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Spontaneous Pneumothorax in a Covid 19 Pneumonia Patient - A Case Report

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ABSTRACT: spontaneous pneumothorax is a rare and serious complication reported in Covid 19 disease even in patients without mechanical ventilation . We report one such case of massive pneumothorax in a 40 year old female who was nasopharyngeal swab positive and under treatment for Covid 19 pneumonia and other complications.

KEY WORDS: covid 19 pneumonia- pneumothorax- spontaneous

I. INTRODUCTION :

The development of pneumothorax in patients with Covid -19 pneumonitis on ventilation is a well established complication. However even in patients without high flow nasal cannula or on non invasive ventilation spontaneous pneumothorax is reported occasionally. The major cause for pneumothorax is bullus formation which is attributed to diffuse alveolar damage and vascular damage[1] .

II. CASE DETAILS :

A 40 year old female presented with complaints of pyrexia of ten days duration followed by chest discomfort, shortness of breath and productive cough of 3 days later. She tested positive for RT PCR. Her heart rate was 100/min , respiratory rate 21 cpm ,blood pressure 110/78 mmHg. Spo2 92 % on 15 liters with high concentration mask .There was no past history of any significant cardio respiratory illness. Baseline investigations were normal limits.CRP was positive . LDH was 764u/l ferritin 1571ng/ml .Total blood count showed neutrophilic leukocytosis . Interleukin 6 serum plasma levels was 45.2 ng/ml. D-dimer was 400ng/ml. Urine culture was positive for E.Coli and Klebsiella organisms. There was mild thrombocytopenia . Chest radiograph on admission revealed bilateral patchy opacities. HRCT lungs showed extensive ground glass opacities with CT severity score 15/25 (Fig 2 A &B).

patient was treated with Remedisvir 100mg for 3 days, Tab Baricitinib, inj Twibact 1.5gms, inj Piptaz4.5gms, inj dexamethasone, inj pantoprazole 40mg and other supportive medications. Follow up chest radiographs showed persistent bilateral pulmonary opacities. There was no significant clinical improvement subsequently . on 13th day of admission her condition suddenly deteriorated . ABG reading was 7.427/43.5/49.0/27.2/1.2 spo2 74% on NIV. Chest radiograph showed massive tension pneumothorax with ipsilateral lung atelectasis and contralateral mediastinal shift (Fig 1). Patient was immediately intubated. Despite all emergency medications given, patient succumbed to sudden cardiac arrest though CPR were initiated as per ACLS BLS guidelines .

III. DISCUSSION:

Introduction:

Corona virus is an infectious disease caused by SARS-COVI-2 Virus.

Most people infected with this virus will experience mild to moderate symptoms of respiratory illness and recover without requiring

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special treatment. However some will become seriously ill and require medical attention. Older people and those with underlying medical conditions like cardiovascular disease, diabetes mellitus, chronic respiratory illness or cancer may develop serious illness. Anyone can get sick with COVID 19 and become seriously ill or may die at any age.

Transmission:
The virus can spread from an infected person's mouth, nose in small liquid particles when they cough, sneeze, speak, sing or breathe.
Symptoms:

- Most common – cough, fever, tiredness, loss of taste or smell.
- Less common – sore throat, headache, aches and pains, diarrhea, irritation, a rash on skin or discoloration of fingers or toes.
- Serious – difficulty in breathing (shortness of breath , loss of speech , loss of mobility , confusion state , chest pain)

On an average it takes 5-6 days from when someone is infected with virus for symptoms to show, however it may take up to 14 days.[2]

Role of ACE-II in COVID 19:

A outbreak of pneumonia caused by severe acute respiratory syndrome corona virus 2 (SARS COV – 2) That started in Wuhan , china at the end of 2019 has become a global pandemic.

Both SARS COV 2 and SARS COV 1 enter host cells via ACE II receptors which are expressed in various human organs. ACE II catalyzes angiotensin II – angiotensin (1- 7) and ACE II / Angiotensin (1-7) mas axis contracts the negative aspects of RAS. (Rennin angiotensin system) , which plays an important role in maintaining , physiological and pathophysiological balance of body. The SARS COV 2 spike glycoprotein which binds to ACE II is a potential mechanism for causing various organ damage including lungs.

SARS COVI 2 enters lung cells via ACE II receptors. The cell free and macrophage phagocytosed virus can spread to other organs and infect ACE II expressing cells at local site causing multi organ injury e.g. – lung, liver, heart, kidneys , pancreas and intestines.

