

Case Report

Cervical edema after anterior cervical fusion, a rare but potentially fatal complication: a case report

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ABSTRACT

Anterior approaches to the cervical spine can be performed for spine decompression and instrumentation in many pathologic conditions. Cervical spine surgeries complicate in 5.3% of cases, with anterior procedures representing 65% of them. Airway compromise requiring tracheostomy or reintubation is rare but may lead to potentially catastrophic complications. There are several causes for airway compromise, including post-operative cervical swelling or hematoma, pharyngeal edema, cerebrospinal fluid (CSF) leak, angioedema, and graft or implant displacement. We present a case of a 57-year-old male with chronic neck and left radicular pain. He was submitted to C5-C6 anterior cervical disc fusion that was complicated with airway compromise in the orthopedics ward. The patient required emergent reintubation for airway protection, wound exploration and intensive care. Hematoma is often the first diagnosis to consider in the immediate postoperative period. A low threshold for intubation should be maintained. After airway protection, it is essential to differentiate etiologies, to guide subsequent management.

Keywords: Cervical edema, Anterior cervical fusion, Airway compromise, Surgical complication

INTRODUCTION

Anterior approaches can be performed for spine decompression and instrumentation in many pathologic conditions.^{1,2}

Cervical spine surgeries complicate in 5.3% of cases, with anterior procedures representing 65% of them.³ They include transient sore throat, dysphagia, hoarseness, dysphonia, recurrent laryngeal nerve paralysis, esophageal perforation, and respiratory insufficiency as a result of upper airway obstruction.²

Causes include post-operative cervical swelling or hematoma, pharyngeal edema, cerebrospinal fluid (CSF) leak, angioedema, and graft or implant displacement.²

Postoperative hematoma occurs in up to 2.4% of anterior approaches.⁴ About 2% of patients undergoing single-level anterior cervical discectomy and fusion (ACDF) may require reintubation and up to 5.2% in multilevel surgery.⁴ Retropharyngeal space is a potential location for hematomas.⁴

Operative times approaching or exceeding 5 hours (h), exposure of four or more vertebral bodies including C4 or higher appear to be associated with high risk for postoperative airway complications.²

CASE REPORT

We present a case of a 57-year-old male, active smoker, with uncontrolled hypertension, with chronic neck and left radicular pain. Magnetic resonance imaging showed C5-C6 spondylosis with left foraminal stenosis (Figure 1).

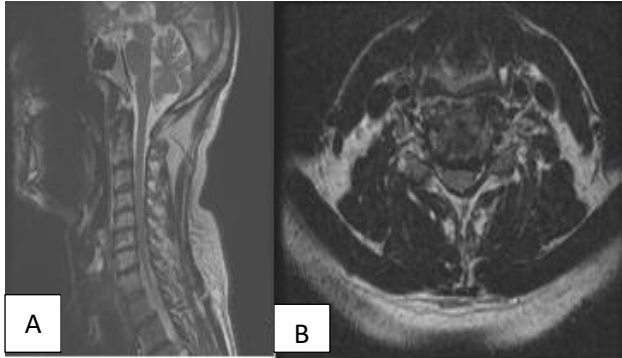


Figure 1: Pre-operative MRI (A) Sagittal image demonstrating C5-C6 and C6-C7 spondylosis. (B) Axial C5-C6 level with severe left foraminal stenosis.

Under general anesthesia, a left-sided anterior cervical approach was performed with C5-C6 discectomy and fusion with cage.

Doubts regarding a possible iatrogenic dural tear, thus a lyophilized concentrate of fibrinogen, aprotinin and thrombin and a hemostatic gelatin sponge were applied. Before wound closure no CSF leak was visible. A surgical drain was placed. The anesthesia lasted 3 hours with an estimated blood loss of 100 ml. The patient maintained difficult-to-control hypertension.

In post-anesthetic care unit (PACU) patient complained of pain, mild dysphagia, and hoarseness. The patient was discharged from PACU to ward 3 h after end of surgery.

In ward, patient maintained high BP. Approximately 9 hours after surgery, cervical edema (Figure 2) was noted in association with progressive dyspnea, worsening dysphonia, and dysphagia. Internal emergency was activated and emergent re-intervention was planned.



Figure 2: Clinical presentation before wound exploration.

Nasal video fibroscopy intubation was unsuccessfully attempted. A clinical deterioration ensued with increasing agitation followed by an altered state of consciousness, hypoxemia, and near cardiopulmonary arrest. The patient was intubated with a video laryngoscope where generalized oropharynx edema and structural distortion were observed.

On wound exploration no active bleeding or cerebral spine fluid was observed.

