

CASE REPORT

NON-TRAUMATIC RIB FRACTURES, HAEMOTHORAX AND CHEST WALL HERNIA ASSOCIATED WITH EXCESSIVE COUGHING

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Haemothorax is presence of blood in pleural cavity and is usually caused by chest trauma. Spontaneous rib fractures leading to haemothorax due to excessive coughing has seldom been described in the literature. We report an unusual case with asthma exacerbation who developed intense coughing followed by chest pain, breathlessness, and widespread bruising, without trauma or coagulopathy. Initial chest X-ray (CXR) and CT pulmonary angiogram (CTPA) showed no significant abnormality. CT scan on subsequent presentation showed left sided haemothorax with rib fractures. The patient was managed successfully with chest tube drainage. On follow up imaging, haemothorax resolved but he was found to have malunited rib fractures with chest wall hernia due to wide separation between ribs. He was referred to cardiothoracic surgeons for rib fixation and chest wall repair.

Keywords: Cough; Haemothorax; Rib fracture

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INTRODUCTION

Haemothorax is commonly caused by penetrating or blunt trauma to the chest. Less frequent causes include iatrogenic injury, malignant or infective pleural diseases, vascular causes like arteriovenous malformation, dissection or aneurysm often in association with underlying connective tissue diseases, shearing of adhesions in spontaneous pneumothorax, pulmonary embolism and bleeding disorders.¹ Non-traumatic haemothorax and chest wall hernia with rib fractures has rarely been reported in the literature.² We describe a patient presenting with vigorous coughing leading to spontaneous rib fractures, subcutaneous haematoma and haemothorax who later went on to develop chest wall hernia due to malunion of rib fractures and widened intercostal space.

CASE

A 63-year-old patient presented to his general practitioner with cough and breathlessness. Only significant past medical history was of well controlled asthma. He had no personal or family history of malignancy, connective tissue diseases or bleeding disorders. He did not take anticoagulants, antiplatelet agents or over the counter medications. He had never smoked, drank alcohol in moderation and was a delivery driver by profession. Blood tests and CXR were unremarkable – he was treated for asthma exacerbation with antibiotics and steroids.

He presented a week later to hospital with severe bouts of cough, chest pain and abdominal bruising. CTPA showed no pleuroparenchymal pathology or pulmonary emboli but small subcutaneous haematoma (Figure-1). He was managed conservatively and discharged with oral analgesia.

He had a bout of violent coughing three days later, associated with shortness of breath. CXR this time showed moderate left pleural effusion. Contrast CT thorax showed left 7th and 8th rib fractures and echogenic pleural effusion raising suspicion of haemothorax (Figure-1). There was no obvious intercostal artery extravasation suggestive of active bleeding. Full blood count (FBC) showed a fall in haemoglobin by 3 g/dL with normal platelets and international normalised ratio (INR). Urea and electrolytes (U & Es) and bone profile was normal and COVID-19 swab was negative. Extended bleeding profile returned normal.

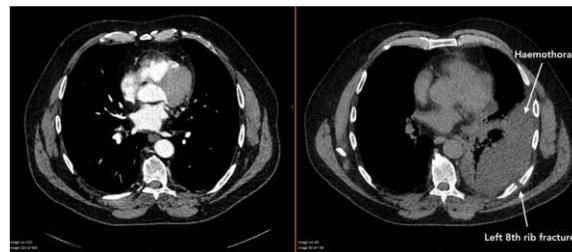


Figure-1: Comparison of CTPA with contrast CT thorax 5 days apart showing interim development of left sided rib fractures

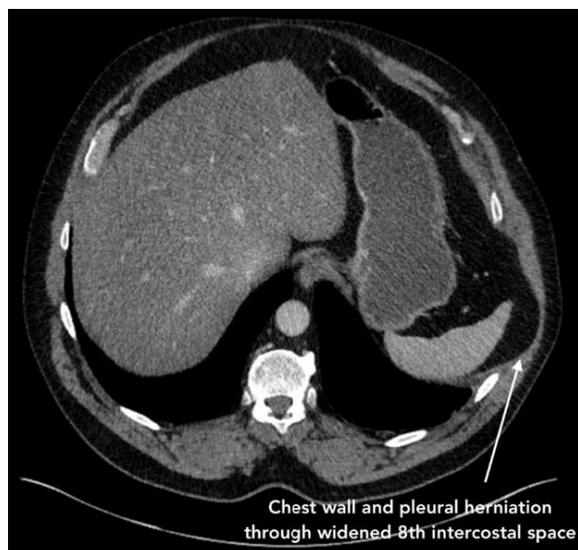


Figure-2: Follow up CT showing resolved haemothorax but chest wall and pleural herniation through widened 8th intercostal

