



Case Report

Life-threatening delayed arterial hemorrhage following anterior cervical spine surgery: A case report and literature review

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ABSTRACT

Background: One of the most serious and potentially life-threatening adverse events associated with anterior cervical spine surgery is postoperative hematoma with acute airway obstruction. The causes of unpredicted delayed bleeding are, however, not fully elucidated. Here, we report a case of delayed arterial bleeding and sudden airway obstruction following a two-level ACDF.

Case Description: A 52-year-old male presented with the right paracentral disc herniations at the C4–C5 and C5–C6 levels. A two-level ACDF was performed. Notably, on the 5th postoperative day, the patient developed an acute respiratory distress due to a large right lateral retrotracheal hematoma requiring emergency evacuation at the bedside. This was followed by formal ligation of a branch of the right superior thyroid artery in the operating room. In addition, an emergency tracheotomy was performed. By postoperative day 15, the tracheotomy was removed, and the patient was neurologically intact.

Conclusion: A superior thyroid artery hemorrhage should be suspected if a patient develops delayed neck swelling with or without respiratory decompensation several days to weeks following an ACDF. Notably, these hematomas should be immediately recognized and treated (i.e., decompression starting at the bedside and completed in the operating room) to prevent catastrophic morbidity or mortality.

Keywords: Anterior cervical discectomy and fusion, Delayed hemorrhage, Superior thyroid artery

INTRODUCTION

Anterior cervical discectomy and fusion (ACDF) is one of the most commonly performed spinal operations.^[10,13] Following ACDF, life-threatening postoperative acute and occasionally delayed hematomas with airway obstruction are observed warranting emergent/urgent decompression/vessel ligation.^[14,18] Herein, we reported a 52-year-old male who developed delayed arterial bleeding from a branch of the superior thyroid artery 5 days following a C45–C56 ACDF. He acutely presented with airway obstruction, warranting an emergency tracheotomy, reopening of the wound at the bedside for clot debridement followed by the

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formal surgical intervention of hematoma evacuation and vascular ligation.

MATERIALS AND METHODS

Scopus and PubMed databases were queried using individual keywords and MeSH terms for identifying postoperative ACDF hematomas due to superior thyroid artery branch dissections.

CASE DESCRIPTION

A 52-year-old male presented with bilateral cervicobrachialgia, bilateral arm paresthesias, and tetraparesis. The magnetic resonance imaging showed the right paracentral disc herniations at the C4–C5 [Figure 1a] and C5–C6 [Figure 1b] levels causing anterolateral cord compression and clinically, cervical myelopathy-radicalopathy. A routine uneventful two-level ACDF was performed, utilizing PEEK (polyether ketone) interbody devices, without a drain. The patient was discharged on the 2nd postoperative day. However, on postoperative day 5, he developed the sudden onset of cervicalgia with neck rigidity and respiratory distress; the immediate concern was for acute cage dislodgement. The cervical CT scan with/without contrast showed marked enlargement of the retrotracheal space due to an extensive hematoma [Figure 2] in the right lateral/retrotracheal soft tissues; with contrast, the bleed appeared to originate from a branch of the right superior thyroid artery [Figures 3 and 4]. The patient required acute reopening of the wound at the bedside to begin evacuation of the hematoma. After an urgent open tracheotomy, the hematoma was evacuated and the branch of the superior thyroid artery was ligated/coagulated. A subcutaneous drain

was left in place and removed a day later. The postoperative CT scan confirmed near-total evacuation of the hematoma [Figure 5]. The patient was weaned from the ventilator, and the tracheostomy was removed on the 15th postoperative day. Notably, the patient sustained no permanent neurological sequelae and was routinely discharged home at that time.

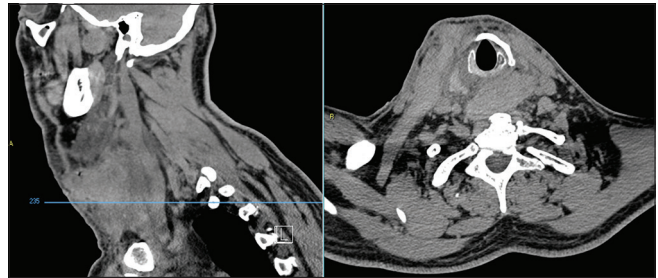


Figure 2: Sagittal (left) and axial (right) CT scan sequences showing a significant right laterocervical and retrotracheal hematoma determining compression of the upper aerodigestive structures.

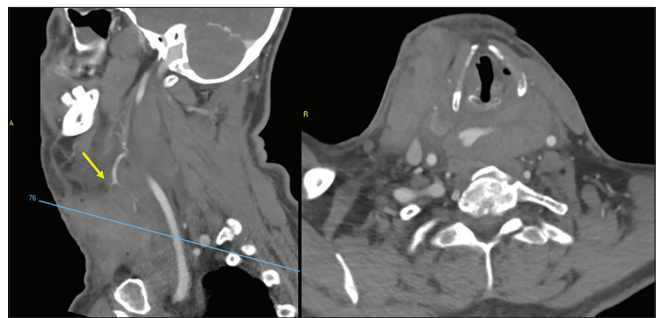


Figure 3: Sagittal (left) and axial (right) CT angiography scan sequences showing a grown up hematoma a few minutes away, the yellow arrow indicates the origin of the bleeding from the right superior thyroid artery.

