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DOI: 10.46903/gjms/21.03.1352

CASE REPORT

ESOPHAGEAL PERFORATION AFTER ANTERIOR CERVICAL SPINE SURGERY: A CASE REPORT

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ABSTRACT:

Esophageal perforation is a rare but well-known complication of anterior cervical spine surgery. We present a case report of 36- year- old male presenting with gradual painful left neck swelling, tenderness, fever, rigor, and chills, four months after anterior cervical spine surgery. After doing necessary investigations the patient was operated for pus drainage and esophageal perforation was also noticed during the surgery that was repaired along with hard ware removal. Later on due to wound complications the patient was referred to another higher center, where he was re-operated. After improvement he was received back in our hospital for follow-up management and then discharged after complete recovery.

KEY WORDS: Esophageal injury; ACDF; Anterior cervical spine; Fusion; Corpectomy; Discectomy; Cervical.

Cite as: Kadasah SK, Malik NW, Alqahtani AS, Alhamoud MAI, Dlboh SSA, Alqahtani AJS,, et al. Esophageal perforation after anterior cervical spine surgery: a case report [case report]. Gomal J Med Sci 2023 Jul-Sep;21(3):205-8. https://doi.org/1046903/gjms/21.03.1352

INTRODUCTION

Anterior cervical discectomy and fusion (ACDF) is a reliable surgical option that is frequently performed for various clinical conditions such as degenerative disc disease, myelopathy, neoplasm, and cervical spinal injury.[1, 2] ACDF is correlated with numerous potential life-threatening complications.[3] Since this operation required retraction and mobilization of neck structures, neurovascular injuries to vital structures such as the spinal cord and its roots, common carotid artery, jugular vein or vocal cord can lead to a devastating sequel.[4,5] Esophageal violation and perforation are feared complications following ACDF.[6] It's rare but potentially disastrous, and that can occur intraoperatively, early postoperative, or even in a delayed manner many years later.[3,7] A strong association between esophageal perforation and the catastrophic outcome is explained in the literature.[8] The incidence of post-ACDF esophageal perforation is estimated to be between 0.02 to 1.52%,[1] with up to 20% mortality rate even if treated within the first 24 hours, and rises to 50% when treatment is further delayed.[9]

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Date Submitted: 19-05-2023
Date Revised: 13-8-2023
Date Accepted: 02-09-2023

CASE REPORT

A 36-year-old male patient was admitted to the authors' hospital following a motor vehicle injury. Initially, he presented with a cervical spine fracture and dislocation of C3- C4 and associated spinal cord injury that subsequently resulted in quadriplegia. The patient was shifted to the operating room for neurosurgical intervention; he underwent anterior cervical decompression and fusion (ACDF) of C3-C4, corpectomy, and anterior plate and screw placement and fixation. As well as the patient was ventilation-dependent and tracheostomized in the same admission. Postoperatively, the patient was stable, looked well, had no early postoperative complications or new complaints, and was discharged to the nearest rehabilitation center and then to his home.

However, roughly four months later, the patient came to the ER as he developed a gradual painful left neck swelling and tenderness in addition to fever, rigor, and chills. Lab investigations revealed increased levels of neutrophils, a high C-reactive protein (CRP) level, and an erythrocyte sedimentation rate. Chest x-ray revealed a left side neck opacity and collection.

CT head and neck with contrast scan was requested and demonstrated well-fixed hardware without loosening or displacement (Fig-1), stable spine with

good cervical fusion, and a large collection of the prevertebral Danger space of the neck extending from the level of the anterior arch of C1 vertebra and down to the prevertebral posterior mediastinal space of the chest until above the diaphragmatic crus. And at the right side of the neck, it is almost encircling the right carotid sheath as well as the anterior triangle visceral space around the right thyroid gland, and it is about 17 cm along its lengths within the neck and chest and about 3.2 X 4.4 cm in maximum transverse diameters within the neck and shows fluid contents with regular relatively thick enhanced wall with and few air contents. Features are impressive of retropharyngeal abscess of the Danger space of the neck. Another collection at the anterior mediastinum slightly to the right retro-sternal space is seen about 3 X 1.7 X 1.8 cm in diameter, suggesting another abscess (Fig- 2). While antibiotic therapy was initiated, the patient was admitted and booked for neck abscess incision and drainage.

