

# Recovered Covid-19 patients may be at risk of developing blood clots: Study

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People who have recovered from Covid-19, regardless of the severity of their disease, may be at risk of developing blood clots because of an overactive immune system, according to a study by local scientists.

Blood clots, especially in arteries that are linked to vital organs, can increase a person's risk of heart attack, stroke or organ failure.

Blood samples from 30 patients who had recovered from mild, moderate and severe Covid-19 were collected a month after their discharge from hospital.

All were found to have blood vessel damage, possibly arising from a lingering immune response, which could trigger the formation of blood clots.

Around half of the patients had pre-existing cardiovascular risks such as diabetes and hypertension, which put them at higher risk of blood clotting, said Assistant Professor Christine Cheung from Nanyang Technological University's Lee Kong Chian School of Medicine yesterday.

Prof Cheung's colleague, research assistant Florence Chioh, who is the first author of the study, said the Sars-CoV-2 virus may attack the linings of blood vessels, causing inflammation and damage, resulting in leakage and triggering blood clotting.

## INFLAMMATORY PROTEINS

But the researchers discovered that even after the patients had recovered, they continued to have high levels of inflammatory proteins called cytokines – which are produced to activate an immune response against pathogens.

In another study led by Dr Eugene Fan, a consultant at Tan Tock Seng Hospital's Department of Haematology, it was found that four patients who had recovered from asymptomatic Covid-19 infection had suffered from arterial thrombosis, or blood clotting in the arteries, weeks after their recovery.

Two of them had a stroke, one had a heart attack, and the other had acute limb ischaemia, which refers to a significant decrease in blood flow to the limb.

One of the four patients had diabetes, while the rest did not have any cardiovascular risk factors that would predispose them to the risk of blood clotting.

Dr Fan said: "This could be a result of several mechanisms, one of which is increased platelet activation, where blood platelets are more sticky post-infection and can lead to blood clot formation.

"Another is the chronic inflammation of the blood vessel lining – known as endotheliitis."