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COVID-19 associated Platypnea Orthodexia syndrome in a young male

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ABSTRACT

Platypnea -orthodexia syndrome is a rare syndrome which is described as breathlessness during the upright posture which is relieved in supine position. Its causes range from cardiac causes to pulmonary causes with few non cardiopulmonary etiologies. COVID-19 can have a wide range of pulmomonary manifestations ranging from acute respiratory distress syndrome to fibrosis of the lung. It is a rare finding of COVID-19. Here, we describe a case of 32 year old male who had respiratory distress due to COVID-19 infection and later suffered from platypneaorthodexia syndrome during his recovery phase. He was managed with chest physiotherapy along with oxygen support with which he improved and was discharged in stable condition. Platypnea Orthodexia is hence a rare manifestation of COVID-19 which must be diagnosed in time so that it can be managed in time with supportive therapy.

Keywords: COVID-19, platypnea orthodexia syndrome

1. INTRODUCTION

Corona Virus Infectious Disease 2019 (COVID-19) ever since it's spread in 2019 has puzzled the physicians all throughout the world with its unforeseeable course. Breathless is one of the primary symptom of COVID-19 (Kumar et al., 2021). Usual complaint associated with breathlessness is breathlessness while in supine posture due to increased pressure in the pulmonary vasculature. On the contrary, platypneaorthodexia is rarely seen with COVID-19. Platypnea-orthodexia is characterized by sudden deoxygenation and breathlessness on changing of posture to sitting or standing from supine position. This is opposite to what is seen in heart failure and thus presents as a diagnostic challenge. Causes of platypnea-orthodexia syndrome are classified as intracardiac shunting, pulmonary shunting, ventilation perfusion mismatch or a combination of all of these causes.

Platypneaorthodexia syndrome is suspected when the arterial oxygen levels remains normal in supine position but reduce on sitting up or standing. Even though it was first reported in 1940, the pathophysiology of platypneaorthodexia syndrome is still uncertain and remains to be a diagnostic dilemma for physicians around the world. It is postulated that both

functional as well as anatomical component are present for POS. The disease is related to a vascular disease which is a functional component in relation with a anatomic compenent which is a shunt. Most common cause described in the literature remains intra atrial shunting or an atrial septal defect (Agrawal et al., 2017). Here, we describe a rare case of a young male who suffered from palytpneaorthodexia syndrome during the recovering phase of Acute Respiratory Distress Syndrome due to COVID-19.

2. CASE REPORT

A 32 year old male, farmer by occupation came with the chief complaint of breathlessness, high grade fever along with cough since two days. There was no history of chest pain, anosmia or ageusia. There was no history of hypertension, diabetes mellitus or any other prior comorbidities. On general examination pulse was 106 beats per minute, regular, blood pressure was 120/70 mm hg in right arm supine position, respiratory rate was 32 breaths per minute and spo2 was 86 percent on room air. On systemic examination there were bilateral bronchial breath sounds present. In the infra mammary region, Heart sounds were normal, Patient was conscious, oriented and abdomen was soft, non tender with no organomegaly.

