Post Covid-19 Pulmonary Fibrosis: A Future Challenge

Shaheen Bhatty[1], Faiza Zafar Sayeed[2]

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We are facing a pandemic. It has been almost two years since the coronavirus disease erupted in Wuhan, China and took the whole world in its grasp due to its highly transmissible nature. It is spread from human-to-human through respiratory droplets. It has varied presentation ranging from asymptomatic carriers to covid pneumonia having high morbidity and mortality. It was also seen to be asymptomatic but transmissible in some individuals. Hand washing, social distancing and disinfecting touched surfaces readily were sufficiently effective in putting a stop to the chain of transmission. Covid-19 presents with fever, body aches, cough, and extreme lethargy which may resolve within a week, but certain patients develop moderate to severe presentation of the disease. Moderate spectrum of the disease has involvement of the lower respiratory tract on imaging with clinical symptomatology and an SpO_2 $\geq$94% at room air while patients with severe disease have either an SpO_2 < 94% on room air, SpO_2/FiO_2 ratio < 300mmHg, respiratory rate >30bpm or imaging evidence of greater than 50% lung infiltrates[1].

Patients having severe illness requiring long term oxygen or non-invasive/invasive ventilation are prone to develop pulmonary fibrosis which may have variable prognosis. Pulmonary fibrosis is a well-established long-term complication of Covid-19 pneumonia. Its pathogenesis is thought to be due to the exaggerated inflammatory response to the inciting agent as well as the remodelling process that occurs by the action of cytokines, inflammatory mediators and growth factors[2]. Severity of the disease plays a vital role in the development of lung fibrosis. Although the susceptibility to develop fibrosis is not yet clear, it has come into knowledge that individuals with comorbidities are more at risk of developing a severe disease than healthy young individuals. Age was also seen to contribute to this complication and patients above the age of 65 years were seen to develop pulmonary fibrosis more frequently. In contrast, very few patients below 50 years of age were reported[3]. Certain studies have shown that hypertension, deranged LDH and CRP values as well as lymphopenia and neutrophilia at disease onset are important factors predicting pulmonary fibrosis as a long-term complication. Symptoms of lethargy, malaise and shortness of breath present in acute disease are also linked to fibrosis[4]. Levels of IL-6 and albumin are also considered as independent risk factors for fibrosis[5]. A retrospective study of 99 patients conducted by Wong et al revealed that elevated levels of LDH at presentation carried a higher risk of fibrosis. It was also concluded in the same study that prolonged ICU stay or patients who required mechanical ventilation during hospitalization were more at risk[6,7]. Several studies discussing the follow-up CT scans of patients recovered from Covid-19 have shown that certain CT scan changes at initial presentation are predictors

[1-2] Department of Medicine, Civil Hospital Karachi

Correspondence: Dr. Faiza Zafar Sayeed
Department of Medicine,
Civil Hospital Karachi
Email: faiza.sayeed@hotmail.com
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of pulmonary fibrosis, such as interstitial thickening, coarse reticulations and parenchymal bands[7,8]. On the other hand in certain studies it was proved that CT changes do resolve entirely in 3 months or later so it cannot be presumed to be an irreversible sequelae[5].

Although research is ongoing for the treatment of post Covid-19 pulmonary fibrosis, it has been suggested that the use of antifibrotic drugs, used for idiopathic pulmonary fibrosis, can act pivotal in attenuating the deleterious effects of inflammatory markers on the lung. It is suggested that agents like pirfenidone and nintedanib be added to the treatment regimen of covid pneumonia preferably before starting the patient on mechanical ventilatory methods[9]. It is estimated that at least 2-6% patients with moderate illness go on to acquire pulmonary fibrosis. Certain studies also suggest that anti-inflammatory drugs if administered till 6 months following Covid pneumonia will have significant impact on declining the incidence of lung fibrosis[10].

Although resolution of CT findings in the lung and clinical improvement may be reversible in certain cases over a period of 2-3 months but managing such cases for a prolonged period is not cost-effective more so in our setup. So, there is a need to conduct trials to intervene with different anti-inflammatory and anti-fibrotic agents to arrest the progression in high-risk patients to overcome this morbid condition.

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