	1	-
Quadri <i>et al.</i> (2016)	1	Female	81	Dysphagia	-	-	-
Sharma <i>et al.</i> (2001)	1	Female	32	Pain and dysphagia	-	-	-
Yahanda <i>et al.</i> (2022)	9	6 Males 3 Females	58	Dysphagia, neck pain, and dysphonia	-	9	3

CASE DESCRIPTION

Preoperative evaluation

A 76-year-old male with a history of a C3–C6 ACF 2 years ago presented with dysphagia for three months. Cervical X-rays showed anterior migration of the expandable cage [Figure 1]. On admission, routine laboratory work was unremarkable (white blood cells were 6.2 k, C-reactive protein was 0.5, and erythrocyte sedimentation rate was 2). The cervical computed tomography (CT) showed anterior extrusion of the expandable cage into the hypopharynx, resulting in esophageal impingement; thus, we suspected esophageal breach-erosion preoperatively. We had ENT perform a nonrigid laryngoscopy that showed no signs of hypopharynx or esophageal breach/perforation.

Surgery

During the intubation, the anesthesiologist directly visualized the expandable cage within the esophagohypopharynx [Figure 2]. Nevertheless, the patient underwent an uneventful surgical removal of the cage. Notably, following cage removal, ENT could not identify a perforation of the esophagus/hypopharynx [Figures 3 and 4]. Further, the ENT placed a Levine catheter to assist by infusing methylene blue orally whether or not there was an identifiable site of

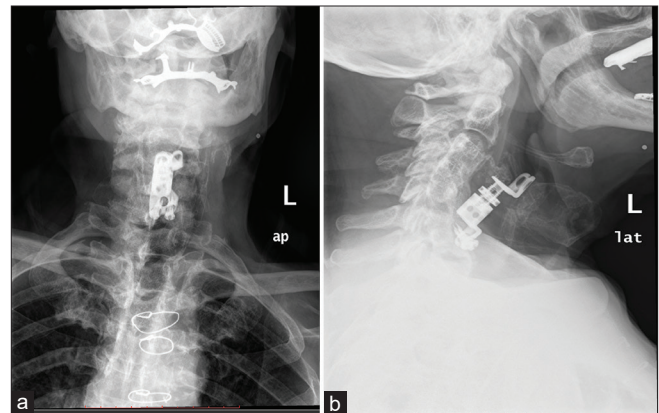


Figure 1: (a and b) Face and profile plain radiographs demonstrate cage anterior migration.

perforation; none was found. It was, therefore, presumed that the esophageal wall collapsed down around the site of the breach, resulting in its occlusion following cage removal.

Postoperative course

Postoperatively, a nasogastric tube was maintained just in case an esophageal perforation had been missed; this would reduce the potential for developing mediastinitis. On the third postoperative day, the patient developed chest pain, difficulty

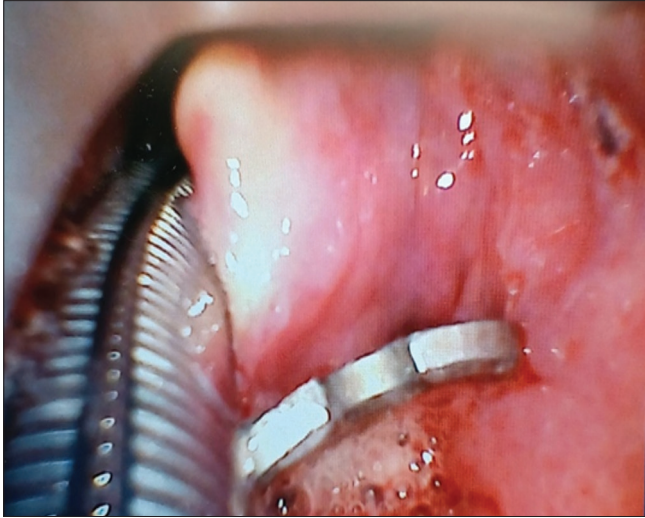


Figure 2: Endoscopic view of the perforation.

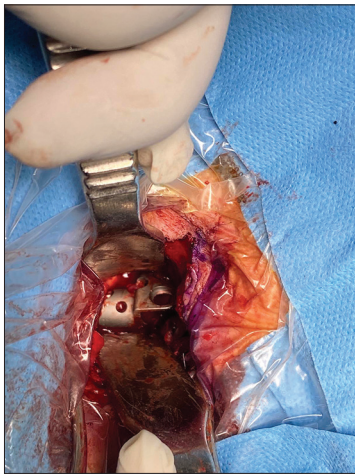


Figure 3: Intraoperative view of the migrated hardware.



Figure 4: The hardware is fully removed.

in breathing, and tachypnea. The emergency chest CT scan documented no mediastinitis, but the electrocardiogram/cardiac workup was diagnostic for myocardial infarction. After a three days stay in the cardiac intensive care unit, he returned to the neurosurgical floor.

Further ENT evaluation

On the 11th postoperative day, ENT performed another laryngoscopy; this was negative. The barium swallow that followed was also normal. The patient was maintained on antibiotics for 14 days in total and ultimately discharged on the 15th postoperative day, fully recovered and without dysphagia.

DISCUSSION

Incidence of pharyngoesophageal erosion/perforation

Pharyngoesophageal erosion is an uncommon complication of anterior cervical surgery. Retrospective study of 2946 patients (Gaudinez *et al.*)^[1] showed an incidence of intraoperative esophageal breach of 0.25-1.49%. Even rarer is the late erosion of the esophagus.^[8] Only one case of pharyngeal perforation with extrusion of some cervical hardware has been reported in the literature to date.^[7] Pharyngoesophageal perforation may occur late, attributed to instrumentation migration, and may present with mediastinitis, pneumonia, meningitis, local abscess, or sepsis, as seen in Table 1.^[3,4,6,9]

Mechanism of pharyngoesophageal erosion/perforation

Multiple mechanisms may lead to pharyngoesophageal perforations and include chronic compression by hardware, pressure sores caused by the titanium implant/cages, and microtrauma of the outer surface of the pharynx.^[2,5,9] Persistent symptoms may include neck pain, dysphagia, or signs of infection.

Diagnosis of pharyngoesophageal erosion/perforation

The diagnosis of pharyngoesophageal erosion/perforation is readily achieved utilizing endoscopy or a Barium swallow-esophagogram. Furthermore, useful in documenting anterior migration/extrusion of instrumentation are X-rays and a contrast CT scan of the neck/chest (i.e., showing air in the mediastinum, a paravertebral collection, and/or mediastinitis).

Surgery pharyngoesophageal erosion/perforation

Although conservative treatment is described in the literature, surgery is the treatment of choice to address pharyngoesophageal erosion/perforation.^[3,4,6,9] Following removal of the extruded foreign body, ENT may repair the

esophageal/pharyngeal defect with an additional muscle flap if indicated.^[9] To “decompress” the site of esophageal/pharyngeal repair, patients should be fed through a nasogastric tube or gastrostomy until the site of the perforation is healed.

CONCLUSION

Pharyngeal perforation after ACF carries significant morbidity and up to a 4% mortality. The preoperative assessment for a patient presenting with significant dysphagia following ACF should include X-rays, magnetic resonance, and CT studies, along with laryngoscopy by ENT to look for an esophageal/hypopharynx perforation directly.

Ethical approval

The Institutional Review Board approval is not required.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

Use of artificial intelligence (AI)-assisted technology for manuscript preparation

The authors confirm that there was no use of artificial intelligence (AI)-assisted technology for assisting in the writing or editing of the manuscript and no images were manipulated using AI.

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