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CASE REPORT

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Spontaneous pulmonary herniation in COVID-19

Andrew Macdonald[1,2] | Cameron Butcher[1,2] | Thuy Nhu Nguyen[1,2]

[1]General Medical Unit, Barwon Health, University Hospital Geelong, Geelong, Victoria, Australia

[2]General Medical Unit, Western District Health Service, Hamilton, Victoria, Australia

Correspondence
Andrew Macdonald, General Medical Unit, Barwon Health, University Hospital Geelong, Ryrie Street, Geelong, VIC, Australia.
Email: andrew.macdonald@barwonhealth.org.au

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Abstract

Spontaneous pulmonary hernia (SPH) is a rare condition. We report a case secondary to extreme coughing and COVID-19 infection. The patient displayed several clinical features typical of this diagnosis; difficult to manage pain on coughing, flank haematoma and bulging of the chest wall on coughing. Clinicians should be aware of the risk factors and clinical features of SPH to aid diagnosis of this rare condition.

KEYWORDS
cough-induced lung herniation, COVID-19, spontaneous pulmonary hernia

INTRODUCTION

Spontaneous pulmonary hernias (SPH) are rare, with approximately 120 cases reported in the literature.[1] Proposed mechanisms suggest increased intrathoracic pressures during acute coughing fits causing spontaneous rib fractures and subsequent herniation. Risk factors include chronic obstructive pulmonary disease (COPD), obesity, steroid use and smoking.[1,2] Classic features of SPH include chest wall pain on coughing, flank haematoma and bulging of the chest wall on deep inspiration and coughing. Management of SPH is still controversial, however surgical management is recommended in those with refractory symptoms.

SARS-CoV-2 (COVID-19) infection is associated with coughing.[3] Given the prevalence of COVID-19 more patients will develop SPH as a complication of their infection. We present a patient who demonstrates the classical features of SPH in the context of COVID-19 infection, the first such documented case.

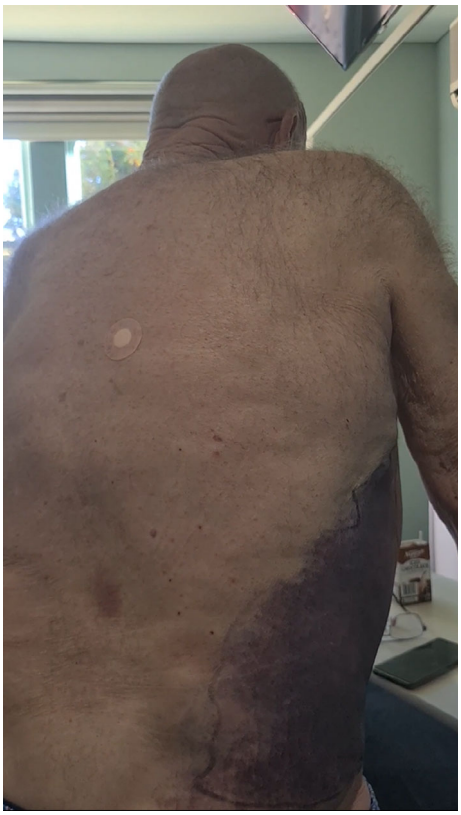
CASE REPORT

Our patient is an 85-year-old Caucasian male presented on day two of SARS-CoV-2 (COVID-19) infection with cough and localized chest pain. His past medical history is significant for asthma, chronic obstructive pulmonary disease (COPD), Crohn's disease, hypertension and obesity. He had no previous thoracic surgery and is an ex-smoker with a 13-pack-year history. His COVID-19 infection was treated with inhaled budesonide and a five-day course of ritonavir/nirmatrelvir.

He described extreme stabbing pain in his right posterolateral chest wall when coughing, with only mild pain at rest. The pain did not change with deep inspiration or expiration. On examination, he was exquisitely tender on palpation of the lateral aspect of ribs 8–10 on the right side. Initial chest X-ray (CXR) showed no acute changes, with long standing hyper expansion of the lung fields. His vital signs and blood tests were unremarkable.

