

CASE REPORT

Prolonged Hoarseness Caused by Arytenoid Dislocation After Anterior Cervical Corpectomy and Fusion

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Study Design. A case of arytenoid dislocation after anterior cervical corpectomy and fusion (ACCF) is reported.

Objective. To emphasize that arytenoid dislocation could be a possible cause of prolonged hoarseness in patients after ACCF.

Summary of Background. Prolonged hoarseness is a common postoperative complication of cervical surgeries, especially in the anterior approach. Postoperative hoarseness is usually associated with paresis of the recurrent laryngeal nerve (RLN). However, other causes such as arytenoids dislocation, which is often misdiagnosed as RLN palsy, should not be ignored either.

Methods. We reported one case of arytenoid dislocation after ACCF and reviewed the related literatures.

Results. One patient treated with ACCF experienced prolonged postoperative hoarseness. Arytenoid dislocation was confirmed by laryngoscopy examination and three-dimensional computed tomography (CT) scan. To deal with the problem, a closed reduction of cricoarytenoid joint was performed under general anesthesia. Fortunately, the motion of vocal fold became nearly back to normal after surgery and the patient recovered uneventfully. He was satisfied with the clinical outcome at the final follow-up.

Conclusion. Arytenoid dislocation should never be ignored in the differential diagnosis of prolonged postoperative hoarseness after ACCF. This situation can be confirmed by CT scan, vocal cord electromyography (EMG), fiberoptic laryngoscopy, or

strobolaryngoscopy. Once the diagnosis is established, appropriate treatment should be considered immediately.

Key words: anterior cervical corpectomy and fusion, arytenoid dislocation, prolonged hoarseness.

Level of Evidence: 3

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The anterior approach of the cervical spine was introduced by Southwick and Robinson in 1957 and has become to be one of the ‘golden-standard’ procedures since then.¹ Along with the widely performance of this procedure, some complications have been noticed and one of them is hoarseness. Kahraman *et al*² reported that about 1.27% patients suffered hoarseness after anterior cervical approach. The hoarseness may attribute to factors, such as recurrent laryngeal nerve (RLN) palsy and arytenoid dislocation. Arytenoid dislocation is a rather rare complication of operations, and it is mostly related to endotracheal intubation or blunt trauma.³ A study of prolonged hoarseness and arytenoid dislocation after tracheal intubation showed that the incidence of arytenoid dislocation was 0.097%.⁴ However, there is few report regarding the arytenoid dislocation after anterior cervical surgery, and therefore it is important to recognize and differentiate it from RLN palsy. Here, we report a case of arytenoid dislocation after anterior cervical corpectomy and fusion (ACCF).

CASE REPORT

A 64-year-old man diagnosed with cervical spondylotic myelopathy underwent ACCF of C5 with instrumentation. The past medical history of the patient included diabetes, abdominal aortic dissection, and benign prostatic hyperplasia. The anesthetic procedure went smoothly and a corpectomy of C5 was performed anteriorly on the right side. Central and bilateral decompressions were completely achieved, and a Titanium Mesh was inserted at the C5 with a Titanium Plate fixed from C4-C6. The RLN was not visualized during the procedure and the operative time

