

# IPCRG practice driven answers on COVID-19 and respiratory questions



## What is the role of pulmonary microemboli in breathlessness in post-COVID syndrome and what is the best treatment?

### What the research says

Pulmonary microemboli have been proposed as a potential mechanism of hypoxemia in patients with acute COVID-19 illness (Herrmann et al 2020; McFayden et al 2020). Pulmonary emboli (PE) may arise due to the hypercoagulopathy associated with COVID-19 in some patients resulting in the formation of venous thromboses and relocation of thrombotic fragments to the lung vasculature. Microthrombotic fragments have the potential to reduce lung perfusion through blockade of the smallest pulmonary vessels, reducing the capacity for blood oxygenation and resulting in hypoxemia.

To date, there is no evidence for or against a direct pathophysiological link between pulmonary microemboli and either hypoxemia or breathlessness in people with acute COVID-19 illness or post-COVID syndrome (PCS). Moreover, the diagnosis of pulmonary microemboli is challenging as they are frequently not visible on traditional computerised tomography (CT) or ventilation-perfusion (VQ) scanning. Where PE is suspected, low plasma D-dimer levels can be considered to rule out thrombotic illness (Rostami and Mansouritorghabeh 2020; Revel et al 2022), although normal D-dimer levels are not sufficient to rule out the presence of pulmonary microemboli.

### What this means for your clinical practice

- Although no specific investigations or treatment are currently recommended with regards to pulmonary microemboli in the context of persistent breathlessness in patients with PCS, D-dimer levels may be useful to rule out thrombotic illness
- For patients with PCS and persistent breathlessness consider and exclude cardiac causes, deconditioning, weight gain and specific pulmonary causes such as fibrosis or asthma
- Consider PE for patients presenting with persistent breathless along with other signs and symptoms suggestive of PE including chest pain, cough, rapid or irregular heartbeat, dizziness, leg pain or swelling, excessive sweating, or fever.

### Authors

With grateful thanks to Dr Alan Kaplan (Chair Family Physician Airways Group of Canada) for and on behalf of the IPCRG practice driven answers review group.

## Useful links and supporting references

Herrmann J, et al. Modeling lung perfusion abnormalities to explain early COVID-19 hypoxemia. *Nat Commun* 2020;11:4883. Available at: <https://pubmed.ncbi.nlm.nih.gov/32985528/> Accessed November 2022.

McFayden JD, et al. The emerging threat of (micro) thrombosis in COVID-19 and its therapeutic implications. *Circ Res* 2020;127:571–87. Available at: <https://pubmed.ncbi.nlm.nih.gov/32586214/> Accessed November 2022.

Rostami M, Mansouritorghabeh H. D-dimer level in COVID-19 infection: a systematic review. *Expert Rev Hematol* 2020;13:1265–75. Available at: <https://pubmed.ncbi.nlm.nih.gov/32997543/> Accessed November 2022.

Revel MP, et al. What level of D-dimers can safely exclude pulmonary embolism in COVID-19 patients presenting to the emergency department?. *Eur Radiol* 2022;32:2704–12. Available at: <https://pubmed.ncbi.nlm.nih.gov/34994845/> Accessed November 2022.

**Last reviewed: 9 December 2022**

**Disclaimer:** The content is drawn from the references listed above. Wording has been adapted for clarity and applicability for the primary care context. The content does not imply direction by the IPCRG nor does it form a position of the IPCRG on this subject. The content may be adapted as new evidence arises. This content is advisory; it is intended for general use and should not be regarded as applicable to a specific case. The IPCRG is a registered charity [SC No 035056] and a company limited by guarantee (Company No 256268). Communication address: 19 Armour Mews, Larbert, FK5 4FF, Scotland, United Kingdom