



## Case Report

# Delayed esophageal perforation after cervical spine surgery: A lesser known devil

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### ABSTRACT

The anterior approach to the cervical spine is commonly utilized for a variety of degenerative, neoplastic, traumatic, and infectious indications. The distinctive anatomy of the anterior neck presents a unique set of hazards. We encountered a case of delayed esophageal perforation after cervical spine surgery, who presented to us forty-two days post-surgery. Although, timely detection and management of esophageal perforation has a good prognosis, associated vascular complications added on to airway management challenges. We outline the issues with diagnosis and key aspects of airway management in this patient.

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## 1. Introduction

Anterior approach performed for cervical spine surgery is a well-established technique for various pathologies namely, prolapsed intervertebral disc, trauma, spondylosis affecting the cervical spine. Various complications result from an anterior approach to the cervical spine include infections and damage to recurrent laryngeal nerve, esophagus, major vessels, and trachea. Esophageal perforation is quite an uncommon entity with an incidence of 0.02-1.52%<sup>1-5</sup> and often remains undetected. The mortality rate approaches 20% even when the patient is managed within 24 hours but rises to 50% if undiagnosed and management is delayed. We encountered a rare case of delayed esophageal perforation associated with profound hemorrhage that remained undetected and posed significant challenges in anesthetic management especially airway management.

## 2. Case Report

A 60 years male, BMI of 30, known hypertensive presented with tingling and numbness in both hands from 6 months with increased tone in all four limbs from the last five months. On clinical examination, the power was 4/5 in all limbs. After radiological investigations, CT Scan, and MRI, the diagnosis was C3-C6 disc prolapse associated with compressive myelopathy. The patient was accepted for anaesthesia as American Society of Anaesthesiology Grade- 2. The surgical procedure performed was anterior cervical C4-C5 corpectomy with cage and plate fixation. The peri-operative course was uneventful and the patient was discharged after 5 days.

Forty-two days after the procedure the patient presented in emergency with high-grade fever. After a bout of excessive coughing, he developed neurological deterioration. The surgical site examination did not reveal any visible swelling or local inflammation. The power in all four limbs deteriorated to 2/5. Urgent CT Scan showed C4-C5 corpectomy with a displaced implant. Clinical diagnosis of an infected implant with displacement was

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made. So, the patient was planned for re-exploration and implant removal. On pre-anaesthetic evaluation, the patient was known hypertensive controlled with Tablet Telmisartan 40mg once daily. Rest systemic examination was within normal limits. On airway examination, mouth opening was more than 3cm, upper incisors were missing, Mallampati Score was 3, and neck movements were restricted due to previous cervical spine fixation. Therefore, it was anticipated difficult intubation. Apart from anemia (Hemoglobin-7.5 g%), other blood investigations were within the normal range. Chest X-Ray, ECG, and ECHO were also normal so the patient was accepted under ASA Grade 2. The difficult intubation cart was kept ready. The airway management plan was fiber-optic intubation under general anaesthesia. ECG, SpO<sub>2</sub>, Temp, IBP monitoring was instituted and room air ABG was sent. General anaesthesia was induced and muscle relaxant administered after confirmation of ventilation. About two minutes after administration of relaxant, bubbling was noted through the transparent face mask. On inspection of the oral cavity, blood was visible inside the mouth. Though an attempt was made to clear it by gentle and thorough suctioning but the oral cavity was full of blood clots. Magill forceps were used to remove the blood clots. A gentle laryngoscopy was performed to clear the oral cavity of blood. After thorough suctioning, the laryngoscope was advanced to identify the source of bleeding and visualize the vocal cords. But, the laryngeal opening was not visible and again there was a trickle of blood. To continue ventilation, I-gel was inserted. As the source of bleeding could not be identified and fiber optic bronchoscopy was not advisable, a decision for emergency tracheostomy was taken. The surgeons performed tracheostomy while ventilation was continued with I-gel. The patient's saturation and hemodynamics were stable, so the surgeons were asked to go ahead with re-exploration. Intra-operatively, a posterior esophageal tear of 5 cm was identified and repaired, the displaced cage was removed and a new implant was positioned. The blood in the surgical field was due to venous oozing of the mucosal surface. The intra-operative course was uneventful; one packed RBC transfused and the patient was transferred to ICU on ventilator support for gradual weaning. The next day, though the patient regained consciousness, still motor power did not improve. On the third post-operative day, he developed a high-grade fever. Blood, urine, and endotracheal tube cultures were sterile. The additional problems included anemia, hypokalemia, and thrombocytopenia. The patient was being managed symptomatically but his condition did not improve and he developed sudden hypotension on the seventh day. The inotropes were started, blood and blood products were transfused. The cause of hypotension was identified as melena. Despite all efforts, the patient was progressing towards sepsis and multi-organ failure. Gradually, the urine

output decreased, urea and creatinine also showed rising trends. The patient was still having a fever and considering the implant to be a potential source of sepsis, the decision was taken to remove it. The next day, the implant was successfully removed in Operation Theater. He received multiple transfusions for anemia and thrombocytopenia, but problems of fever, hypotension, deranged renal functions, and prolonged ventilator support persisted. His condition did not improve even after implant removal and he succumbed to his illness twenty days after detected esophageal perforation.