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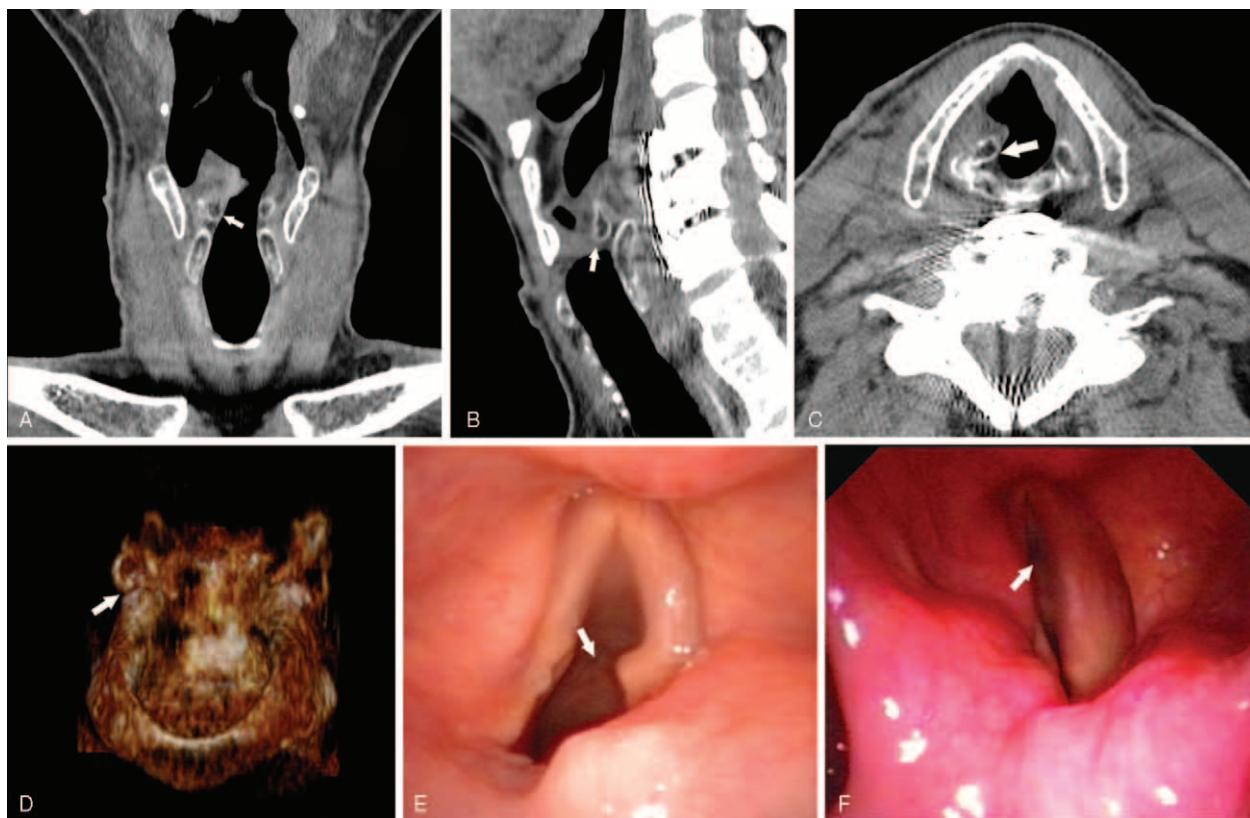


Figure 1. A: Coronal images of high-resolution CT scanning shows dislocation of the right arytenoid cartilage inward. (As shown in the white arrow). B: Sagittal images of high-resolution CT scanning shows dislocation of the right arytenoid cartilage forward. (As shown in the white arrow). C: Axial images of high-resolution CT scanning shows dislocation of the right arytenoid cartilage in front inward shift. (As shown in the white arrow). D: Three-dimensional CT view shows asymmetry in the joint space with a wider space on the right(As shown in the white arrow). E: Laryngoscopic view shows poor mobility of the right vocal fold(As shown in the white arrow). F: Laryngoscopic view shows incompetent glottal closure of the right vocal fold (As shown in the white arrow).

was about 120 minutes. The time for transverse and lengthways retraction was about 60 minutes. The endotracheal tube cuff was inflated to the sealed pressure. The preoperative symptom of numbness of the upper extremities was alleviated immediately after the operation. However, he complained of newly developed hoarseness after recovery from general anesthesia. At first, he was suspected to have suffered a throat discomfort which was commonly seen among the postoperative patients who underwent general anesthesia. On postoperation day 1, the symptom of hoarseness became worse with bucking when drinking. We ordered laryngoscopy examination and three-diamentional CT scan of cricoarytenoid joint and ENT and anesthesiology consultation for this patient. The results showed that the vocal fold motion was reduced and an arytenoid dislocation on the right side was found (Figure 1). Then close reduction of the dislocated arytenoids was performed by ENT doctor under general anesthesia. The arytenoid was pushed backward during the procedure, and the motion of vocal fold became nearly back to normal after surgery. A louder and clearer verbal pronunciation. The patient recovered uneventfully and was satisfied with the clinical outcome. The laryngoscopy examination and three-dimensional CT

showed the reduction of the arytenoid dislocation at 6 weeks postoperation (Figure 2).

