Platypnoea-orthodeoxia syndrome in an older patient with COVID-19 pneumonia and orthostatic hypotension – a case of prolonged hospital admission.

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Abstract
An 89-year-old woman was admitted to hospital with a fall, general malaise and low oxygen saturations. She tested positive for SARS-CoV-2 and commenced on standard therapy for COVID-19 pneumonia. She improved initially but reported ongoing dyspnoea exacerbated by position. Following investigations to rule out other causes, she was given a diagnosis of platypnoea-orthodeoxia syndrome (POS). She was treated with gradual verticalization therapy with supplemental oxygen and subsequently discharged to an intermediate care bed (ICB).
Keywords: COVID-19, Platypnoea, Frailty, Older people.

Keypoints:
- Platypnoea Orthodeoxia Syndrome is a rare but potentially reversible consequence of COVID-19 pneumonia.
- Early gradual verticilization therapy is key in the management of platypnoea-orthodeoxia syndrome (POS) secondary to COVID-19 pneumonia.
- A holistic approach should be adopted in the management of older patients with platypnoea-orthodeoxia syndrome (POS).

Case Report

An 89-year-old woman with background of orthostatic hypotension, heart failure, chronic obstructive pulmonary disease and chronic kidney disease was admitted to hospital with a fall, malaise, and low oxygen saturations. Prior to admission, she was independent with activities of daily living (ADLs) and did not require any formal carer support.

Chest auscultation revealed bilateral crackles, expiratory wheeze and reduced air entry bilaterally. She was hypoxic but maintained oxygen saturations at 96% with FiO2 60% supplemental oxygen therapy via Venturi mask. Remaining cardiological, abdominal and neurological examinations were unremarkable.
She tested positive for SARS-CoV-2 and was commenced on standard therapy of dexamethasone 6mg once daily for ten days and supplemental oxygen. She was weaned off oxygen on Day 17 of admission.

Review by the physiotherapists revealed a postural fall in her oxygen saturations from 96% (supine) to 77% (upright) associated with significant dyspnoea and dizziness. Her saturations improved after two minutes in the upright position to 91% with 2L of supplemental oxygen via nasal cannula. When transferred from sitting to standing, her blood pressure dropped from 84/45 to 67/36 and therapy was abandoned. Oxygen saturations returned to 97% on air after two minutes in bed in the supine position.

Her symptoms raised suspicion of POS and further investigations were instigated to elicit the cause of her positional oxygen desaturation. A trans-thoracic echocardiogram did not show evidence of patent foramen ovale (PFO). A bubble Echocardiogram was not pursued in view of her frailty as it was felt she would not be fit for PFO closure surgery. A CT pulmonary angiogram ruled out pulmonary embolism but showed extensive bi-basal ground glass changes in keeping with COVID-19 pneumonia.

A diagnosis of POS secondary to COVID-19 pneumonia was made. The patient continued gradual verticalization therapy with supplemental oxygen aiming to maintain saturations above 90%. Her tolerance to this was limited due to postural dizziness secondary to orthostatic hypotension which improved with fludrocortisone. Her symptoms of POS gradually improved until she was safe for discharge to ICB.

Discussion

POS is a rare clinical entity characterised by dyspnoea and oxygen de-saturation while in the upright position [1]. It is defined as a drop in PaO2 >4mmHg or SaO2 >5% from a supine to an upright position. Its aetiology is broad and includes right-to-left intra-cardiac shunts, chronic pulmonary disease and liver disease. Several case reports have described reversible POS secondary to severe COVID-19 pneumonia [2–4]. The true prevalence of POS is unknown, and a high index of suspicion is required to consider the diagnosis.

The mechanism of POS in COVID-19 pneumonia is poorly understood. Tan et al. (2020) proposed that it is a result of gravitational shunting of blood to the lower lung zones leading to wasting of ventilation, as posterior and lower zone parenchymal involvement is common in COVID-19 Acute Respiratory Distress Syndrome. This results in significant V/Q mismatch, so called the Zone 1 phenomenon [2]. In the context of orthostatic hypotension, a postural fall in cardiac output can augment this V/Q mismatch.

POS poses significant challenges in the rehabilitation of patients who have survived COVID-19 pneumonia and can result in prolonged hospital stay. The mainstay of treatment in this case as proposed by Tham et al. is gradual verticalization therapy to facilitate safe mobilization and to help regain functional ability to perform ADLs [5].
Conclusion

In older people, a holistic approach should be adopted in the investigation and management of POS. Early physiotherapy with gradual verticalization therapy and supplemental oxygen is recommended for POS secondary to COVID-19 pneumonia. Optimisation of co-morbidities is essential in minimizing the effects of POS and to increase chances of successful rehabilitation.

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