Differential diagnosis:

- Traumatic haemothorax
- Malignant pleural effusion
- Spontaneous pneumothorax / haemopneumothorax
- Parapneumonic pleural effusion including empyema
- Boerhaave syndrome
- Pulmonary embolism
- Aortic dissection

Diagnostic thoracentesis confirmed haemothorax, and a chest tube was inserted draining 2000 ml of frank blood. Cardiothoracic surgeons advised conservative management in view of clinical stability. Chest tube was removed 3 days later when there was no further drainage; thoracic ultrasound confirmed no residual effusion and haemoglobin had stabilized.

We suspect the violent coughing caused spontaneous rib fractures presumably causing intercostal artery injury leading to haemothorax. Patient remained haemodynamically stable throughout admission and was discharged home. On subsequent follow up, he was noted to have chest wall dehiscence at the site of rib fractures. CT thorax showed resolution of haemothorax but chest wall hernia due to malunited rib fractures and widened 8th intercostal space (Figure-2). He was referred to cardiothoracic surgeons for rib fixation and chest wall repair.

DISCUSSION

Cough is a protective physiological mechanism to prevent excessive secretions and foreign bodies from reaching lower respiratory tract. Violent coughing

can generate extremely high intrathoracic pressures and cause life-threatening complications including cardiac arrhythmias, loss of consciousness due to cough syncope, fatal haematomas, pneumomediastinum and gas embolism.²

Vigorous coughing can cause stress fractures due to inelastic deformation of ribs possibly due to the opposing actions of various respiratory muscles on the same rib.³ Cough induced rib fractures are commoner in females with chronic cough and are associated with reduced bone density.⁴ Obesity and chronic steroid use are considered risk factors for reduced bone density and fragility fractures.⁵ Spontaneous haemothorax can develop due to rib fractures causing tear of intercostal artery.^{6,7} Non-traumatic haemothorax has also been described as a result of spontaneous rupture of intercostal arteries.^{8,9} Chest wall herniation associated with spontaneous rib fractures is uncommon with obesity being a significant risk factor.¹⁰

Spontaneous non-traumatic haemothorax associated with rib fractures is rare and can easily be overlooked in emergency settings. It should be suspected in patients presenting with acute chest pain, breathlessness and widespread bruising after vigorous coughing. Medical history should cover history of trauma, recent medical procedures, malignancy, infection, haematological conditions and connective tissue diseases. Drug history including antiplatelets, low molecular weight heparin, or oral anticoagulants should be taken.

Investigations should include FBC, U&Es, bone profile, vitamin D and clotting screen. CXR must be done to look for rib fractures and pleural effusion with or without pneumothorax. CT scan with contrast/CT angiogram should be considered for suspected haemothorax to confirm diagnosis, localize bleeding point and rule out other possibilities. Pleural fluid aspirate should include haematocrit, microbiology and cytology analysis.

Conservative treatment including optimal analgesia is usually sufficient for cough-induced rib fracture alone.⁷ Haemothorax necessitates insertion of chest tube to evacuate the pleural cavity, to prevent pleural infection, and avoid long-term sequelae like fibrothorax. In case of ongoing bleeding with or without haemodynamic compromise, CT angiography with transcatheter arterial embolization must be considered.⁸ If there is ongoing haemorrhage and if the bleeding focus is not identified by imaging, then video assisted thoracoscopic surgery or thoracotomy would be required.¹¹

Prognosis is usually excellent if treatment is instituted in a timely manner and most patients recover fully without any long-term complications.

Learning points:

- Acute chest pain, breathlessness and bruising after severe coughing should lead one to suspect rib fracture even without history of trauma.
- Haemothorax is a medical emergency and requires urgent attention to prevent immediate and long-term complications.
- Haemothorax may resolve with conservative management but clinicians should keep a low threshold of arranging CT angiogram to localize the bleeding focus.

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