DISCUSSION

Arytenoid dislocation was first reported by Komorn in 1973.⁵ Since then, more and more cases of arytenoid dislocation have been reported and endotracheal intubation has been considered as the common cause of these cases.^{3,6-8}

The cricoarytenoid joint is diarthrodial, which is composed of the articulation of the pyramidal-shaped arytenoid cartilage and the elliptical cricoid facet, with a synovium-lined capsule.⁸ The complex motion of the cricoarytenoid joint renders abduction and adduction of the true vocal folds, which is critical for the phonation. Once arytenoid dislocation occurs, patients may suffer from hoarseness, breathiness, or dysphagia, and so on.^{8,9} Several methods are helpful to confirm the diagnosis, including CT, vocal cord EMG, fiberoptic laryngoscopy, and strobolaryngoscopy.^{3,8} Possible therapeutic approaches include closed reduction, speech therapy, steroid injection, surgery, and so on.⁸

Hoarseness is a common complication after operations,⁴ and it could be caused by arytenoid dislocation as well as recurrent laryngeal nerve (RLN) palsy. However, arytenoid

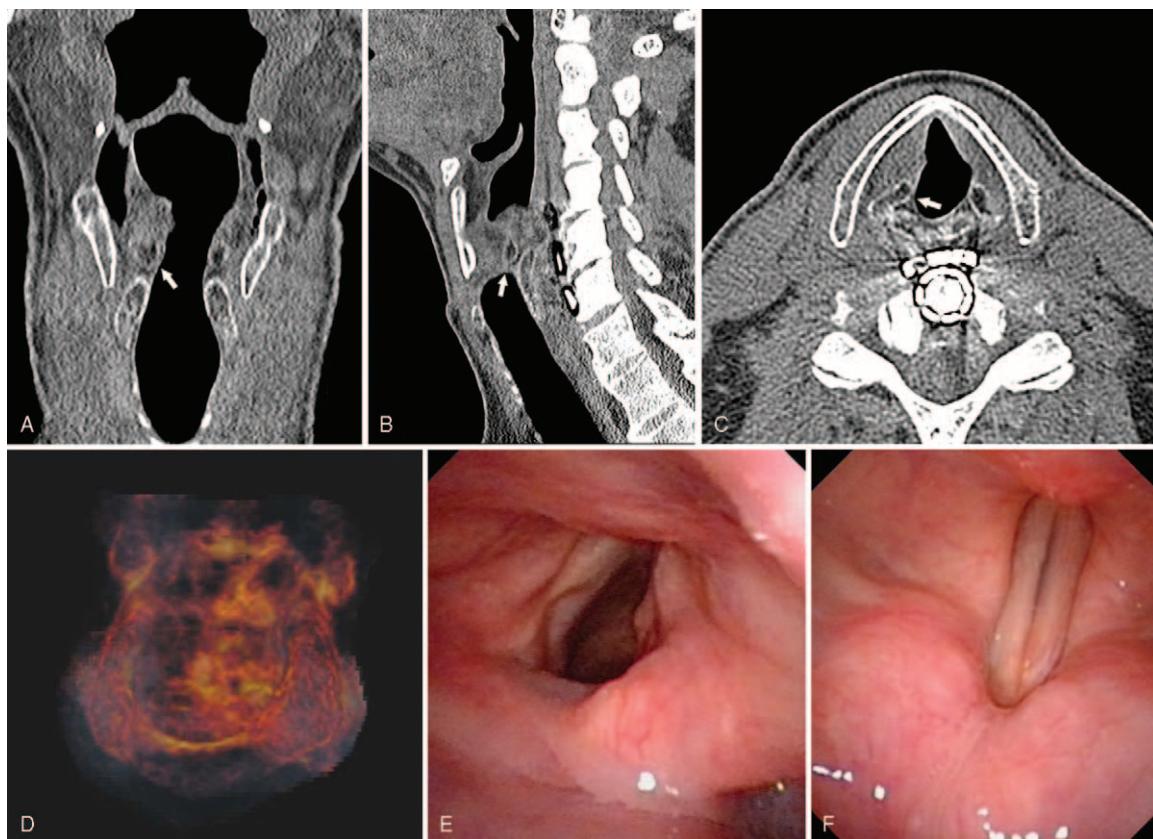


Figure 2. A: Coronal images of high-resolution CT scanning shows reduction of the right arytenoid cartilage. (As shown in the white arrow). B: Sagittal images of high-resolution CT scanning shows reduction of the right arytenoid cartilage. (As shown in the white arrow). C: Axial images of high-resolution CT scanning shows reduction of the right arytenoid cartilage. (As shown in the white arrow). D: Three-dimensional CT view shows symmetry in the joint space on both sides. E: Laryngoscopic view shows normal mobility of the right vocal fold. F: Laryngoscopic view shows normal closure of the right vocal fold.

dislocation is often misdiagnosed as RLN palsy, especially after anterior cervical approach, which often manifests with hoarseness as well. It is difficult but critical to differentiate RLN palsy and arytenoid dislocation. A timely treatment can not be received in case when a patient suffering from hoarseness which is misdiagnosed as RLN palsy, but is actually caused by arytenoids dislocation.

Several methods could be useful when to differentiate arytenoid dislocation from RLN palsy. First, duration of hoarseness caused by RLN palsy are usually temporary and able to relieve gradually, whereas it could last for a long time with a severe hoarseness in cases of arytenoid dislocation.^{4,10} Second, a high-resolution CT scanning is convenient to identify arytenoid dislocation, but a negative scan does not rule out dislocation, especially for the young patients whose cartilage is frequently not ossified and is thus difficult to assess.