

## Letter to the Editor

# Hypoxia and thrombosis in COVID-19: new considerations for air passengers

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Submitted 13 July 2020; Revised 19 July 2020; Editorial Decision 20 July 2020; Accepted 20 July 2020

**Key words:** Coagulopathy, silent hypoxia, oximeter, endotheliopathy, oxygen saturation, venous thromboembolism

It is well known that the number of aircraft passengers in the years preceding the COVID-19 pandemic exceeded 4 billion, with 11 million occupying the airspace on any given day.<sup>1</sup> International arrivals exceeded 1.1 billion in 2015.<sup>2</sup> Previous studies have noted that environmental and physiological changes that occur during routine commercial flights may lead to mild hypoxia and gas expansion, which can exacerbate chronic medical conditions or induce acute in-flight medical events. One study found a reduction in oxygen saturation (SpO<sub>2</sub>), as measured by a pulse oximeter from 97% at ground level to 93% at cruising level in healthy travellers.<sup>3</sup> Globally ~10 million cases of venous thromboembolism (VTE) occur annually. It is one of the leading causes of global morbidity and mortality and is the commonest cause of hospital-acquired death. It is also associated with long-haul flights.<sup>4</sup>

International travel led to the spread of the COVID-19 pandemic.<sup>5</sup> COVID-19 has at least two effects relevant to air travel. Firstly, unlike normal pneumonia, in which patients experience cough, chest discomfort and significant breathing difficulties, initially COVID-19 pneumonia patients do not always experience such symptoms, causing a condition termed as ‘silent’ or ‘happy’ hypoxia. This may be aggravated by the hypobaric cruising cabin altitude pressure. The reason for silent hypoxia is that the virus only causes the air sacs to collapse, reducing the oxygen levels but carbon dioxide removal remains normal. It is important to detect hypoxia in these patients before they begin to experience dyspnoea so that an early intervention may prevent the lungs from deteriorating. Secondly, COVID-19 has also been associated with coagulopathy and endotheliopathy with resultant VTE’s.<sup>6</sup> This has already been documented in a traveller.<sup>7</sup>

Current projections indicate that the COVID-19 pandemic is likely to last for a considerable period. As at 9 July 2020 more than 12 million cases of the disease have been reported

(as per <https://www.worldometers.info/coronavirus/> website). As many economies return to normal, commercial aircrafts will resume operations whilst implementing preventative strategies. Pre-boarding as well as on-board pulse oximetry screening can be used for early detection of silent hypoxia in unwell passengers boarding long haul commercial aircrafts. It is an easy to use device and may mitigate the risk of an in-flight medical emergency requiring a flight diversion. The Federal Aviation Administration does not currently mandate the device as part of its emergency medical equipment though most major airlines carry them.

It has been theorized that the hypoxic cruising altitude cabin pressure may predispose to VTE on long-haul flights. Identified risk factors may be accentuated by the procoagulatory effects of undiagnosed or resolving COVID-19 and increase the risk of VTE’s. The ‘new normal’ pre- and post-travel consultation will need to take all these considerations into account. A scenario of a traveler with known risk factors of being obese, pregnant, and being a known smoker,<sup>8</sup> immobilized in a window seat on a 19-hour flight with underlying hypoxia and coagulopathy due to COVID-19 may just be the perfect storm for VTE.

## Acknowledgments

The inputs of Dr Arifa Parker and Dr Sa’ad Lahri are acknowledged. Both authors read and agreed on the final manuscript.

## Funding

No funding was involved.

## Conflict of interest

None declared.

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