Where is my tooth? A case of multiple cough-induced rib fracture

Saria Tasnim MD, Muhammad Ali Anees MD, Thien Vo MD

Abstract

Rib fractures can occur from cough in patients with osteoporosis, malignancy, or renal disease. In absence of these risk factors, it is a rare event with only few case reports. Our patient had persistent and forceful cough secondary to probable aspiration of foreign body leading to rib fractures. Such cases of refractory cough should always be reviewed thoroughly to evaluate and treat any potential reversible causes.

Keywords: Cough, foreign body, rib fracture

Introduction

Cough is a normal physiological response to any irritant in the airway. It is usually harmless, but forceful and paroxysmal cough can cause complications, such as pneumothorax, lung herniation, syncope, and incontinence. Rib fractures secondary to cough occur infrequently. Most of the cases reported in the medical literature had risk factors, such as osteoporosis, malignancy, or renal disease. Without these risk factors, rib fracture involving multiple ribs is an unusual event.

Case

A 51-year-old man with a history of hypertension was admitted to the hospital for severe left-sided chest pain and persistent cough. He denied any recent falls, weight loss, fever, or chills. He had smoked briefly as a teenager; he denied alcohol or substance abuse. On admission, his vital signs were within normal limits. Laboratory tests revealed normal blood counts, chemistry panel, and PSA level. Troponin was negative, and his ECG showed sinus tachycardia with

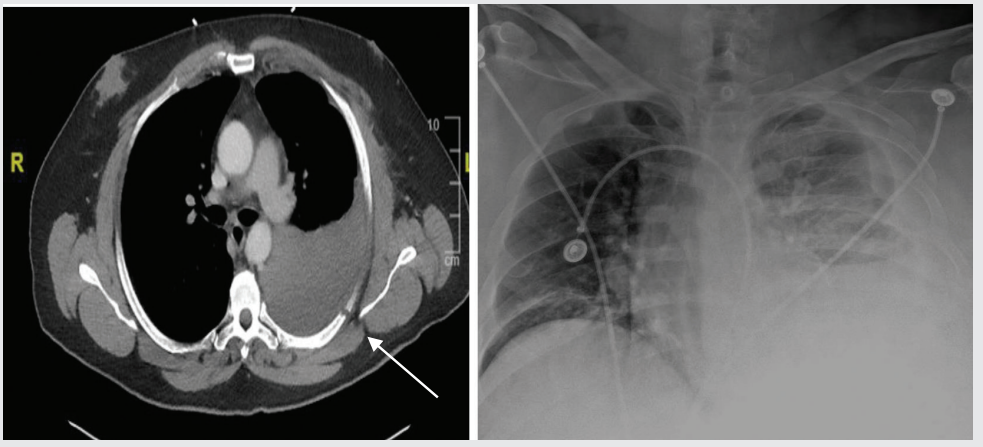

Figure 1. Chest x-ray and CT scan of the patient showing a left-sided rib fracture (arrow) and large left-sided pleural effusion.

Corresponding author: Saria Tasmin
Contact Information: Saria.Tasmin@ttuhsc.edu
DOI: 10.12746/swrccc.v10i43.983

premature atrial complexes. Computed tomography (CT) of the thorax showed a relatively large left-sided pleural effusion and displaced fractures of left posterolateral 5th–8th ribs.

A left-sided chest tube was placed, and 1600 ml of bloody fluid drained out over an initial 12 hours. The pulmonary medicine service was consulted, and he underwent bronchoscopy twice. He had a small right middle lobe endobronchial lesion, small mucous plugs, and large white material posterior to the mucous plug initially in the right middle lobe and then in the right lower lobe on repeat bronchoscopy. On additional questioning, the patient mentioned that he had lost a tooth as a child and that this foreign body might be his lost tooth. The pathology report from the endobronchial biopsy from right middle lobe showed inflamed bronchial and granulation tissue; the foreign body was described as tan to red firm material without conclusive features of a tooth.

The foreign body was removed, and the bronchoalveolar lavage culture grew group C beta-hemolytic streptococci. The patient was started on IV ceftriaxone, the chest tube was removed after the output decreased, and he was discharged on oral antibiotics. He was readmitted a month later due to persistence of cough and an increasing hemothorax. Decortication and rib plating were done by the cardiothoracic surgeon. His vitamin D was low (13.6 ng/ml), but a DEXA scan done as an outpatient showed normal bone mineral density. He was also seen by an ENT specialist, and direct laryngoscopy showed a left posterior vocal cord lesion with reactive right vocal cord nodule. He was treated conservatively with voice therapy and pantoprazole for possible gastroesophageal reflux and was encouraged to follow up with his primary care physician and the ENT clinic as an outpatient. He had no additional hospitalizations for cough.