⁸ The relationship between the arytenoid and the cricoid cartilages is the most important issue.¹¹ A diagnosis of arytenoid dislocation could be made when asymmetry in the joint space, specially obliteration or widening was found.¹² Third, it was reported that the most important tool for diagnosing arytenoid dislocation was strobolaryngoscopy, which could identify flickering of muscle activity and coexisting pathology clearly.⁸ Vocal cord EMG is useful when it is need to distinguish from RLN palsy.⁸

Goz *et al*¹³ reported two cases of arytenoid dislocation after ACDF and both of the two patients recovered spontaneously at 6 weeks and 3 months postoperation. In our opinion, the diagnosis of RLN palsy can not be completely excluded as it was farfetched to diagnose arytenoid dislocation just by laryngoscopy. Our case was diagnosed with arytenoid dislocation by a high-resolution CT scanning, a three-dimensional CT scanning, and laryngoscopy. The diagnosis was clear enough and the patient received timely and effective treatment. In addition, RLN palsy after anterior cervical spine procedure is the most frequent nerve complication, with an incidence from 2% to 21.6%.¹⁴⁻¹⁶ The most likely mechanisms of RLN injury include indirect stretch or focal pressure on the nerve,² and the former was accepted by more researchers.^{17,18} Based on this theory, ACCF is a more probable cause of hoarseness as ACCF needs more space and the retractor stretches more compared with ACDF. As a result, arytenoid dislocation is tend to be misdiagnosed when hoarseness occurs after ACCF.

At last, we advise that arytenoid dislocation can never be neglected and an otolaryngologist should be consulted expediently when hoarseness occurs after ACCF, especially when hoarseness persists for more than 4 or 5 days. Once a diagnosis of arytenoid dislocation is established, a therapeutic procedure should be performed as soon as

possible. Early diagnosis and early treatment are more likely to reestablish or improve joint mobility. Delayed spontaneous repositioning of displaced arytenoid has been reported,¹³ but awaiting such an occurrence should be considered carefully for its uncertain outcomes. Recommended treatment of early arytenoid dislocation is immediate reduction, which has been reported with good results.¹⁹

CONCLUSIONS

Possibility of arytenoids dislocation should never be ignored in the presence of prolonged postoperative hoarseness after ACCF procedures. The diagnosis of arytenoids dislocation could be confirmed using CT scan, vocal cord EMG, fiberoptic laryngoscopy, and strobovidelaryngoscopy. Once the diagnosis is established, treatment must be considered immediately.

