

## Long-COVID

- i** *Long-COVID is generally defined as COVID-19-related symptoms that are present 28 days or more after the onset of acute COVID-19 infection.*
- i** *Common symptoms in long-COVID include fatigue, persistent anosmia, dyspnoea, myalgia, persistent cough and headaches, although a diverse array of symptoms have been reported.*
- i** *There is no role for routine testing in patients suspected of having long-COVID. A documented history of acute COVID-19, or a positive antibody test, support the diagnosis of long-COVID, although owing to suboptimal test sensitivity and coverage, these are not required to make the diagnosis.*
- i** *An individualized approach to management is recommended, based on patient symptoms and goals, and taking into account patient comorbidities. Where feasible, a multidisciplinary team approach is likely to be most useful, with the inclusion of doctors, physiotherapists, occupational therapists, and psychologists amongst others.*

### Background

In the aftermath of the first wave of COVID-19, reports began accumulating of patients having persistent or new symptoms following acute COVID-19 infection. This phenomenon is now most commonly referred to as “long-COVID”. Although there is no international consensus definition, it is usually defined as symptoms due to COVID-19 being present 28 days after the onset of the acute infection.<sup>1</sup>

### Epidemiology and pathogenesis

A study in Britain reported that COVID-19 symptoms were present in 13% of patients at 1 month, 5% at 2 months, and 2% at 3 months.<sup>2</sup> Risk factors for prolonged symptoms in that study included having more than 5 symptoms initially, older age, and female sex. The severity of the initial disease is also predictive of long-COVID, with hospitalised patients and those with abnormal chest auscultation at presentation being more likely to have persistent symptoms at days 30 and 60.<sup>3</sup> In this cohort of patients who sought medical attention (a group somewhat more severely affected than the general population), approximately two-thirds of patients had symptoms at both 1 and 2 months.

The pathogenesis of long-COVID is likely to be multifactorial, with different causes in different patients. Postulated mechanisms include a post-infectious inflammatory syndrome, skeletal muscle deconditioning, residual end-organ damage, and symptoms due to anxiety, depression or posttraumatic stress disorder (PTSD).<sup>4-6</sup>

## Clinical features

The most common clinical features reported in long-COVID, each present in a half or more of patients, are fatigue, anosmia, dyspnoea, myalgias, persistent cough, myalgias, fever, and headaches.<sup>2,3</sup> However, a diverse array of symptoms have been reported, including diarrhoea, tinnitus, palpitations, memory and sleep disturbances, and peripheral neuropathy. Some symptoms may only start for the first time 3-4 weeks after the acute COVID-19 infection.<sup>2</sup> It is also important to consider psychological symptoms and syndromes that may follow COVID-19 infection, including depression, anxiety and posttraumatic stress disorder.<sup>7-9</sup>

Despite their ongoing symptoms, patients with long-COVID do not need isolation, as they are not infectious.

## Exclusion of other causes

- A thorough history and examination is recommended to exclude other causes or to make a differential diagnosis linked to long-COVID. Particular attention should be paid to excluding alternative causes in patients with unusual symptoms such as weight loss, and those with a history of cancer or other significant comorbidities, etc.
- Known sequelae of COVID-19 that warrant consideration include myocarditis, pulmonary embolism and stroke. However, these are not likely to be present in most cases of long-COVID.
- There is no role for routine investigations in long-COVID, other than those guided by the history and examination.
- A history of a positive test for acute COVID-19 (by PCR or antigen test), or a positive antibody test at the time of either acute infection or suspected long-COVID, would support the diagnosis of long-COVID. However, as these tests have suboptimal sensitivity, a positive result is not an absolute requirement to make the diagnosis. Conversely, a history of a positive COVID-19 test in a patient with new or ongoing symptoms does not necessarily indicate that long-COVID is the cause.

## Management – general principles

- Patients should be reassured that the majority of symptoms resolve with time. However, patients with troublesome symptoms or with symptoms that fail to resolve in 6-8 weeks should be advised to seek medical attention.
- Focus is on slow and stepwise rehabilitation and symptom alleviation. There is no specific pharmacological therapy for long-COVID.
- Most guidance at this stage is based on common-sense extrapolations from what is known about rehabilitation and symptom alleviation in other similar contexts. Robust evidence from patients with long-COVID specifically is eagerly awaited.
- An individualized approach is recommended, based on patient symptoms and goals, and taking into account patient comorbidities.

- The optimal rehabilitation strategy is likely to cut across several disciplines. A multidisciplinary team approach is likely to be most useful when available, with the inclusion of doctors, physiotherapists, occupational therapists, and psychologists amongst others.
- Close attention should be paid to optimizing the management of any comorbidities, to ensure that these conditions are not contributing to the ongoing symptoms.

### Specific strategies that may be useful

- Fatigue and low energy levels may be helped by graded exercise programs, tailored towards the individual. Key features are careful pacing, prioritization and modest goal setting. Patients should engage in low intensity exercise initially, increasing gradually only if tolerated.<sup>5,6</sup>
- Where available, respiratory or cardiac rehabilitation programs may be useful particularly for those patients who had severe COVID-19, and/or who had significant underlying cardiopulmonary comorbidities.<sup>6</sup>
- Breathlessness and cough may respond to breathing control exercises.<sup>5</sup>
- Patients with long-COVID should be assessed for symptoms compatible with depression, anxiety or post-traumatic stress disorder. Stress reduction techniques, peer support, and referral to a psychologist or psychiatrist may be required.<sup>5</sup> COVID-19 may precipitate or unmask underlying psychiatric diseases.<sup>9</sup>
- Patients with anosmia may benefit from olfactory training.<sup>10</sup>
- Athletes or patients in physically demanding jobs who have confirmed COVID-19 myocarditis should ideally only resume high-intensity physical activity after a period of rest, and after their heart has been assessed as normal by echocardiography and ECG. Consultation with a cardiologist is advised.<sup>6</sup>

## References

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