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Letter to the Editor

Tailored Post-Acute Care Coordination for Survivors of Moderate to Severe COVID-19 Infection



The severe acute respiratory COVID-19 pandemic has raised issues about its acute and chronic management.¹ In particular for patients requiring respiratory support due to severe hypoxic acute respiratory failure,^{2,3} and presented with critical symptoms with persistence of radiologic, clinical, and functional symptoms.⁴ Thus, they need tailored follow-up during the so-called chronic or long-phase of the infection.⁵ The common intention is to prospectively perpetuate a coordinated patient's continuity in the care-line helpful for clinic and research purposes focused to reduce unnecessary hospitalizations, to avoid unmotivated specialist follow-up, to promote multidisciplinary approach, and most of all to confirm the patient centrality in the health care system. The care path is usually structured to actively link 3 different parts: *managerial*, relates to the management offered to assist and support the hospital health-care organization; *clinical*, includes all the diagnostic and therapeutic services offered within the hospital; and *global*, includes all different patient/person needs and not only clinical.

A few studies have already evaluated the post-COVID-19 lung sequelae highlighting the need of postdischarge follow-up for patients with more severe lung involvement, such as: hypoxic acute respiratory failure and acute respiratory distress syndrome who presented with lung involvement persistence (ground glass opacities, interstitial thickening, residual consolidation, and various shades of interstitial lung disease).⁶ Also, neurologic, dermatologic, immunologic, musculoskeletal, and chronic fatigue features have been extensively described in the literature.⁷ This promoted the initiation of the long-term COVID-19 care-coordination multidisciplinary program that follows.

The tertiary Policlinic University Hospital started this specific follow-up process (ethics committee 6847-04/2021) for patients who presented outcomes or sequelae of COVID-19 infection, reformulating an organizational model based on previous disease management programs and chronic care models, which are now the organizational-operational reference for all the most significant experiences in Italy and abroad in the area of acute and chronic care.

The integrated patient management program agreed within the health care system regional parts was based on (1) an articulated

and proactive treatment path and (2) a personalized follow-up plan. The logical-conceptual framework underlying integrated management and coordinated proactive follow-up relates to “managed care” opposite to “usual care” and is based on a structured and collaborative perspective health care delivery model of integration among various multidisciplinary professionals to improve patients' health status.

The respiratory physician acts as disease manager and links the discharged patient to the plan of continuity of long-term care ensuring that each patient needing a high or medium intensity of care requiring various respiratory supports such as proning, high-flow nasal cannula, noninvasive ventilation, invasive mechanical ventilation, or extracorporeal membrane oxygenation is included in the program, being responsible to monitor and to combine the acute care system to the activity of the outpatient clinic. In **Table 1**, the screening scheme for patients to be included in the program is detailed. The disease management team reaches out to discharged patients to ensure correct and timely follow-up postdischarge. Often this is only possible after a pulmonary rehabilitation step, which gains its fundamental role in the adequate early assessment with pre-discharge symptoms of fatigue, anxiety, depression, and dysphagia. An outpatient visits schedule was ideated and planned by the Apulia region government at 3, 6, 9 (optional), and 12 months postdischarge. In each outpatient follow-up, a full physical examination, respiratory functional/muscular tests, and lung ultrasonography are performed.⁹ In this tertiary clinic hospital, the routine of outpatient follow-up has dramatically changed: indeed, 5 days a week ongoing dedicated post-COVID-19 outpatient follow-ups with an average of 5 patients seen per day has been added, on top of the usual routine for chronic respiratory diseases. This has been causing a further postponing of the previous outpatient agenda. Furthermore, a multidisciplinary network of specialists is usually consulted in support of the main core of respiratory physicians formed by cardiologists, physiatrists, psychologists, neurologists, gastroenterologists, nutritionists, psychiatrists, and dermatologists (**Figure 1**). Moreover, a remote health care team offers teleconsulting (TC) via a multidisciplinary core of physicians and psychologists either for a single patient or group of patients depending on a first assessment talk and on each patient's need.

During all phases of the clinical follow-up, quality questionnaires are provided to ensure that good feedback from the patients is collected to further improve the follow-up program.¹⁰ In conclusion, patients with recent moderate to severe COVID-19 infection admitted with high intensity of care and hypoxic acute respiratory failure need a tailored, comprehensive follow-up to safely transition and continuously improve from the acute to a long chronic phase. The structured follow-up program should be based on the key presence of COVID-19 respiratory disease manager linked to a large network of other multidisciplinary

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Table 1
Inclusion and Exclusion Criteria for Coordinating Acute-to-Chronic Care of Patients With Severe COVID-19 Infection During Admission in Hospital

