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Case Report

Forceful sneeze: An uncommon cause of laryngeal fracture ☆,☆☆

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ARTICLE INFO

Article history:

Received 22 December 2020

Revised 31 December 2020

Accepted 2 January 2021

Keywords:

Laryngeal fracture

Thyroid cartilage

Sneezing

Coughing

ABSTRACT

Laryngeal fractures are generally induced by direct blunt or penetrating trauma to the neck. Coughing vigorously or sneezing forcefully is extremely rare causes of laryngeal fractures, with only 4 cases found after thorough literature search. Herein we present a case of a 34-year-old male presenting to the ENT emergency room with throat pain, odynophagia, dysphagia, and hoarseness. Following primary evaluation, through physical examination and imaging he was diagnosed with thyroid cartilage fracture and treated conservatively. The triad of odynophagia, dysphagia, and dysphonia after a severe episode of coughing or sneezing in a young adult male patient should prompt suspicion of a laryngeal fracture.

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Case report

A 34-year-old male reported to our emergency department complaining of throat pain, odynophagia, dysphagia, and hoarseness that had begun immediately after a forceful sneeze five hours earlier. The patient was otherwise healthy and denied any symptoms of dyspnea or prior cervical contusion. On physical examination, vital signs were unremarkable but mild tachycardia. His initial cervical examination indicated extreme tenderness over the right thyroid cartilage lamina. Thorough neck examination revealed stable laryngeal cartilages upon palpation, with no swelling or crepitus over the thyroid cartilage and surrounding soft tissues. Flexible fiberoptic laryngoscopy revealed intact mucosa through-

out the pharynx and larynx, and normal bilateral horizontal and vertical vocal fold movement.

Laboratory tests revealed a normal blood count and no signs of active inflammation. Because of the COVID-19 pandemic and the patient's upper respiratory symptoms, a nasopharyngeal swab for polymerase chain reaction (PCR) was taken and was negative for SARS-CoV-2.

As a result of the significant subjective complaints of the patient and the overt tenderness, a noncontrast computed tomography (CT) scan of the neck was performed, revealing a nondisplaced right paramedian fracture of the thyroid cartilage without any edema, hemorrhage or free-air (Fig. 1).

Given the concern for potential airway compromise, the patient was admitted to the otolaryngology department for further observation and evaluation. For the first 24 hours, no

☆ Declaration of competing interest: No Conflict of interest to declare.

☆☆ Financial disclosure: No financial support or funding.

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<https://doi.org/10.1016/j.radcr.2021.01.002>

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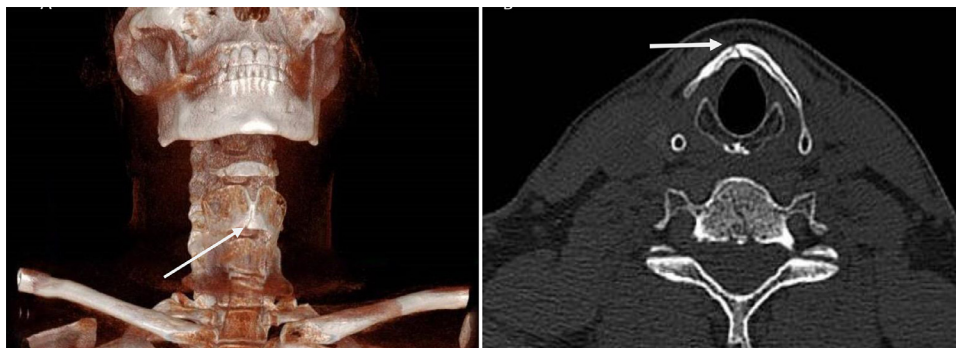


Fig. 1 – Images from the CT scan demonstrating a right paramedian nondisplaced thyroid cartilage fracture. (A) 3D reconstruction of the laryngeal cartilages. (B) A coronal section at the level of the thyroid ala.

oral intake was provided, and he received preventive intravenous cefazoline, a nutrient-enriched IV solution, and analgesics.

On repeated fiberoptic laryngeal examination during the initial 24 hours of admission, a mild right vocal fold erythema was noted with no hemorrhage or edema. After 48 hours of conservative treatment, the patient's neck tenderness had improved significantly, and he was discharged with a course of oral cephalexin (500 mg TID) for 7 days. On the follow-up visit 1 week after the injury, the patient reported further improvement of symptoms with only mild odynophagia and no dysphonia or dysphagia.

Discussion

Nontraumatic fracture of the thyroid cartilage is extremely rare; here, we describe the fifth case to be reported in the medical literature [1–3]. As in our patient, a triad of odynophagia, dysphagia, and dysphonia was reported in three of the 4 previous cases. In our case, the signs on presentation were extremely mild, with only tenderness on palpation of the thyroid cartilage. Subtle presentation of minimal signs with significant objective findings that are revealed only by CT scan could indicate that this phenomenon is underdiagnosed.

Three of the previous cases followed an episode of forceful sneezing [2,3], which suggests a mechanism involving barotrauma. According to Bernoulli's principle, the narrowed diameter leads to an increase in air velocity. Thus, with a strong exhalation of air as occurs in sneezing, synchronized with sudden and forceful closure of the glottis, as occur in coughing, a much greater intraluminal pressure is generated beneath the vocal folds. This increased pressure, inducing some degree of barotrauma, can be harmful on rare occasions and cause hemorrhagic polyps or a vocal cord hematoma. Moreover, forced expiratory volume and flow are probably greater for physically active young man [4], as were all the patients presented.

The finding that 3 of the 4 cases had paramedian thyroid cartilage fractures might indicate that this area is prone to barotrauma. Alexander and Toynton [5] postulated that a pre-existing congenital abnormality resulting in a focal weakness

in the thyroid cartilage might have predisposed these patients to fractures. Another contributing factor to the predisposition for such fractures might be related to the degree of mineralization of the thyroid cartilage. The mineralization and ossification of the thyroid cartilage differ between men and women and varies with age. All the patients who were previously described, as well as our patients, were young adult males (aged 29 to 47 years).

Conclusions

The triad of odynophagia, dysphagia, and dysphonia after a severe episode of coughing or sneezing in a young adult male patient should prompt suspicion of a laryngeal fracture. A CT scan should be performed to confirm or rule out the diagnosis.

Patient consent

Patient consent has been obtained.

REFERENCES

- [1] Fenig M, Strasberg S, Cohen JC, Almadi R, Gold M. Laryngeal fracture after coughing. *Am J Emerg Med* 2013;31(9):1421 e1-3. doi:10.1016/j.ajem.2013.05.013.
- [2] Beato Martínez A, Moreno Juara A, López Moya JJ. [Fracture of thyroid cartilage after a sneezing episode]. *Acta Otorrinolaringol Esp* 2007;58(2):73–4. <http://www.ncbi.nlm.nih.gov/pubmed/17371687> Accessed April 24, 2020.
- [3] Byrne B, Tillman R, Johansson M. Laryngeal fracture after a stifled sneeze: a case report. *J Emerg Med* 2020. doi:10.1016/j.jemermed.2019.11.047.
- [4] Quinlan PT. Fracture of thyroid cartilage during a sneezing attack. *Br Med J* 1950;1(4661):1052. doi:10.1136/bmj.1.4661.1052.
- [5] Alexander VRC, Toynton S. Spontaneous fracture of the larynx after coughing. *Otolaryngol - Head Neck Surg (United States)* 2012;147(4):801–2. doi:10.1177/0194599812445744.