Pneumorrhachis
Associated with COVID-19: A Rare Observation

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We wish to attract the attention of the readers to an intriguing and rare finding seen in one of our COVID-19 Pneumonia patients.

Pneumorrhachis, a phenomenon of air within the spinal canal, in the extradural space; in the intradural space; or in the subarachnoid space is a rare benign condition following traumatic, non-traumatic and iatrogenic causes. It is usually incidentally detected during radiological investigations. There are very rare reports of the combined occurrence of pneumomediastinum and extradural pneumorrhachis not associated with thoracic injury in the published literature and never been described in the on-going COVID-19 pandemic.

We describe a case of a 46-year-old male with a background of Diabetes presented with a week’s history of fever followed by breathlessness. On initial evaluation his oxygen saturation was found to be 82% on ambient air. His Chest X-ray showed bilateral peripheral heterogeneous opacities. COVID-19 PCR from nasopharyngeal swab was positive. The patient was started on high flow nasal cannula and was cared for in the intensive care unit (ICU) as a case of severe COVID-19 pneumonia. He received broad spectrum antibiotics, corticosteroids, low molecular weight heparin, Remdesivir, convalescent plasma and off label Tocilizumab.

A week later, the patient developed worsening hypoxia, a CT Pulmonary angiogram was done to rule out possible Pulmonary Embolism but demonstrated extensive pneumomediastinum with surgical emphysema extending in neck, bilateral chest walls and air in the spinal canal, known as pneumorrhachis (Figures 1, 2). Patient was managed conservatively on high flow nasal cannula and recovered after a long course of Hospitalization.

Our case developed pneumorrhachis, pneumomediastinum and surgical emphysema without any trauma or positive pressure ventilation. He was oxygenated majorly with high flow nasal cannula system throughout the hospital stay which has minimal PEEP (Positive end expiratory pressure).

This term Pneumorrhachis was coined by Newbold et al in 1987 after it was previously referred to as intraspinal pneuomocoile, spinal and epidural emphysema, aerorachia, pneumosaccus, and air myelogram.

Alveolar air leak comprising of pneumothorax, pneumomediastinum, and subcutaneous emphysema have been seen in COVID-19 associated organising pneumonia with and without obvious barotrauma prompting emerging theories of lung damage in SARS Co-V2 infection. COVID-19 infection can affect both type I and II pneumocytes which can result in the breakdown of alveolar membrane integrity. This infection can also cause an increase of alveolar pressure due to violent coughing and eventually causing alveolar damage.

The association of Pneumomediastinum and Pneumorrhachis however is less understood. The air in the soft tissue of the posterior mediastinum may dissect along the fascial planes communicating through the intervertebral neural foramina, and may end up into the extradural or the subarachnoid space.

It is usually asymptomatic and primarily a clinical imaging finding, but it can result in neurological deficits with the air possibly compressing the spinal cord. Similar to management of Pneumomediastinum, giving high-concentration oxygen helps in resolution of pneumorrhachis, as it can raise the oxygen content of the entrapped gas, leading to quicker absorption. There was no neurological deficit which prompted conservative management from our side. This incident demonstrates the utter devastating alveolar destruction and development of interstitial emphysema, progressing to diffuse thoracic air-leak in COVID-19 pneumonia.

References

These patients were kept under antibody and RTPCR testing after 3 days. It was found that patients had antibodies in the study were subjected to repeat testing. It was also suggested that the patients were further investigated for antibody testing. It was found that the patients were further investigated for antibody testing. It was also suggested that the patients were further investigated for antibody testing. It was also suggested that the patients were further investigated for antibody testing. It was also suggested that the patients were further investigated for antibody testing.