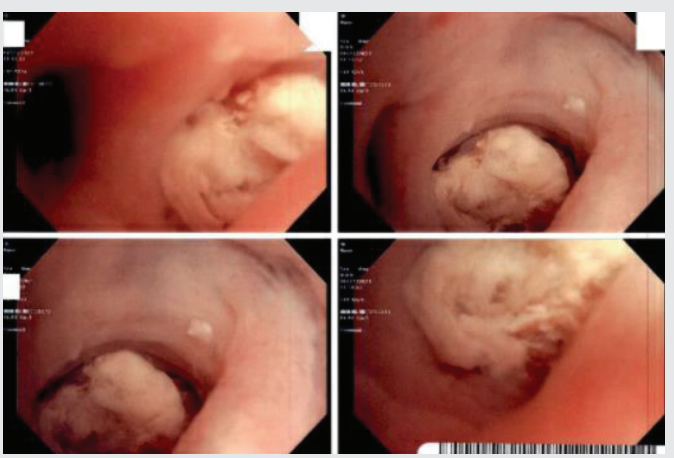

Figure 2. Bronchoscopic image showing foreign body in the right lower lobe.

Discussion

Cough-induced rib fracture occurs due to mechanical stress on the ribs from chronic persistent forceful cough. When the force of the cough is greater than the elastic limit of the ribs, the cough can cause a fracture in the most vulnerable location, the costochondral junction. A second mechanism invokes an opposing force from the muscles attached to the same rib. This happens during violent coughing when the serratus anterior moves the ribs superiorly and laterally and the external oblique contracts to pull the ribs into medial alignment.[1]

In most patients, the fracture is solitary and occurs in the right side of the chest. The middle ribs along the lateral aspect of the rib cage are affected most, and the right 10th rib is the most common site for cough induced fracture.[2] In our patient, all the rib fractures occurred along the left rib cage.

Several factors can increase the risk for cough-induced rib fractures; these include COPD, end stage renal disease, prostate/breast cancer, multiple myeloma, osteoporosis, rheumatic arthritis, and chronic corticosteroids use.[3] Our patient did not have any of these risk factors.

Patients with rib fractures typically present with localized pain in the chest wall andshortness of breath from an inability to take deep breaths. Chest x-ray and CT scans are sufficient for the diagnosis of cough-induced rib fractures in most cases. In addition, bone scintigraphy may reveal abnormal radionuclide concentrations in hidden fractures.[4] In our patient, the fracture was visible both on x-ray and CT scan.

The management of cough-induced rib fractures involves close clinical observation, adequate pain control, and breathing exercise to avoid atelectasis. In case of complications, such as pneumothorax, pleural effusion, subcutaneous emphysema, hemothorax, hematoma, diaphragmatic rupture, lung hernia, a surgical intervention may be indicated.[5] Our patient developed hemothorax, requiring chest tube placement followed by decortication and rib plating. In addition, the underlying cause of cough should be sought and treated. Our patient's cough was probably secondary to the foreign body in his airway, and the vocal cord nodule was thought to be reactionary from persistent cough. The foreign body was removed, and the nodule was managed conservatively.

Conclusion

Cough-induced rib fractures can occur in the presence of risk factors; however, it is an uncommon occurrence in the absence of these risk factors. However, all patients need a directed work-up to rule out any potential risk factors that could cause cough.

Article citation: Tasnim S, Anees MA, Vo T. Where is my tooth? A case of multiple cough-induced rib fracture. The Southwest Respiratory and Critical Care Chronicles 2022;10(43):40–42
From: Department of Internal Medicine, Texas Tech University Health Sciences Center, Amarillo, Texas
Submitted: 1/13/2022
Accepted: 4/3/2022
Conflicts of interest: none

References

1. Sünnetçioğlua A, Baturb A. Cough-induced rib fracture: a case report. Eastern J Med 2015;20:254–255.
2. Bezerra LS, Barbosa da Silva GS, Santos-Veloso MSO, et al. Clinical and radiological aspects of cough-induced rib fractures: a case report. Cureus 12(2):e6840.
3. Katrancioglu O, Akkas Y, Arslan S, et al. Spontaneous rib fractures. Asian Cardiovasc Thorac Ann 2015;23:701–703.
4. Suga K, Nishigauchi K, Fujita T, et al. Bone scintigraphy in two cases with cough related stress fractures of rib. Kaku Igaku 1992;29:495–499.
5. George L, Rehman S U, Khan FA. Diaphragmatic rupture: A complication of violent cough. Chest 2000;117:1200–1201.