Acute lung injury:

Although mortality rate in COVID 19 is lower than that in SARS and MERS, numerous patients have acute lung injury. Severe diffuse alveolar damage, extensive edema, hyaline membrane formation, organisation and fibrous tissue formation are some of the changes observed in COVID 19 lung injury. RAS and ACE II down regulation contributes to the pathogenesis of lung injury in COVID 19.However spontaneous pneumothorax is a rare phenomenon which is the subject of discussion of present case report.[3]

Spontaneous pneumothorax following COVID -19 Pneumonia is infrequently reported from most of the centers treating these patients [4]. Massa Zantah et al [5] in their review of over 3000 patients admitted with COVID -19 pneumonia , noted 6 cases of spontaneous pneumothorax (0.66%) which developed even in the absence of mechanical ventilation. Matthijio jansen [1] observed that spontaneous pneumothorax can develop at any stage of respiratory illness due to alveolar destruction causing bullae formation. Mansoor Hameed et al [6] reported 3 cases of pneumothorax in patients with COVID -19 pneumonia who were not on ventilation or have any pre existing pulmonary disease and attribute the cause of pneumothorax due to possible rupture of pneumatocele, parenchymal injury, ischaemia of parenchyma. Krishdhan [7] reported a case of large pneumothorax that developed spontaneously in a patient who has recovered recently from COVID- 19 pneumonia. In their analysis of 1619 patients with COVID-19 disease , Emmanuel et al [8] found that spontaneous pneumothorax developed in 22 patients (1.4%). In one of the largest retrospective multicentric case series pneumothorax is associated with COVID-19 pneumonia in 61 patients in a study from 16 centers (Anthony w martinelli [9]).

Our patient who was categorized with CT severity index of 15/25 on admission developed spontaneous pneumothorax on 13th day . He was never intubated during the course of management in the hospital. There was no evidence of bullae on HRCT chest. The most likely pathogenesis for the development of pneumothorax is severe parenchymal inflammation and ischaemia as seen in other studies.

As per the British Thoracic Society guidelines the treatment of pneumothorax includes bubbling chest drain.

Conclusion: the physician and intensive care specialists should be aware of spontaneous pneumothorax

As a life threatening complication that can develop in a COVID19 pneumonia patient at any time of treatment or later and this should be strongly suspect it when there is sudden deterioration in the patient condition or the development of hypoxia.

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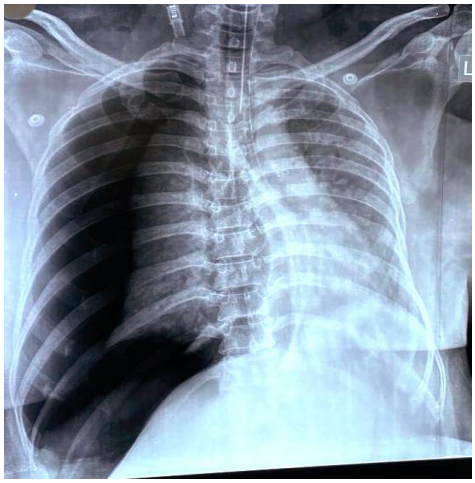

Fig 1) Chest radiograph shows large pneumothorax right side with lung collapse

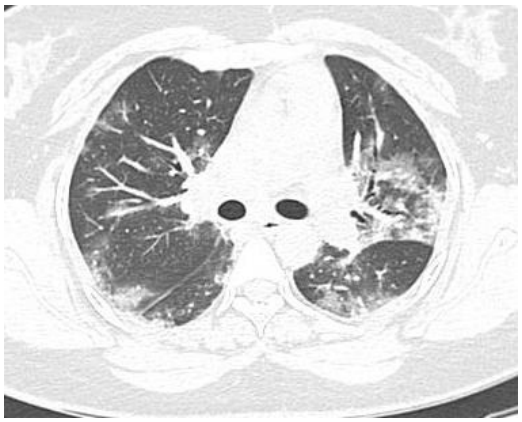

Fig 2 A)

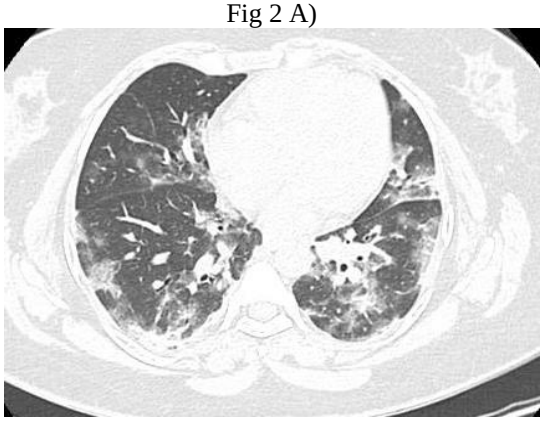

Fig 2 B)

Fig 2A&B : HRCT show extensive ground glass opacities in peripheral and subplural distribution