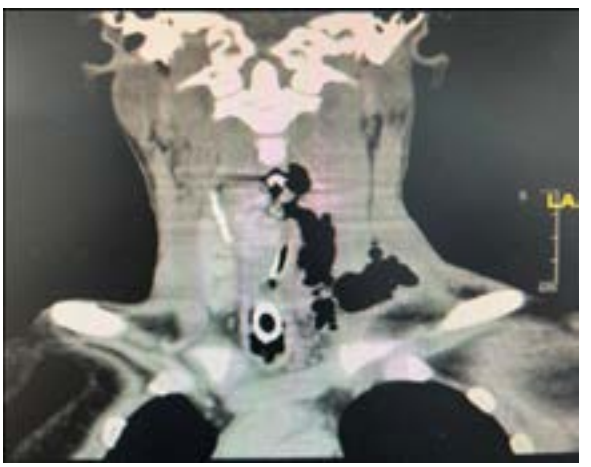

Fig. 1: Lateral CT scan of the cervical spine show proper placement of the plate from C3 to C4 without hard-ware failure.

The pre-operative examination did not demonstrate any airway or esophageal defects. Intraoperatively, wound re-exploration and pus drainage were done. But surgeons noted that a continuous serous fluid was coming out from a small cervical skin opening, the esophageal injury was suspected, and flexible esophagoscopy was done and showed an upper esophageal erosion and perforation with visible screws of the previous cervical fixation at the hypo pharyngeal region near the level of the cricoid cartilage. After the operation, the patient was admitted to ICU for close monitoring; oral intake was suspended and a nasogastric tube was placed to enable feeding. Intravenous antibiotics were administered. Daily 4 hourly wound dressing was applied with favorable progress without any new complaint or sign of local infection. Two weeks postoperatively, a contrast-medium swallowing study was performed and revealed there is an esophageal defect with contrast leakage from the posterior wall of the esophagus at the level of C6 vertebral body anterior to the cervical fusion plate as well as a cotonou esophageal fistula (Fig. 3).

Consequently, the patient was scheduled for anterior hardware removal and primary esophageal defect repair. The operation was performed by a team of neurosurgeons and otolaryngology surgeons.

Neurosurgeons started incision at the same site of the previous operation, and done dissection till plates and screws were visible (Fig. 4), no signs of hardware failure were seen, the anterior plate was stable and the screws were found to have a good solid fixation, the defect was identified at posterior cricoid cartilage level to be 2cm X 5 cm and a nasogastric tube was visible through the defect (Fig. 5). The anterior hardware was removed and evidence of a stable spine with a good cervical fusion was noticed, indicating that further stabilization was not considered obligatory. After that,

Fig. 2: Preoperative coronal CT scan showing neck swelling, a prevertebral abscess and air bubbles at the prevertebral space.

Otolaryngology surgeons started dissection and debridement of the fibrotic area around the esophageal defect and repaired primarily the Esophageal defect with fascia lata myofasciocutaneous flap, and muscle was approximated, incision closing and wound dressing was done and the patient was shifted to ICU.

After surgery, intravenous antibiotics were administered. Pressure dressing and negative wound drain were established, but on the fourth postoperative day, the patient complaint of fever, rigor, and chills. A foul smelled greenish wound discharge was observed. Wound and tracheostomy tube salivary discharge was seen, but there is no palpable swelling, crepitation, or wound dehiscence. Letter on patient developed necrotizing fasciitis and graft failure. Early aggressive neck exploration and debridement of necrotic tissue were done. The patient was placed

on broad-spectrum parenteral antibiotic therapy and wound dressing was continued till the patient improved, then he was transferred to a higher center for revision esophageal repair using sternocleidomastoid muscle flap that ended successfully and the patient shifted back to our institution to continue the management.

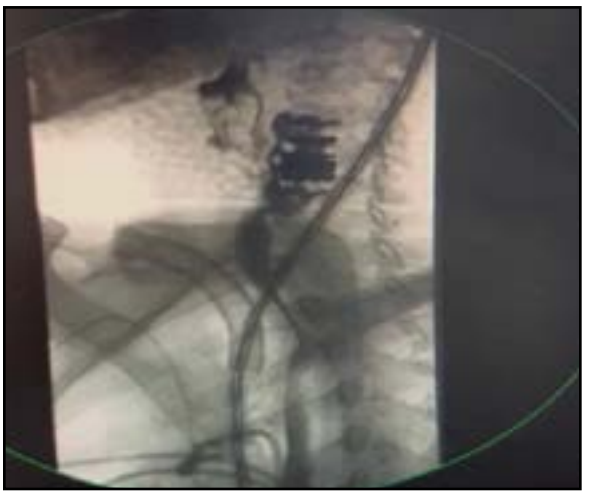

Fig. 3: A contrast-medium swallowing study revealed an esophageal defect with contrast leakage from the posterior wall of the esophagus at level of C6 vertebral body.

