

Air at rest; oxygen at movement!

India has seen a sudden surge of COVID-19 patients during the second wave in April-May 2021 and the existing health

care system was overburdened with an increased number of severe COVID-19 patients with high consumption and requirement of oxygen support. Many patients were cared in home-based oxygen and the clinicians were at times forced to discharge patients on low flow oxygen therapy to accommodate for new patients. As per the revised discharge policy by the

Ministry of Health and Family Welfare, Government of India, patients can be discharged if normal oxygen saturation is maintained $>95\%$ without oxygen support for three consecutive days.^[1]

However, we observed that pulmonary reserve is significantly reduced in many patients recovering from the severe COVID-19. Various factors have been attributed to this finding. COVID-19 causes extensive injury to alveolar epithelial cells and endothelial cells with secondary fibroproliferation,^[2] which leads to chronic vascular and alveolar remodeling leading to lung fibrosis and/or pulmonary hypertension.^[3] Impairment of diffusion capacity was observed in as many as 40% of patients recovering from COVID-19.^[4] Huang Y *et al.*^[5] observed that impaired diffusion capacity, reduced respiratory muscle strength, and lung imaging abnormalities were present in more than half of the COVID-19 patients in the early convalescence phase and these factors may lead to desaturation with minimal exertion in these patients.

These patients often have a normal resting saturation in room air. But the number of $\text{SpO}_2 >95\%$ on the monitor can often be misleading and gives a false sense of assurance. When these patients are subjected to minimal exertion such as standing out of bed, coughing, or passing stools, their pulmonary reserve is not able to meet the increased oxygen demand and SpO_2 often falls substantially requiring oxygen supplementation. Moreover, early morning desaturation is common in the wards and ICUs as most of the patients pass stools in the morning, get personal care including change of clothes, bed-sheets, physiotherapy, and exercises in morning hours triggering increased oxygen requirement. In certain wards, patients are allowed to go to the washroom, as they have acceptable SpO_2 in room air at resting condition, which may invite the risk of unattended collapsed patients in the

washroom. Although such findings may be observed in other patients presenting with acute cardio-respiratory failure and hypoxia, in the current COVID-19 pandemic overwhelming number of sick patients and mounting pressure on clinicians for early discharge to increase bed availability may raise the risk of premature discharge of such patients without considering the possibility of oxygen requirement on exertion.

Therefore, it is very important to be vigilant in the care of the severe COVID-19 patients who have been recovering and awaiting discharge. ICUs should formulate their standard operating procedure (SOPs) to prevent any untoward event. A sample SOP followed in the ICU step-down unit of our hospital is provided in Table 1. Patients who have normal SpO_2 at room air but become hypoxic at minimal exertion on normal activities of daily living should be identified. A six-minute walk test may be performed in these patients. Extra caution should be exercised in the care of these patients including the arrangement of post-discharge home oxygen therapy. At discharge, they should be counseled regarding the gradual escalation of daily activities and the use of oxygen. However, the efficacy of the SOP remains to be tested in a large number of patients for any possible outcome benefit.

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Conflicts of interest

There are no conflicts of interest.

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Table 1: A sample SOP for recovering severe COVID-19 patients followed in the ICU step down unit of our hospital

Components of care

Patients should be kept in a ward with provision for oxygen supply
Regular monitoring of SpO_2 3-4 hourly
Monitoring of SpO_2 during mobilization of patient out of bed, defecation, physiotherapy, exercises etc.
Provide oxygen therapy if $\text{SpO}_2 <90\%$ on movement and/or symptomatic dyspnea
Perform 6 minute walk test before discharge
Advise the patient to self-monitor SpO_2 during movement after discharge and arrange provision for oxygen concentrator at home in suitable patients
Advise stool softener, encourage breathing exercises and incentive spirometry


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