Grading of COVID-19 Infection	Inclusion Criteria		Exclusion Criteria
	High Care Intensity	Medium Care Intensity	
Radiologic grading of COVID-19 infection.	Proved COVID-19 infection. Cough, fever, sign of severe interstitial pneumonia on chest X-Ray, lung ultrasound and/or CT-scan	Proved COVID-19 infection. Cough, fever sign moderate to low interstitial pneumonia on chest X-Ray, lung ultrasound and/or CT-scan	Proved COVID-19 infection. Mild respiratory symptoms with no sign of interstitial pneumonia on chest X-Ray, lung ultrasound and/or CT-scan. Treated at home
Clinical grading of COVID-19 infection	1. Pulse oximetry (SpO ₂) <92% in room air 2. Dyspnea, as defined by a Borg ⁸ scale score >3	1. Pulse oximetry (SpO ₂) between 92% and 96% in room air 2. Patients with dyspnea Borg ⁸ scale scores from 1 to 3	1. Pulse oximetry (SpO ₂) >96% in room air 2. Patients without dyspnea
Location of admission/home stay	Patients who required admission in RICU and/or ICU with high-flow oxygen requirements	Patients who required admission in infectious disease or internal medicine with low oxygen flow requirements	Patients who did not require admission and were treated at home
Oxygen requirements for COVID-19 admission	Patients with a Pao ₂ /Fio ₂ lower than 200, while breathing in room air or through Venturi mask measured after 1 h from hospital admission	Patients with a Pao ₂ /Fio ₂ included between 300 and 200 while breathing in room air or through Venturi mask measured during the whole hospital admission	
Respiratory support for COVID-19 infection	Patients requiring noninvasive respiratory support (ie, high-flow nasal cannula, noninvasive ventilation) or patients requiring invasive respiratory support (ie, intubation, invasive mechanical ventilation, extracorporeal membrane oxygenation, tracheotomy)		

specialists and other health care providers involved in COVID-19 patient care. Thus, we will be able to better comprehend all the complications related to the infection and prolonged admission and to provide constant support for the long-term chronic sequelae. This could be of support as a scheme plan for other tertiary hospitals worldwide similarly affected by the ongoing course of the pandemic.

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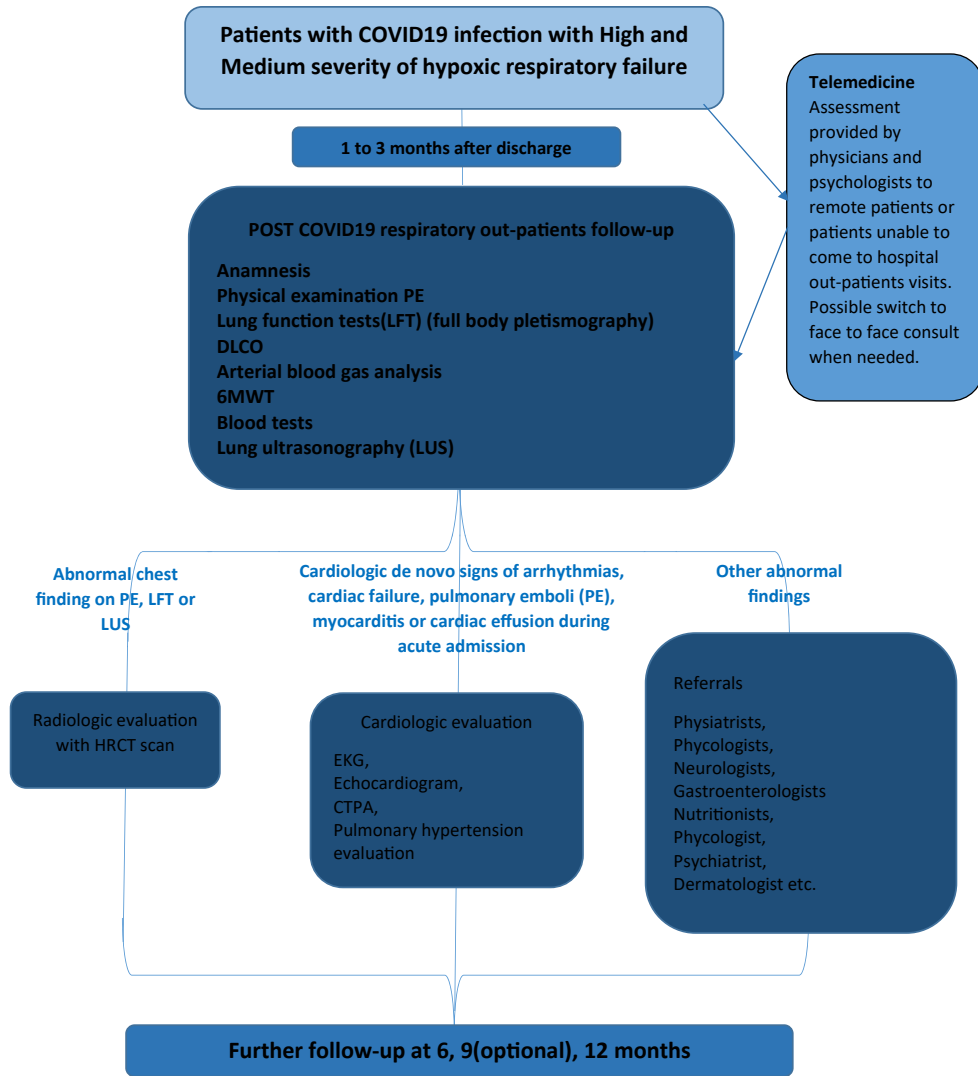


Fig. 1. Flow chart of the time of follow-up and multidisciplinary network of specialists consulted in support of the main core of respiratory physicians during post-COVID-19 outpatient visit.