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From Lungs to Spine: The Tale of A Pandemic

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Abstract
Pneumorrhachis, also known as Epidural emphysema, is a rare condition characterised by intraspinal air or air in the epidural space as a result of traumatic, iatrogenic factors from surgery, anaesthesia, and diagnostic interventions, or as a result of non-traumatic incidents, such as forced coughing from bronchial asthma. Rarely, this condition is linked to Covid 19. A case of pneumomediastinum complicated by pneumorrhachis (PR) in an elderly man with a covid-positive diagnosis is presented here. Our study emphasises the significance of physician vigilance in cases of covid patients reporting lower back pain. Complications related to covid-induced pneumorrhachis can be reduced by prompt diagnosis and ventilation strategy.

Keywords: Pneumorrhachis, Covid 19,Epidural emphysema,back pain,pneumomediastinum

Introduction

Pneumorrhachis (PR) refers to the intra- or extradural presence of air within the spinal canal. It is typically observed in conditions involving epidural anaesthesia, lumbar puncture, and traumatic pneumothorax.[1,2] Although non-traumatic spontaneous pneumorrhachis is extremely uncommon, it can occur as a rare complication of spontaneous pneumomediastinum.[3] Forceful coughing can cause alveolar rupture, followed by air dissection along the bronchoalveolar sheaths and into the mediastinum. The air then flows down the path of least resistance into the mediastinum and into the neck fascial planes. The absence of fascia barriers between the posterior mediastinum and the epidural space allows air to leak into the epidural space via the neural canal.[4] It is usually managed conservatively while in some cases it may need surgical intervention.[5] In this study we present a rare case of PR associated with Covid 19.

Case study

A 68-year-old male with a history of diabetes mellitus and systemic hypertension presented to emergency medicine department with cough, dyspnea, fever and a positive Covid 19 in rapid antigen test (RAT). Patient's pulse rate was 80/mt, Blood pressure -130/80 mmHg and oxygen saturation was 80% on room air. Though his initial vitals were stable, he later developed saturation fall and was shifted to the Covid ICU. He was managed with oxygen and parenteral antivirals (remdesivir), steroid heparin and other supportive medications as well as awake proning. His initial chest X-ray revealed bilateral basal infiltrates. Three days after testing negative for RAT, the patient reports lower back pain. The physical examination revealed bilateral infrascapular crepitations on palpation, while all other general physical examination parameters were normal. Total counts and CRP were slightly elevated. Chest x-ray **(Fig 1 A)** showed pneumomediastinum. Non contrast CT chest -Axial section of upper abdomen **(Fig 1 B)**, lower thorax **(Fig 1 C)** and Coronal section **(Fig 1 D)** showed multifocal lung consolidation, extensive

pneumomediastinum with mild pneumo pericardium, surgical emphysema, Pneumorrhachis and bilateral minimal pneumothorax. During the course in hospital, patient deteriorated clinically and succumbed to covid infection.

