

Asymptomatic SARS-CoV-2 Infection: What is the next step after lockdown?

An important challenge for returning to normality is the prevalence of asymptomatic infection and the question of whether such individuals could sustain community virus transmission.

Two independent studies in the Lancet Infectious Diseases Journal by Sakiko Tabata and colleagues and Ivan Fan-Ngai Hung and colleagues have focused on the COVID-19 outbreak on board the Diamond Princess cruise ship during February 2020. They retrospectively and prospectively compared asymptomatic with presymptomatic infection.

Screening for viral shedding of all individuals on board was done when the ship was docked in Japan and those who tested positive were hospitalised.

Individuals who tested negative and who returned to their country of residence were further quarantined and monitored for infection.

These control measures provided an opportunity for studying asymptomatic infection.

A previous study had found that half of the 634 passengers who screened positive for SARS-CoV-2 while on board the Diamond Princess ship were asymptomatic. (Although whether these individuals remained asymptomatic until infection resolution was not prospectively determined).

Of the 43 individuals positive for SARS-CoV-2 on PCR test who were also asymptomatic on admission to a hospital in Tokyo, ten developed COVID-19 including severe lung disease.

Of the 215 asymptomatic individuals who returned to Hong Kong for further quarantine eight became PCR swab positive and three of them eventually developed symptoms. A ninth individual was seropositive on PCR testing and had abnormalities on chest CT scan but remained asymptomatic.

All the individuals from both studies were monitored until discharge from isolation.

Unfortunately, neither of the studies were able to identify the time from initial exposure to the virus that led to infection. PCR swab positivity can persist for weeks and is subject to sampling error, the comparison between asymptomatic and symptomatic cases can be confounded by the difference in time from virus exposure.

However notwithstanding this, both these studies describe two remarkable features:

First the presence of comorbidities did not appear to increase susceptibility to symptomatic infection or even disease outcome, instead old age appeared to be the only demographic feature that differentiated symptomatic from asymptomatic outcome in the individuals in Hong Kong as well as differentiating severe from mild cases in the Japanese hospital.

Second almost 50% of asymptomatic individuals showed radiographic changes including ground glass opacities on chest CT scans.

The Hong Kong study also found the patients with CT scan abnormalities had higher concentrations of SARS-CoV-2 spike protein and nucleoprotein antibodies than those with normal CT scans, regardless of whether they were symptomatic or asymptomatic.

These facts appear to suggest that the type of infection and extent of infection might not differentiate symptomatic from asymptomatic cases. This suggests that some patients can tolerate a certain extent of lower respiratory tract infection without developing any symptoms.

Besides the extent of lung infection, differentiation between symptomatic and asymptomatic outcomes could be related to the type of host response to the infection.

In the Japanese study but not in the Hong Kong study, a significantly increased serum lactate dehydrogenase was observed in presymptomatic individuals compared with the asymptomatic individuals. Lactate dehydrogenase is a marker of pyroptosis, which is an inflammatory form of programmed cell death. Pyroptosis releases proinflammatory molecules such as IL-1, which has previously found to be expressed before decreased respiratory function and peak expression of other cytokines. Pyroptosis could therefore be an initiator of pulmonary inflammation and symptomatic disease.

These studies have helped to review asymptomatic and presymptomatic infections, which can help to determine clinical insights in to how the COVID-19 disease progresses.

The London General Practice has kept abreast with all features of the coronavirus and COVID-19 pandemic. It is providing a travel service for swabs and antibody testing and is happy to see patients face to face wearing full PPE. If you have any medical concerns do not hesitate to be in touch.

Dr Paul Ettlinger
 Founder
 The London General Practice