The initial impression was musculoskeletal pain with a differential diagnosis of hepatobiliary pathology or pneumonia. He was admitted for analgesia however his pain was difficult to control. Despite oral and subcutaneous opioids and an erector spinae plane nerve block his pain remained extreme on coughing. Four days into his admission extensive flank haematoma developed, inferior to the site of his pain. Clinical examination demonstrated significant bulging of the chest wall on deep breathing and coughing (Video 1). A CT chest displayed a new right posterolateral pulmonary herniation between the eighth and ninth ribs (Figure 1). CXR demonstrated pleural herniation on expiratory films but not inspiratory films (Figure 2). A diagnosis of SPH was made.

Given his refractory pain despite ongoing medical therapy our patient was referred to cardiothoracic surgery for operative management. He underwent a right lung hernia repair with propylene mesh as well as fixation of fractured costal cartilage without complication.



VIDEO 1 Video demonstrating visible herniation on deep breathing and coughing. Flank haematoma is visible inferiorly to herniation
Video content can be viewed at https://onlinelibrary.wiley.com/doi/10.1002/rcr2.1145

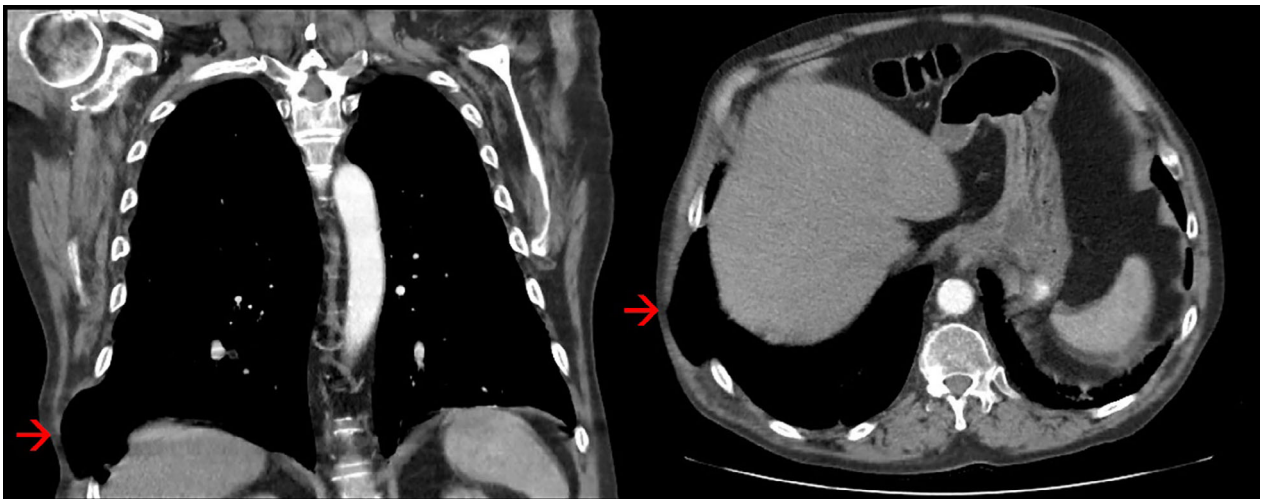


FIGURE 1 Coronal and axial CT views of right sided pulmonary herniation

DISCUSSION

First described in 1499, the pulmonary hernia is characterized by the protrusion of the lung, including parenchyma and pleura through a defect in the chest wall.[4,5] The classical features of pulmonary hernias include visible herniation of the chest wall, localized chest pain and flank ecchymosis.[1,2,6] Most lung hernias occur in the context of trauma or post-operatively. Spontaneous pulmonary hernias, without antecedent trauma or surgery, make up approximately 30% of cases.[7]

Spontaneous pulmonary hernias due to coughing occur owing to dramatically increased intrathoracic pressure causing damage to the chest wall. Risk factors include male gender, obstructive airways disease (COPD/asthma), smoking status, steroid use and obesity.[1,2]

