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

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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...
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.

**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 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 and shortness 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. 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.

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**References**