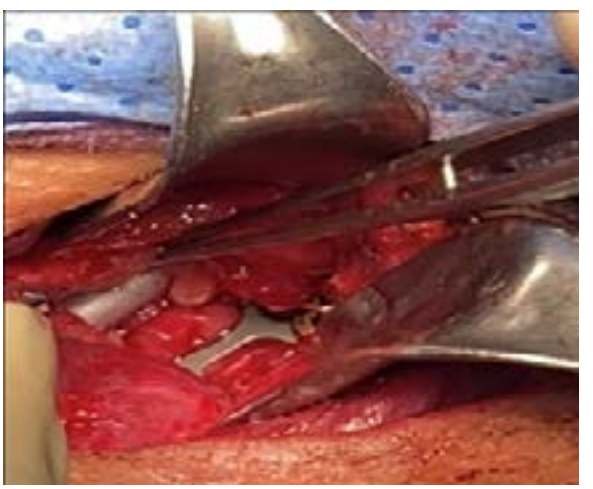

Fig. 4: An esophageal wall defect and a nasogastric tube (arrow) were visible just anterior to the cervical plate.

DISCUSSION

Esophageal perforation after anterior cervical spine surgery is a rare but dreadful complication that can evolve into potentially catastrophic results. Unfortunately, early detection of patients with esophageal perforation can be challenging as the clinical presentation and initial onset are highly variable. Once an esophageal injury is suspected, an instant diagnostic work-up should be initiated to confirm the presence of a perforation, its morphologic characteristics, and associated lesions.[10]

A plain neck X-ray can be useful for detecting indirect signs such as subcutaneous emphysema, prevertebral air, graft failure, and hardware dislodgment. A Neck CT scan could detect the presence of prevertebral abscess and graft displacement.[5] However, despite normal radiographic findings in some patients, a negative radiographic workup does not rule out the possibility of esophageal perforation, and therefore, imaging studies are not always conclusive and must be used as adjuvant diagnostic tools.[11] Esophagoscopy or esophagography can locate perforation more accurately by showing the spillage of dye via the fistula or in the adjacent tissues.[12] The patient in the current report had a prior corpectomy and presented with Painful neck swelling, fever, and saliva draining from an anterior cervical wound, indicating chest collection and esophageal fistula. X-ray and contrast CT scan was used to assess the integrity of the chest and esophageal wall which revealed prevertebral collection. later on, a barium swallow study and esophagoscopy were performed to confirm the diagnosis and define the location and extent of perforation.

Appropriate management of esophageal perforation is extremely vital since its associated mortality rate is high. Early neck exploration with anterior hardware removal, surgical repair of the perforation reinforced by a sufficient flap, short-term esophageal rest through NGT placement, and intravenous antibiotics are imperative in the majority of esophageal complications and multiple approaches are existing there. The best strategy is to perform a permanent closure of the perforation in a safe and fast manner and without any postoperative complications.[13] Conservative management may be effective in the setting of early small perforation with a well-contained defect and without signs of septicemia. This approach consists of extra-oral feeding via parenteral or enteral nutrition, prolonged wide-spectrum antibiotic therapy, and close observation.[14]

If perforation is evident intraoperatively, primary repair with or without flap reinforcement will suffice. If detected in the early postoperative period, suturing with drain placement to avoid any collection might be enough. Large perforation usually requires reinforcement with muscle or omentum. In late postoperative perforations, a muscle flap is essential to restore the integrity of the esophagus.[5] An appropriate flap selection is essential to provide adequate perforation coverage and to avoid flap failure.

Our patient was treated with anterior hardware removal, esophageal defect repairment with reinforcement using fascia lata myofasciocutaneous flap, intravenous antibiotics, pressure dressing, and negative wound drain. However, the patient began to show signs of recurrent esophageal leakage, as well as necrotizing fasciitis, the patient was transferred to

a higher center for revision esophageal repair where early aggressive neck exploration and debridement of necrotic tissue were done, wound left completely open, and irrigation and drainage continued as it shows a great role in the healing and allows better control over infection.[15] Latter on SCM flap was done that ended with success and the patient came back to our institution for follow up.

Conclusion

Esophageal perforation following anterior cervical spine surgery is a rare but potentially serious complication that can lead to a catastrophic outcome. Early detection of patients with esophageal perforation can be challenging as the clinical presentation and initial onset are highly variable. Greater vigilance is obligatory in the initial assessment of patients with unexplained fever, respiratory distress, persistent dysphagia, or wound complications after ACDF. Appropriate management of esophageal perforation is extremely vital. This case highlights the necessity for early detection, appropriate management, and proper long-term follow-up, particularly in patients with ACDF.

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CONFLICT OF INTEREST
Authors declare no conflict of interest.
GRANT SUPPORT AND FINANCIAL DISCLOSURE
None declared.