A cervical CT-scan was performed on the 2nd post-operative day (POD) revealing an extensive hematoma (10x2.05x7.46 cm) (Figure 3A and B) on the pre-vertebral space from C2 to C6 that extended to the carotid and parapharyngeal space bilaterally. It was also visible a total collapse of the hypopharynx surrounding the OT tube and a mediastinal hematoma. A CT on the 4th POD and showing a slight reduction in hematoma (9.36x1.69x6.19 cm) (Figure 3 C and D). The patient was extubated on the 5th POD.

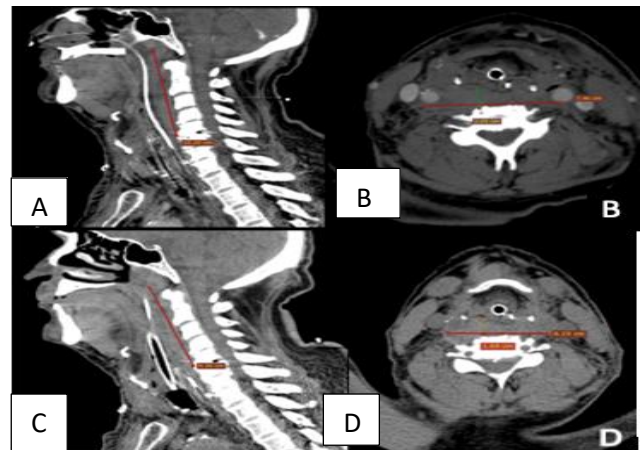


Figure 3: TC after wound exploration (A) Sagittal 2nd POD, (B) Axial 2nd POD, (C) Sagittal 4th POD, (D) Axial 4th POD.

The patient was transferred to the orthopedic ward on the 7th POD. The stay in the ward was uneventful, and was discharged on the 9th POD with only residual dysphagia and dysphonia.

On the first postoperative outpatient evaluation, the patient referred improvement of the cervical and radicular pain, no longer complained of dysphagia nor dysphonia.

DISCUSSION

Respiratory distress after ACDF may progress from being asymptomatic to having partial or complete airway obstruction within a few minutes or gradually over several days. Early on, they may complain of difficulty breathing, swallowing, and talking, exacerbated in the supine position. Patients may complain of choking, that the cervical collar is too tight or voice changes even though, oxygen saturation will often remain normal.⁵

Etiologies of acute postoperative airway compromise present in a predictable timeline, with most adverse airway events occurring 24-48 hours after surgery. Angioedema is seen as the earliest cause, typically within 6-12 hours. Retropharyngeal hematomas can be seen between 6-24 hours. Pharyngolaryngeal edema is seen within 24-72 hours. After 72 hours, a retropharyngeal abscess is the most likely etiology.⁴

Following the previously described chronology, it is necessary to think in cervical angioedema and retropharyngeal hematoma. In either case, if the airway obstruction is significant or progressive, a low intubation threshold should be maintained as patients may progress rapidly to respiratory failure.⁶

It is essential to differentiate these two entities because subsequent management is distinct. With a retropharyngeal hematoma, evacuation of the hematoma will relieve symptoms while in angioedema not. Most cases of angioedema are treated with corticosteroids, antihistamines or epinephrine, maintaining a low intubation threshold.⁴ If present, swelling of the tongue is perhaps the most clinically obvious sign distinguishing angioedema from a cervical hematoma.⁶

Hematoma is commonly the first diagnosis to consider in the presence of upper airway obstruction in the immediate postoperative period, that may result from inadequate control of arterial or venous bleeding, or secondarily to coagulopathy, increased BP, or elevated venous pressure due to the Valsalva effect of coughing at the time of extubation.^{4,5}

Pressures present in neck hematomas were not enough to compress a trachea, and that obstruction was probably due to supraglottic edema caused by laryngeal venous obstruction.⁷ A study demonstrated that the maximum pressure achievable from a hematoma developing after neck surgery was not enough to cause direct obstruction of the airway.⁸ Thus, compression of the venous system leads to supraglottic edema and airway obstruction.⁸

A hematoma can also directly act via a “mass effect” causing compression of the carotid sinus, promoting a baroreflex-mediated sudden hemodynamic instability, with bradycardia and hypotension, which promptly reverts with the evacuation of the hematoma.⁹

The authors believe that, given the presence of supraglottic edema during intubation and hematoma on CT, probably the cause of airway obstruction, in this case, was compression of the venous system after hematoma.

Other causes like CSF leak, graft or implant displacement, hypersensitivity, or allergic/anaphylactoid reactions also described in literature and must be taken into account.²

CONCLUSION

The diagnosis of airway complications is essential since they can be catastrophic. The team, and the patient, should be aware of the warning signs. A low threshold for intubation should be maintained, as delayed intubation can be increasingly difficult or even impossible. After airway protection, it is essential to differentiate etiologies, to guide subsequent management.

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