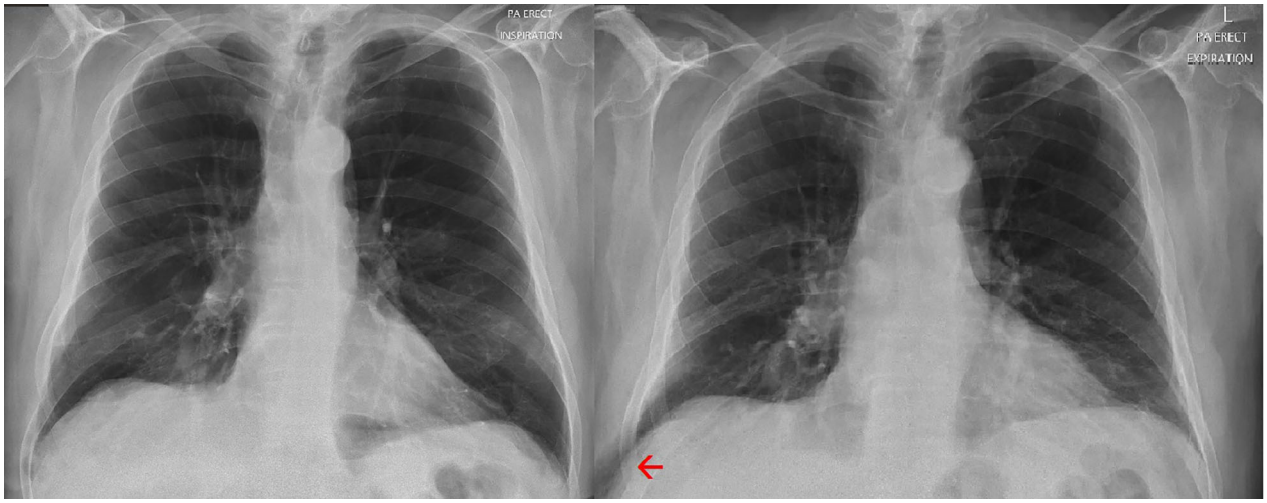


FIGURE 2 Inspiratory and expiratory chest X-rays. Right sided pulmonary herniation present only on expiratory films

Like other viral respiratory infections, COVID-19 infection is strongly associated with cough. Most patients display a dry cough in their acute infection, with cough being the initial symptom in 60%–70% of cases. This cough can persist in some patients for weeks to months post-acute infection, as part of the emerging pattern of long COVID-19.[3]

The investigation and management of SPH remain controversial, with limited evidence. Detection rates are poor with CXR, with findings present in only 20% of cases.[1] This further highlights the need for clinicians to be aware of SPH, as patients with a high degree of clinical suspicion require CT imaging. Conservative management of SPH includes analgesia, breathing techniques, weight loss and supportive bracing/strapping of the hernia. There are currently no clear guidelines for proceeding to surgical management but relative indications include uncontrolled pain, increasing size, haemoptysis, steroid use or incarceration.[4,8]

In conclusion, this case represents the first reported case of SPH in the context of COVID-19 infection. Given the worldwide prevalence of COVID-19 infections and its strong association with coughing it is likely more patients will present with this rare condition. Imaging should be pursed in patients who present with refractory chest wall pain, chest wall bulging or flank haematoma.

AUTHOR CONTRIBUTION STATEMENT

All authors conceived concept of case report. CB prepared case presentation section. TN reviewed and prepared the radiology for the paper. AM prepared the discussion, took the clinical photos, and drafted the manuscript. All authors read and approved the final manuscript.

CONFLICT OF INTEREST STATEMENT

None declared.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

ETHICS STATEMENT

The authors declare that appropriate written informed consent was obtained for the publication of this manuscript and accompanying images.

ORCID

Andrew Macdonald https://orcid.org/0000-0001-5155-5119
Cameron Butcher https://orcid.org/0000-0001-7732-4984
Thuy Nhu Nguyen https://orcid.org/0000-0002-8444-5327

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