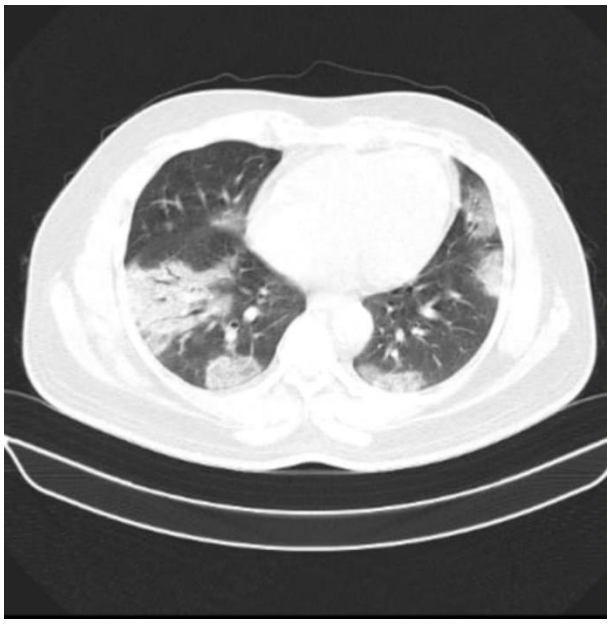

Figure 1 Showing Bilateral Ground Glass Opacity on HRCT Thorax

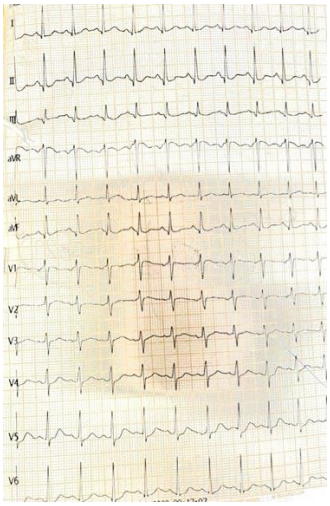

Figure 2 ECG Suggestive of Sinus Tachycarida

HRCT thorax was done which was suggestive of extensive bilateral ground glass opacity with a CT Severity Score of 15/25 and CORAD 5 (figure 1). A Nasopharyngeal swab was done for Reverse Transcription Polymerase Chain Reaction which turned out to

be positive for COVID-19. Patient was admitted in the intensive care unit and was managed with remdesavir, steroids, high flow oxygen and other supportive measures. Patient's lab investigations were indicative of increased inflammatory markers (Table 1). During the course of hospital stay, patient's oxygen saturation decreased further and he was taken on non-invasive ventilation on day 5 of his admission. Fio2 was gradualy decreased and patient was shifted to oxygen support on day 9 of his admission. Oxygen was tapered and it was observed that patient had saturation of 98 percent on 4 litre of oxygen support in supine position while he had 90 percent of oxygen saturation on 4 litre oxygen support in sitting position which was confirmed by an arterial blood gas analysis.

Patient was supported with oxygen and physiotherapy and oxygen was gradually tapered. An ECG was done showing sinus tachycardia (figure 2) with 2D echocardiography was done which showed normal left and right ventricular functions with no pericardial effusion or evidence suggesting pulmonary embolism (figure 3). Chest physiotherapy was continued and steroids were tapered and stopped after 15 days. His oxygen saturation improved and patient was ultimately discharged after 24 days of hospitalization and is doing well on follow up for pulmonary rehabilitation.

Table 1 showing Lab investigations of the case

CBC	Hb-13.6gm/dl MCV-85fl Platelet count-112000/dl WBC Count-6500/dl
LFT	Total Protein-7.1gm/dl, Albumin3.5gm/dl, Globulin3.6gm/dl, aspartate aminotransferase 20 units/l , alanine aminotransferase 24 units/l, AlkanlinePhophatase93IU/l, Total Bilirubin :1.3mg/
KFT	Creatinine:0.9mg/dl, Urea37mg/dl, Sodium133mmol/l, Potassium -4.2mmol/l
CRP	43.0mg/dl
D-Dimer	1.13
Serum Ferritin	446ng/ml

