Case Report

Postoperative inverted intercostal hernia incidentally detected by chest computed tomography in a patient with COVID-19

Murilo de Sá Barrêto Callou Peixoto, MD, Bruno Lima Moreira, MD, Pablo Rydz Pinheiro Santana, MD, Artur Rodrigues Ferreira, MD, Ricardo Mingarini Terra, MD

Article history:
Received 13 May 2022
Revised 8 June 2022
Accepted 11 June 2022

Keywords:
Thoracic surgery
Hernia
Multidetector computed tomography

Introduction

Inverted intercostal hernias are uncommon findings after thoracic surgical procedures, as the majority of postoperative hernias in the thoracic region are comprised of lung tissue. Soft tissue inverted intercostal hernias are better depicted through multidetector computerized tomography (MDCT) of the chest, and radiologists should be aware of its appearance to avoid interpreting it as another entity, such as a tumor, especially in cases of incarceration.

Case presentation

A 48-year-old woman visited our emergency department with a 10-day history of intermittent symptoms of dry cough and

© 2022 The Authors. Published by Elsevier Inc. on behalf of University of Washington. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/)
myalgia, which had worsened on the previous day. No fever or dyspnea was identified. The patient reported contact with family members who had been having similar symptoms. Her medical records included an open lung surgery performed five years earlier, which consisted of left lower lobectomy with bronchoplastic procedure and mediastinal lymphadenectomy due to an endobronchial typical carcinoid tumor. There were no relevant complaints related to the thoracotomy scar. On examination, the patient’s vital signs were within normal ranges. Thoracic auscultation and complete blood count were normal; C-reactive protein level was only mildly elevated (1.07 mg/dL). Real-time reverse-transcription polymerase chain reaction of her nasopharyngeal swab tested positive for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) nucleic acid, thereby confirming the diagnosis of coronavirus disease 2019 (COVID-19). Unenhanced chest MDCT showed no lung opacities with typical features of COVID-19 pneumonia. In addition to usual findings related to the left lower lung lobectomy, the CT scan incidentally detected a convex lens-shaped herniation with protrusion of soft tissue of the left posterior chest wall (including major rhomboid muscle and fat tissue of the deep chest wall) towards the pleural cavity through the posterior region of the fifth intercostal space, which was widened (Fig. 1). This condition is known as inverted intercostal hernia.

Discussion

Postoperative thoracic hernias, defined as protrusion of lung or soft tissue through a widened intercostal space, are rare, and most reported patients present with outwards intercostal hernia of the lung [1,2]. Inverted intercostal hernia of soft tissue of the chest wall is an unusual type, defined as inwards protrusion of soft tissue into the pleural space, which is very

Fig. 1 – Unenhanced chest CT images (soft tissue window) in the sagittal (A) and axial (B) planes revealing inverted intercostal hernia characterized by protrusion of major rhomboid muscle and fat tissue of the left posterior chest wall (arrow) towards the pleural cavity through the fifth intercostal space. Coronal-oblique (C) maximum intensity projection CT image (bone window) depicting the widening of the fifth left intercostal space (asterisks). Axial-oblique (D) CT image (lung window) showing the previously described inverted intercostal hernia (arrow). No lung parenchymal opacities with typical features of COVID-19 pneumonia were encountered. In addition, there were imaging findings compatible with left lower lung lobectomy.
rarely reported in the medical literature [2,3]. It is believed that the muscle tension in the chest wall is usually sufficient to prevent a protrusion of its soft tissue toward the pleural cavity (which has negative pressure) via an intercostal space that has been widened in patients who have undergone chest surgery. Progressive muscle weakness and inadequate closure of the chest wall are possible factors that contribute to its occurrence [1–3].

As in the case reported by Torres et al [2], our patient was diagnosed with inverted intercostal hernia by chest MDCT, which revealed a protrusion of soft tissue of the chest wall (including muscle and fat tissue) toward the pleural space through a widened intercostal space (previous surgical access). MDCT scan with multiplanar and tridimensional reconstructions and maximum and minimum intensity projection images can be considered an important tool for diagnosis and characterization of intercostal hernias [4]. Ultrasonography and magnetic resonance imaging may be radiation-free alternatives to CT for evaluation of the chest wall [4,5].

Weissberg et al [1] list a few indications for surgical correction of intercostal hernias, such as increasing size, pain, signs of impending incarceration, such as difficulty to reduce the hernia, and cosmetic reasons. However, since the literature regarding the issue is scarce, there is no consensus regarding which patients should undergo operative treatment and which techniques should be implemented. Unlike our case, Torres et al [2] described a patient with chest pain at the inverted intercostal hernia site, who underwent a surgical reapproach consisting of exploratory thoracotomy via the widened intercostal space followed by careful closure of the thoracotomy incision with strong stitches to prevent hernia recurrence. Eventually, the incarceration of soft tissue into the widened intercostal space can mimic a chest wall tumor as reported by Iwata et al [3].

Conclusion

Inverted intercostal hernias are an uncommon finding in the postoperative setting. Medical practitioners, especially thoracic surgeons and radiologists, should be aware about this condition and recognize it on CT images.

Patient consent statement

The authors of the case report “Postoperative inverted intercostal hernia incidentally detected by chest computed tomography in a patient with COVID-19”, sent to Radiology Case Reports for potential publication hereby declare to have obtained patient consent for publishing this case.

REFERENCES

[1] Weissberg D, Refaely Y. Hernia of the lung. Ann Thorac Surg 2002;74:1963–6.
[2] Torres US, Portela-Oliveira E, Braojos FC, Cardoso LV, Souza AS Jr. Inverted intercostal hernia of soft tissue of the chest wall: multi-detector computed tomography findings. Arch Bronconeumol 2013;49:553–4.
[3] Iwata T, Yasuoka T, Hanada S, Suehiro Y, Nishibayashi A, Inoue K, et al. Inverted intercostal hernia of soft tissue manifested as slow-growing chest wall tumor after thoracotomy. Ann Thorac Surg 2010;90:1355–7.
[4] Detorakis EE, Androulidakis E. Intercostal lung herniation—the role of imaging. J Radiol Case Rep 2014;8:16–24.
[5] Macedo ACS, Kay FU, Terra RM, Campos JRM, Aranha AGA, Funari MBG. Transdiaphragmatic intercostal hernia: imaging aspects in three cases. J Bras Pneumol 2013;39:513–17.