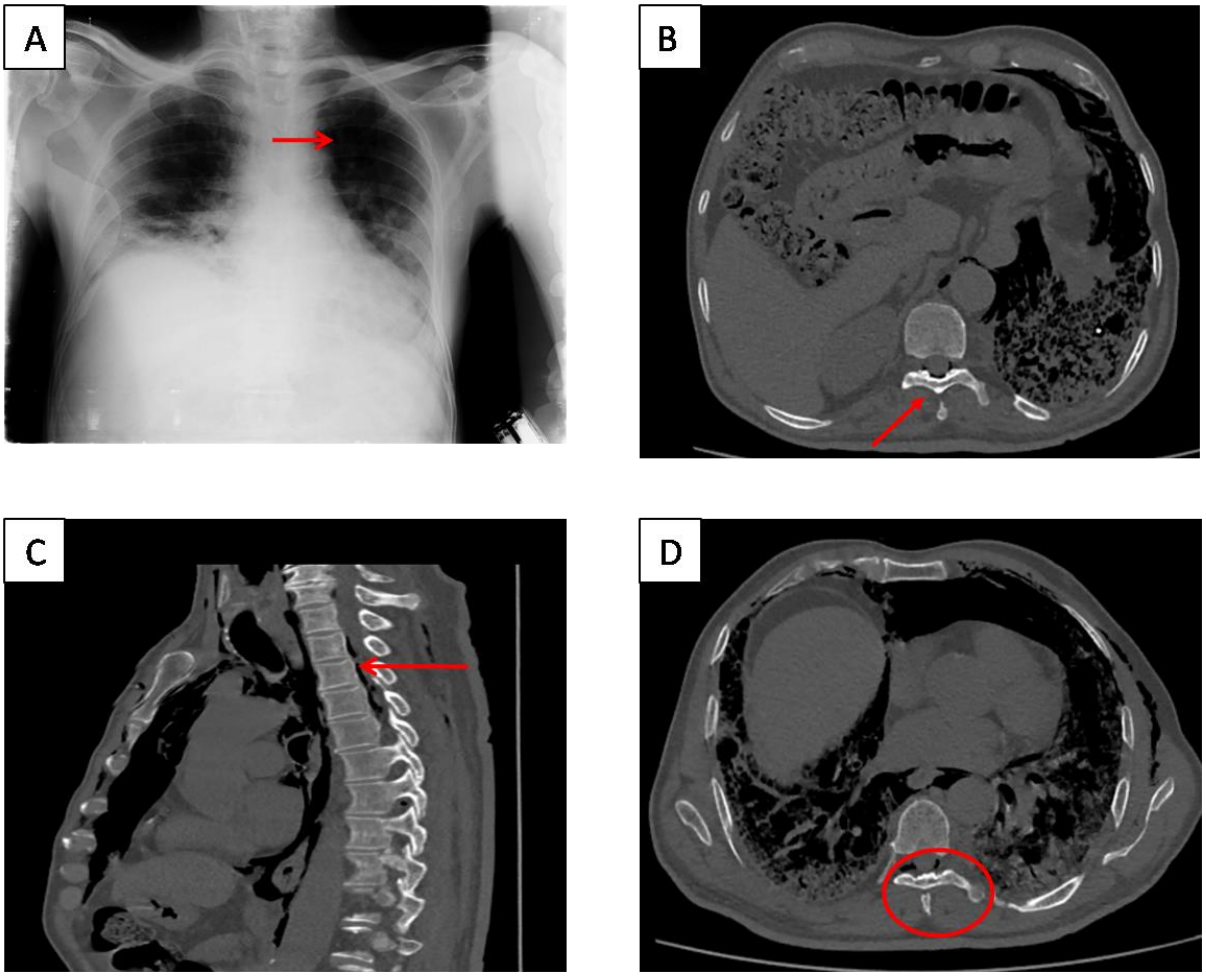

Figure 1:- A:- Chest X-Ray B:- Non contrast CT chest -Axial section of upper abdomen, C:- Non contrast CT chest -lower thorax D:- Non contrast CT chest Coronal section

Discussion

Pneumorrhachis is a rare complication of Covid 19 infection that is typically accompanied by a poor prognosis.[6] Though this condition is commonly asymptomatic[7], a very few cases with symptoms such as headache, neck pain, and neurological symptoms such as progressive weakness of the muscles have been reported.[8] PR diagnosis is difficult due to its rarity, diversity of aetiologies, and unexplained pathophysiology, hence there are no empirical guidelines for the treatment of these patients.[9] Conservative management involving bed rest, close neurological observations, and oxygen therapy is typically employed for patients presenting with pneumorrhachis, although in rare instances, symptoms of cord compression may arise, necessitating decompressive surgery. Although an association with pneumomediastinum in COVID 19 patients has been reported earlier, to the best of our knowledge, this is the first report of symptomatic PR induced by Covid.

The diagnosis of pneumorrhacis (PR) can be challenging, but our case report provides evidence that healthcare professionals should maintain a heightened level of suspicion for this condition when

assessing patients with severe COVID-19 infection who present with low back pain. In the literature, PR has been associated with myelopathy, radicular discomfort, paraplegia, headache, and neck pain.[11]
Limited literature exists on the occurrence of spontaneous pneumomediastinum in COVID-19 patients receiving noninvasive ventilation, albeit a few cases have been complicated by pneumothorax.[12] Radiological examination revealed that our patient had extensive pneumomediastinum with mild pneumo pericardium, surgical emphysema, pneumorrhachis, and bilateral minimal pneumothorax. Our study is indicative that the emergence of pneumomediastinum during COVID-19 infection may be regarded as a potential marker of disease progression.

Conclusion

Pneumorrhachis is a rare complication associated with Covid 19. Physicians should have a high suspicion for PR while evaluating patients with severe covid 19 infection reporting low back pain. Early imaging with a chest CT scan plays an important role in the prompt diagnosis and determination of COVID-19-associated PR. The development of pneumomediastinum during COVID-19 infection is a possible indicator of disease progression. The key to management is early diagnosis and a suitable ventilation strategy.

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