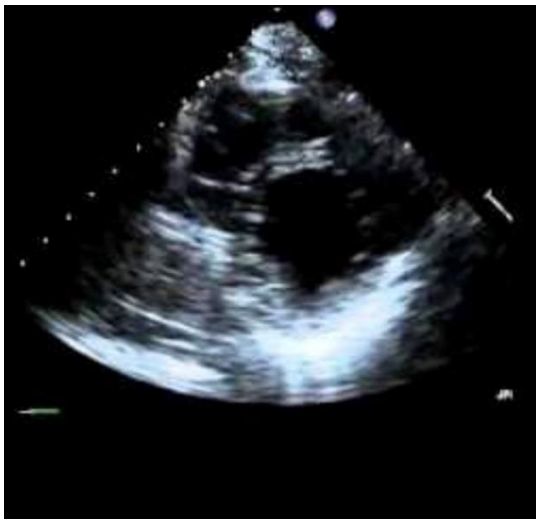

Figure 3 Showing Normal 2D echo study of the patient

3. DISCUSSION

Platypneaorthodexia syndrome is a rare entity in which patient has breathlessness and hypoxia while changing posture from supine to sitting or standing posture. A fall in spo2 of more than 5 percent and in paO2 of more than 4 percent is essential to make a diagnosis of POS. Altman and robin first described the term playpnea and orthedexia respectively and the first case of platypneaorthodexia was reported in 1949 which was post traumatic intrathoracic arteriovenous shunt.

The pathophysiology of POS is basically mixing of the deoxygenated venous blood with oxygenated arterial blood resulting in desaturation. This shunting is exaggerated in the upright posture hence leading to breathlessness and hypoxia. In pulmonary causes this shunting occurs due to non-cardiac causes like the formation of a pulmonary arteriovenous malformation. In the upright posture there is increase in blood flow to gravity dependent lower zones of the lung thus causing increase in shunting through arteriovenous malformation and aggravation of symptoms. Similar mechanism can be seen in patients with cirrhosis and hepatopulmonary syndrome. However, diseases effect the parenchyma of the lung, such as emphysema, interstitial lung diseases and pneumonia preferentially effecting the basal portion of the lung leads to a profound mismatch of ventilation and perfusion. This V/Q or ventilation/perfusion mismatch is more in the upright position due to preferential blood flow to the base of the lung by the effect of gravity (Singh et al., 2020).

In the case of COVID-19, there is predominant involvement of bilateral lower lobes of the lung as well as the posterior aspect of the lung (Jain et al., 2020). This leads to a ventilation and perfusion mismatch in upright posture due to poorly ventilated lower lobes which receive more blood due to gravity (Talwar et al., 2021). Pulmonary microangiopathy and microthrombosis in COVID-19 are also possible etiology for POS (Tan et al., 2020). In our patient bilateral lower lobe involvement was present thus there was a ventilation perfusion mismatch more profound in the sitting or upright posture when more blood was directed to the diseased lower lobe of the lung. Thus we report a case of Platypneaorthodexia syndrome in COVID-19 pneumonia. With the given common involvement of lower and posterior segment of lung in COVID-19, POS is highly under reported. The reason for this under reporting might be lack of checking of saturation with positional variation in COVID-19 also when the patients are started to mobilize in the recovery stage of COVID-19 the lesions of lower lobe might be in recovering phase thus reducing the hypoxemia. Lack of awareness in physicians about this rare syndrome might also be a cause behind the scarcity of its reporting.

Hence we highlight that though rarely reported Platypneaoethodexia might be commonly encountered entity by physicians in COVID-19 given the lower lobe infilteration in COVID-19. This can be easily managed with chest physiotherapy and oxygen therapy and hence is important to diagnose promptly.

4. CONCLUSION

Thus we report platypneaorthodexia syndrome, a rarely reported entity which the physicians need to be on a look out for as it can be commonly expected in COVID-19 due to the bilateral lower lobe involvement. Knowledge about this rare syndrome is essential for the physicians as its knowledge can help in prompt diagnosis and management and thus help in recovery from hypoxia in COVID-19 patients.

Acknowledgement

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Conflict of interest

The Authors have no conflicts of interest that are directly relevant to the content of this clinic-pathological case

Financial Resources

There are no financial resources to fund this study

Informed Consent

Informed Consent was obtained from the patient.

Author's contribution

All the authors contributed equally to the case report.

Data and materials availability

All data associated with this study are present in the paper.

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