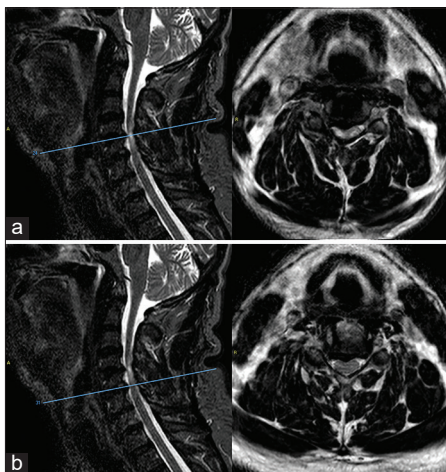


Figure 1: Sagittal (left) and axial (right) T2-weighted MRI sequences showing right paracentral disc herniation at C4–C5 (a) and C5–C6 (b) levels and myelopathy-associated spinal cord hyperintensity.

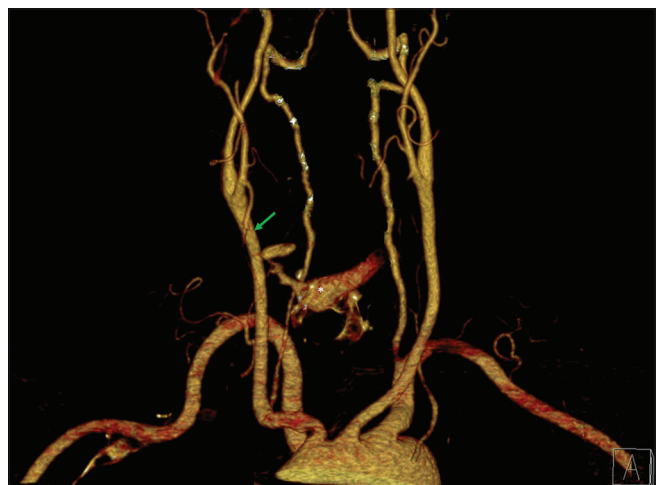


Figure 4: 3D CT angiography reconstruction of the epi-aortic arterial vessels: the green arrow highlights the point of leakage (*) of the contrastum medium from the right superior thyroid artery.

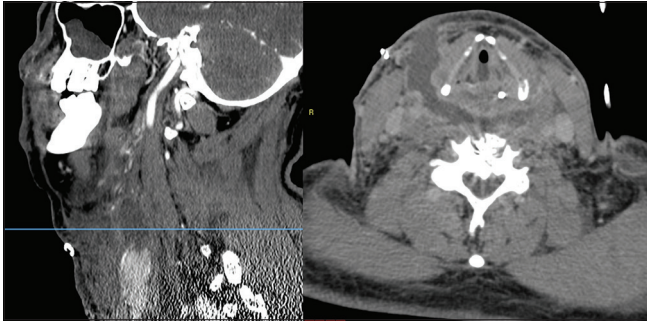


Figure 5: Post-operative sagittal (left) and axial (right) CT angiography scan sequences proving the successful evacuation of the retro-tracheal hematoma and the absence of further vessel abnormalities.

DISCUSSION

Anterior cervical spine operations are among the most commonly performed procedures among spine surgeons and have low complication rates.^[7,2,10,13] Although postoperative retropharyngeal hematomas are rare, typically occurring within hours of surgery, they can lead to acute airway compromise.^[14-17] Therefore, immediate recognition and removal are critical to limit morbidity and mortality.

Etiology of superior thyroid artery dissection

The etiology of superior thyroid artery dissection in our case remained unclear. Yu *et al.*^[19] described major vascular injuries occurring during anterior cervical spine surgery, consisting typically of VAIs, due to excessive soft-tissue retraction (i.e. of longus colli musculature particularly distally at the C56/C67 levels, where they diverge with the distance between the bellies enlarging to an average of 14 mm) and/or excessive lateral drilling of disc/bone.^[6,5,9]

Time of onset of postoperative hematomas due to ACDF

Most vascular arterial complications of ACDF are detected intraoperatively or in the early postoperative period.^[6] Most hematomas become symptomatic within the first 6–12 postoperative hours.^[8,4,12] Song *et al.* and O'Neill *et al.* found 65–67% incidence of retropharyngeal hematomas within 24 h of ACDF surgery; the remaining 33–35% of hemorrhages occurred within 3–6 postoperative days.^[11,16] Certainly, late hemorrhages may be suspected if vascular damage occurred intraoperatively (e.g. although it was controlled with tamponade and/or initial normal angiography); delayed pseudoaneurysm formation and rerupture can occur.^[5,9] Of interest, Bovonratwet *et al.* found in his series of ACDF that 37% of postoperative hematomas requiring reoperations occurred postdischarge (e.g. within the 1st postoperative month).^[3]

Delayed arterial bleeding leading to postoperative ACDF hematomas

Few cases report delayed arterial postoperative hematomas after ACDF. In our patient, the postoperative hemorrhage from a branch of superior thyroid artery was encountered on the 5th postoperative day. One report in the literature cited a hemorrhage following a C34/C45 ACDF as occurring 16 days postoperatively; it too was due to a superior thyroid artery dissection.^[19] In that case, as the carotid angiogram showed dye extravasation from the right superior thyroid artery, it was successfully embolized with coils. Other cases of iatrogenic vertebral artery injury occurring during ACDF may warrant intraoperative/postoperative angiography, embolization, occlusion, and/or direct repair.^[1,5,6]

CONCLUSION

Retropharyngeal hematomas are rare following anterior cervical surgery. They typically present acutely, within 6–12 postoperative hours, and occasionally from 3 to 7 days to up to 1 month postoperatively. Here, we presented a patient with a retrotracheal hematoma occurring 5 days following a C45/56 ACDF attributed to a hemorrhage from a branch of the superior thyroid artery.

Declaration of patient consent

Patient's consent not required as patients identity is not disclosed or compromised.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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