➤ Key Points

- A rare case of arytenoid dislocation after ACCF was reviewed.
- Arytenoid dislocation should never be ignored in the differential diagnosis of prolonged postoperative hoarseness after ACCF.
- Once the diagnosis is established, appropriate treatment should be considered immediately.

References

1. Southwick WO, Robinson RA. Surgical approaches to the vertebral bodies in the cervical and lumbar regions. *J Bone Joint Surg Am* 1957;39-A:631–44.
2. Kahraman S, Sirin S, Erdogan E, et al. Is dysphonia permanent or temporary after anterior cervical approach?. *Eur Spine J* 2007; 16:2092–5.
3. Norris BK, Schweinfurth JM. Arytenoid dislocation: an analysis of the contemporary literature. *Laryngoscope* 2011;121:142–6.
4. Yamanaka H, Hayashi Y, Watanabe Y, et al. Prolonged hoarseness and arytenoid cartilage dislocation after tracheal intubation. *Br J Anaesth* 2009;103:452–5.
5. Komorn RM, Smith CP, Erwin JR. Acute laryngeal injury with short-term endotracheal anesthesia. *Laryngoscope* 1973;83: 683–90.
6. Prasertwanitch Y, Schwarz JJ, Vandam LD. Arytenoid cartilage dislocation following prolonged endotracheal intubation. *Anesthesiology* 1974;41:516–7.
7. Lee DH, Yoon TM, Lee JK, et al. Treatment outcomes of closed reduction of arytenoid dislocation. *Acta Otolaryngol* 2013;133: 518–22.
8. Rubin AD, Hawkshaw MJ, Moyer CA, et al. Arytenoid cartilage dislocation: a 20-year experience. *J Voice* 2005;19: 687–701.
9. Frink EJ, Pattison BD. Posterior arytenoid dislocation following uneventful endotracheal intubation and anesthesia. *Anesthesiology* 1989;70:358–60.
10. Nanda A, Sharma M, Sonig A, et al. Surgical complications of anterior cervical discectomy and fusion for cervical degenerative disk disease: a single surgeon's experience of 1576 patients. *World Neurosurg* 2014;82:1380–7.
11. Hoffman HT, Brunberg JA, Winter P, et al. Arytenoid subluxation: diagnosis and treatment. *Ann Otol Rhinol Laryngol* 1991;100: 1–9.
12. Maue WM, Dickson DR. Cartilages and ligaments of the adult human larynx. *Arch Otolaryngol* 1971;94:432–9.
13. Goz V, Qureshi S, Hecht AC. Arytenoid dislocation as a cause of prolonged hoarseness after cervical discectomy and fusion. *Global Spine J* 2013;3:47–50.
14. Bulger RF, Rejowski JE, Beatty RA. Vocal cord paralysis associated with anterior cervical fusion: considerations for prevention and treatment. *J Neurosurg* 1985;62:657–61.
15. Cloward RB. New method of diagnosis and treatment of cervical disc disease. *Clin Neurosurg* 1962;8:93–132.
16. Flynn TB. Neurologic complications of anterior cervical interbody fusion. *Spine* 1982;7:536–9.
17. Audu P, Artz G, Scheid S, et al. Recurrent laryngeal nerve palsy after anterior cervical spine surgery. *Anesthesiology* 2006;105: 898–901.
18. Weisberg NK, Spengler D, Netterville J, et al. Stretch-induced nerve injury as a cause of paralysis secondary to the anterior cervical approach. *Otolaryngol Head Neck Surg* 1997; 116: 317–26.
19. Talmi Y, Wolf M, Jacob B, et al. Postintubation arytenoid subluxation. *Ann Otol Rhinol Laryngol* 1996;105:384–90.