### 3. Discussion

The most common complications reported after anterior approach in the cervical spine is dysphagia and dysphonia with an incidence of 0.8-5%.<sup>6,7</sup> Most of these complications are attributed to esophageal traction or recurrent laryngeal nerve (3.5%) injury leading to postoperative edema and neuropraxia.<sup>8</sup> Intraoperative retraction of the esophagus leads to ischemia of the pharyngeal/oesophageal wall. So, the intermittent release of the retractors can avoid injury to the esophagus. Other causes of dysphagia include edema, hematoma, infection, injury to pharyngeal plexus, superior laryngeal nerve or recurrent laryngeal nerve, scar formation around cervical plates, and bone graft dislodgement.<sup>9</sup> Though incidence of esophageal perforation is reported to be as low as 0.02-1.52%,<sup>1-5</sup> however, associated morbidity and mortality (19%)<sup>10</sup> is quite high (Table 1). Usually, these injuries are recognized early but at times the diagnosis is delayed. Most of them manifest within 7-10 days following surgery, but, delayed esophageal perforations have been reported weeks to years after anterior spinal surgery. The proposed etiopathology is either suboptimal instrumentation placement or chronic compression of the esophagus against the cervical plate resulting in pressure necrosis.<sup>9</sup>

The diagnosis is very challenging as a clinical presentation of esophageal perforation is quite variable. The presenting symptoms are vague like fever, dysphagia, cervical swelling, odynophagia, aspiration, subcutaneous emphysema, etc. Even when the history or examination does not suggest esophageal perforation, one must have a high clinical suspicion of this complication in case of displaced cervical spine implant. Patients presenting with a displaced implant must undergo esophagoscopy and if it is doubtful, plan further investigations i.e. CT scan, barium swallow, and bronchoscopy for precise size and location of esophageal injury. Gaudinez et al reported that only 72% of patients with esophageal perforation had positive results on an imaging study, and endoscopy was required in 64% of cases to correctly establish the diagnosis.<sup>10</sup> Complications secondary to oesophageal perforations include wound breakdown, malnutrition, mediastinitis, oesophageal stricture, osteomyelitis, pneumonia, prevertebral or retropharyngeal abscesses,

**Table 1:** Showing incidence of esophageal perforation after anterior cervical spine surgery

Authors	Journal	Instrumentation	Complications	Management
Quadri et al <sup>1</sup>	Journal of Neurosurgery: Spine 2017	ACDF at the C2–3 level utilizing a polyetheretherketone (PEEK) cage	Tear in the posterior pharyngeal after three and half years	Surgical
Elgafy et al <sup>11</sup>	World J Orthop 2017	C4 and C5 partial Corpectomy, inferior screws pullout with plate migration	An esophagocutaneous fistula after 4 months	Conservative
Dakwar et al <sup>9</sup>	J Neurosurg Spine. 2009	After anterior cervical spine surgery.	5 cases of delayed esophageal perforations	Surgical
Hershman et al <sup>12</sup>	Global Spine Journal 2017	After anterior cervical spine surgery.	2 out of 9591 cases had intra-op perforation	Surgical

and tracheoesophageal fistulas.<sup>13</sup>

Though small esophageal perforations may heal with conservative management, it may take four to twelve weeks and there is a 20–45% incidence of abscess formation even with antibiotics usage.<sup>4</sup> Surgical repair is definitive management, so the perforation was repaired using Sternocleidomastoid muscle (SCM) flap after the cage was repositioned and fixed. SCM flap acts as a barrier between the esophagus and cervical spine. Post-operative intensive care plays a very important role in these patients. Appropriate wound care, broad-spectrum antibiotic therapy, blood and fluid management, care of tracheostomy tube, weaning from ventilator, proper nursing care of a quadriplegic patient, nutrition are all ICU concerns. In case we intubate such a patient with an endotracheal tube, extubation becomes a high risk. It is advisable to extubate over a soft 22F exchange catheter with an oxygen insufflation port. Patients must be monitored in ICU for at least 24 hours post-extubation. After cervical instrumentation, airway management becomes difficult, and, sometimes esophageal perforations have been reported in the difficult airway, so in case of re-intubation experienced anaesthesiologist should be present.<sup>14</sup>

#### 4. Conclusion

It is prudent to suspect a high risk of esophageal perforation that is a rare but known complication following anterior cervical spine surgery. Securing the airway can be challenging because of bleeding, distorted anatomy secondary to airway edema, and restricted neck movement as a result of spine fixation. Esophagoscopy, especially in patients presenting with dysphagia, may clinch the diagnosis of oesophageal perforation in patients with displaced implant.

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None.

#### 6. Conflict of Interest

The authors declare that there is no conflict of interest.

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