Minimizing the Risk of Retropharyngeal Hematoma After Anterior Cervical Spine Surgery: An 8-Point Checklist Before you Close

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Citation

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Abstract

Retropharyngeal hematoma with associated airway compromise is a feared and potentially catastrophic complication after anterior cervical spine surgery. The anterior approach to the cervical spine is commonly used for a variety of cervical spine diseases. This approach has been well described, as have been the potential complications. The most common reported complications include dysphagia, hematoma, and recurrent laryngeal nerve palsy. Meticulous surgical technique is always of paramount importance to minimize the risk of complications and maximize successful treatment outcomes. The authors propose a systematic evaluation method for the anterior cervical wound prior to closure to aid in minimizing the risk of airway compromise due to post-operative retropharyngeal hematoma. Described is an eight-point checklist of pertinent anatomic structures to evaluate for complete hemostasis prior to closing the surgical wound.

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INTRODUCTION

Although an uncommon complication after anterior cervical spine surgery (ACSS), retropharyngeal hematoma with associated airway compromise has potentially catastrophic consequences. This paper will focus on minimizing the risk of this complication by using a systematic evaluation method of the surgical wound prior to closure. The authors will describe an eight-point checklist of pertinent anatomic structures to evaluate for complete hemostatis prior to closure of the surgical wound.

To our knowledge there have been no reports in the peer-reviewed literature regarding this topic. We performed a Pubmed search of the English literature from 1966 to December 2007 using the keywords, “retropharyngeal hematoma”, “airway compromise”, “post-operative”, “anterior cervical spine”, “surgery”, and “complication”. No results were found concerning subject.

BACKGROUND

The anterior approach to the cervical spine is one of the most commonly used approaches in all of spine surgery. Many different pathologic conditions may be treated with this approach. Degenerative disease of the cervical spine may be addressed with anterior cervical discectomy and fusion (ACDF) or corpectomy. Fusion surgery may be performed with a variety of instrumentation techniques as well as the use of autograft or allograft. Traumatic, infectious, and neoplastic conditions of the cervical spine may also be addressed via this approach.

The first description of this surgical approach was in 1955 by Robinson and Smith [1]. The potential complications of this approach have been well described. These include sore throat, dysphagia, hoarseness, dysphonia, recurrent laryngeal nerve paralysis, esophageal perforation, and respiratory insufficiency secondary to upper airway obstruction [2]. The most common complications of this approach according to Fountas et al. [3] are dysphagia (9.5%), hematoma (5.6%), and recurrent laryngeal nerve palsy (3.1%). Other less common complications described by Fountas et. al [3] were cerebrospinal fluid (CSF) leak (0.5%), esophageal perforation (0.3%), and temporary unilateral Horner’s syndrome (0.1%).

Pickett et al. described a case of retropharyngeal hematoma requiring evacuation after cervical disc arthroplasty [4]. Roy [5] reported a case of a 65 year-old woman status-post uncomplicated anterior cervical discectomy who presented to the emergency department (ED) with tachypnea,

diaphoresis, anterior neck swelling, and tracheal deviation. The patient's status decompensated acutely with "near-respiratory arrest". The incision was opened in the ED and a gloved finger was used to evacuate the hematoma. This resulted in complete relief of the compromised airway. Other reports found regarding airway compromise after ACSS describe causes such as edema, angioedema, CSF leak, or hardware complications [6-10].

In a review of 1015 patients undergoing first time ACDF, Fountas et al. [3] reported 57 patients (5.6%) who presented with clinically evident post-operative soft tissue hematoma. These patients presented with symptoms of severe dysphagia, respiratory difficulty, and/or painful neck swelling. Of these 57 patients, 24 (2.4%) required emergent surgical evacuation of the hematoma. The remaining 33 patients (3.2%) were successfully managed with close observation. It should be noted that none of these patients had a bleeding diathesis or coagulapathy. Also noted was no statistically significant difference regarding the development of post-operative hematoma and those treated with or without a cervical plate.

The importance of meticulous surgical technique is well known to minimize the risk of complications and maximize successful treatment outcomes. In order to achieve this surgeons often employ systematic and reproducible methods of evaluation and treatment for given pathologies. This technique aids in optimizing surgical efficiency while decreasing the likelihood of missing pathology. Regarding ACSS, each surgeon has likely developed individual surgical tactics, which are followed for the reasons mentioned above. The authors propose an eight-point checklist (Table 1) of pertinent anatomic structures to evaluate for hemostasis to aid in minimizing the risk of post-operative retropharyngeal hematoma and associated airway compromise after ACSS.

