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International Journal of Physical Medicine and Rehabilitation

Case Report

COVID-19 Patterns with Chronic Respiratory Disease Patients: Case Series

Naglaa Hussein[1,2*], Matthew Bartels[2], Mark Thomas[3]

[1]Department of Physical Medicine, Rheumatology and Rehabilitation, Alexandria University, Alexandria, Egypt; [2]Department of Physical Medicine and Rehabilitation, Albert Einstein College of Medicine, New York, United States; [3]Department of Physical Medicine and Rehabilitation, Albert Einstein College of Medicine, Montefiore Medical Center, New York, United States

ABSTRACT

52-y-old asthmatic female developed severe COVID-19, intubated and recovered on oral and inhaled steroids. 87-y-old COPD, Cardiac man on continuous O2 therapy developed sudden death in one day after catching COVID-19 from family member.

Keywords: Asthma; COPD; COVID-19

INTRODUCTION

COVID-19 disease was found to have severe morbidity and mortality for those patients with prior chronic respiratory diseases as asthma and Chronic Obstructive Disease (COPD). The following cases presenting varieties of extreme severe morbidity and mortality of COVID-19 in chronic respiratory disease patients.

CASE DESCRIPTION

52 y-old asthmatic female physician, (never intubated), while recovering from asthma exacerbation, exposed to COVID from a patient, 4 days later, experienced Shortness of Breath (SOB), fever, nausea, rib pain. Deteriorated and admitted, COVID-19 swab positive, Chest x ray: extensive bilateral infiltrates. PO2 94, started on hydroxychloroquine, azithromycin, steroid inhaler, Montelukast, cetirizine, fluticasone. In 8 hours, worsening condition, PO2 (80-77). Elevated D-dimer and C-reactive protein, ESR. Negative troponin, normal liver and kidney functions.

Immediately intubated, ICU transferred. Anticoagulants started, 24 h later, ex-tubated, on 15 L O2 mask, continued SOB, impending mechanical failure, nail bed petechial hemorrhage. Immediately given Solu-Medrol. Partially improved. Continued steroids x 5 days. Transferred to floor on O2 15 L mask, oral prednisone 40 mg twice/day, IV Remdesivir. Discharged home in 2 weeks on tapering prednisone 40 mg for month, PO2 96, lost 12 lb.

87-y-old COPD, CAD man on 2 L O2 therapy, steroid inhaler, nebulizer treatment, exposed to COVID from above daughter, experienced 20 h fever 100 F, worsening SOB, received azithromycin, hydroxychloroquine x 1d and O2 increased to 5 L, found dead in 5 hours.

DISCUSSION

The above mentioned cases represented severe course of COVID-19 in patients with underlying chronic respiratory disease. The first case, an asthmatic patient who never intubated but her COVID-19 rapidly deteriorated to the extent of intubation and oral steroids as well as inhaled steroid, promptly shortened the course of the disease and fastened the recovery. The patient has no any other underlying co-morbidity like cardiovascular disease, obesity or smoking history. This can by itself be a positive factor for rapid recovery.

The second patient, represented severe morbidity and mortality of COVID-19 in a chronic COPD and cardiac elder man that lead to sudden death in hours. No autopsy done, but the possible explanation could be blood clot that either embolize the coronary or pulmonary arteries or could be severe sudden respiratory failure.

Asthmatics have susceptibility of SARS-COV-2 infection due to deficient antiviral immune response [1,2]. Up-regulation of ACE2 receptors increases virus replication enhanced by certain cytokines like IL17, TNF alpha, IL12, IL1, IL8 whereas IL-4 and IL-13 can down-regulate ACE2 expression [1-3].

Correspondence to: Naglaa Hussein, Department of Physical Medicine, Rheumatology and Rehabilitation, Alexandria University, Alexandria, Egypt, E-mail: naglaa.hussein@alexandriamedical.net

Received: April 20, 2021; **Accepted:** May 04, 2021; **Published:** May 11, 2021

Citation: Hussein N, Bartels M, Thomas M (2021) COVID-19 patterns with chronic respiratory disease patients: Case Series. Int J Phys Med Rehabil. 9:612.

TNF alpha, IL12, IL17a are highly produced in T helper/ neutrophilic asthma and COPD and can upregulate ACE2 expression hence severe version of COVID-19 can be encountered in such patients [3].

Branco, et al. documented in their study their study upregulation of ACE2 receptor is crucial for COVID-19 as SARs-CoV2 can only enter ACE2 expressing cells, nevertheless, ACE2 expression is also important for the control of lung inflammation and damage upon viral infection. During COVID-19, the over expression of ACE2 that usually happen in asthmatic and COPD patients increase viral infection and regulation, modified by cytokines; Some of them upregulate the expression like IL17, whereas IL-4, IL13 can down regulate ACE2 expression [3].

Oral steroids were found to diminish inflammatory process in Asthmatics with COVID-19. Inhaled steroids reduce ACE2 expression on sputum [3,4]. COPD have similar effect on ACE2 expression [3,4].

This COPD patient mostly had severe COVID-19, because of his severe pre-morbid condition, sudden death occurred which could be either secondary to pulmonary or cardiac embolus or mostly acute respiratory failure.

Vouri, et al. reported no arrhythmia with azithromycin and hydroxychloroquine in cardiac patients [5].

CONCLUSION

Chronic respiratory disease; asthma and COPD severely affect morbidity and mortality of COVID-19.

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