Figure 1

Table 1: eight-point checklist of pertinent anatomic structures

1	Cervical vertebrae
2	Longus colli
3	Trachea
4	Esophagus
5	Carotid sheath and contents
6	Superior and Inferior thyroid artery
7	Anterior and External Jugular veins
8	Platysma and skin edges

TECHNIQUE

After completion of the surgical procedure all retracting devices should be removed, as increased tissue pressures will tamponade bleeding sites. A handheld retractor (such as a cloward retractor) should be introduced into the wound and manipulated appropriately for visualization. Bipolar electrocautery and thrombin-soaked gelfoam should be readily available on an as needed basis.

The patient's blood pressure (BP) should be noted and compared to pre-anesthesia values. If there is a significant discrepancy with a lower intra-operative BP noted, than the anesthesiologist should be asked to raise the patient's BP to approximate pre-anesthesia values. The authors' feel this is valuable as it allows the surgeon to address any occult bleeding sites, which may not have been noticed when the patient's BP is decreased.

The evaluation process begins in the deep aspects of the surgical wound and continues superficially. The first structures evaluated are the cervical vertebrae, particularly if Caspar pins have been used for distraction purposes. If bleeding is noted then thombin-soaked gelfoam or bone wax should be applied appropriately.

Second to be evaluated are the longus colli, with particular attention paid to their medial borders, under which retractor blades are typically placed during the procedure. These muscles have a tendency to ooze along their medial borders and may result in an occult bleeding site after retractor removal. The third and fourth structures evaluated are the esophagus and trachea, respectively, along the medial aspect of the wound. These structures should be examined along the length of the wound with any associated perforating vessels, which may have been disrupted.

Depending on the superior and inferior extent of the dissection, the fifth set of structures evaluated are the superior and inferior thyroid arteries and veins, respectively. It is known that these vessels are not always directed visualized, however, anastomosing vessels, which may have been disrupted, must be identified and coagulated.

Moving to the lateral aspect of the wound, the sixth structure evaluated is the carotid sheath and its contents. The carotid pulse should be palpated and sheath contents visualized for signs of bleeding or sheath compromise along the length of the wound. As the examination continues superficially the seventh set of structures to be evaluated are the anterior and external jugular veins as well as associated anastomosing vessels, which may have been disrupted during the initial dissection process.

The eighth and final examination of the wound should be performed after copious irrigation and removal of the handheld retractor. Attention should be paid to the platysma and skin edges and it should be made sure that there is no oozing coming from the deeper aspects of the wound. Once complete hemostasis is assured, a drain is placed at the discretion of the surgeon and the wound is closed in standard fashion.

CONCLUSION

Airway compromise due to post-operative retropharyngeal hematoma after ACSS, although uncommon, has potentially catastrophic consequences. The importance of meticulous surgical technique in order to minimize potential complications and maximize treatment outcomes cannot be overstated. This can be aided through the use of systematic and reproducible surgical techniques. The authors propose a systematic evaluation method for the anterior cervical wound prior to closure to aid in minimizing the risk of airway compromise due to post-operative retropharyngeal hematoma. An eight-point checklist of pertinent anatomic structures to evaluate for hemostasis prior to closing the surgical wound has been described.

References

1. RobinsonRA, Smith GW. Anteriorlateral cervical disc removal and interbody fusion for cervical disc syndrome. Bull Johns Hopkins Hosp. 1955;96:223-4.
2. Sagi HC, Beutler W, Carroll E, Connolly PJ. Airway Complications Associated With Surgery on the Anterior Cervical Spine. Spine. 2002;Vol.27,No.9:949-53.
3. Fountas KN, Kapsalaki EZ, Nikolakakos LG, Smisson HF, Johnston KW, Grigorian AA, Lee GP, Robinson JS. Anterior Cervical Discectomy and Fusion Associated Complications. Spine. 2007;Vol.32,No.21:2310-17.
4. Pickett GE, Sekhon LH, Sears WR, Duggal N. Complications with Cervical Arthroplasty. J Neurosurg Spine. 2006;Feb;4(2):98-105.
5. Roy SP. Acute Postoperative Neck Hematoma. Am J Emerg Med. 1999;May 17(3):308-9.
6. Emery SE, Smith MD, Bohlman HH. Upper-airway obstruction after multilevel cervical corpectomy for myelopathy. J Bone Joint Surg Am. 1991;73:544-5 .
7. Krnacik MJ, Heggeness MH. Severe Angioedema Causing Airway Obstruction After Anterior Cervical Spine Surgery [Case Report]. Spine.1997;Vol. 22 (18)15:2188-90.
8. Wong DT, Fehlings MG, Massicotte EM. Anterior Cervical Screw Extrusion Leading to Acute Upper Airway obstruction: Case Report. Spine. 2005;Nov 15;30(22):E686-6.
9. Riew KD, Sethi NS, Devney, Goette K, Choi K. Complications of Buttress Plate Stabilization of Cervical Corpectomy. Spine. 1999;Nov 15;24(22):2404-10.
10. Penberthy A, Roberts N. Recurrent Acute Upper Airway Obstruction after Anterior Cervical Fusion. Anaesth Intensive Care. 1998;26:305-7.

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