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Clinico-Radiological profile and outcome of COVID-19 patients with requirement of oxygen therapy for greater than one week

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Abstract

The novel coronavirus disease (COVID-19) pandemic, caused by the highly contagious severe acute respiratory syndrome-coronavirus-2 (SARS-CoV-2), is still at its height causing thousands of deaths each week. Although several large randomized drug trials are underway, current survivalfrom severe COVID-19 depends entirely on providing the best possible supportive care.[1]

Data from China suggests that although the majority of people with COVID-19 have mild illness (40%) or moderate illness (40%); about 15 % of them have severe illness requiring oxygen therapy, and 5% will be critically ill requiring intensive care unit treatment[2,3]

Oxygen therapy is recommended for all moderate, severe and critical COVID-19 patients, with low doses ranging from 1-2 L/min in children and starting at 5 L/min in adults with nasal cannula, moderate flow rates for use with venturi mask (6-10 L/min); or higher flow rates (10-15 L/min) using a mask with reservoir bag. In addition, oxygen can be delivered at higher flow rates and in higher concentrations, using high-flow nasal cannula (HFNC) devices, non-invasive ventilation (NIV) and invasive ventilation devices. [4]

Objectives: The aim of the study is to assess the clinical profile and outcome of COVID-19 patients requiring oxygen therapy for more than one week duration.

Keywords: Covid -19, SARS-CoV-2, MERS-CoV

Introduction

In this study we would like to identify the risk factors leading to prolonged oxygen requirement in COVID-19 patients. This information will help us in managing our resources effectively in a resource-limited setting by preparing the mindset of the patients early on in the admission for home oxygenation.

In a study conducted in Lombardy Region, Italy on ICU patients, of the 1591 patients included in the study, the median age was 63 (56-70) years and 1304 (82%) were male. Of the 1043 patients with available data, 709 (68%) had at least 1 comorbidity and 509 (49%) had hypertension. Among 1300 patients with available respiratory support data, 1287 (99% [95% CI, 98%-99%]) needed extended respiratory support, including 1150 (88% [95% CI, 87%-90%]) who received mechanical ventilation and 137 (11% [95% CI, 9%-12%]) who received noninvasive ventilation.[5]

In a study done on patients with Middle East respiratory syndrome coronavirus (MERS-CoV), the follow-up chest radiographs were normal in 23 out of 36 (64%) patients. Among the patients with abnormal chest radiographs (36%), the following were found: lung fibrosis in 12 (33%) patients GGO in 2 (5.5%) patients, and pleural thickening in 2 (5.5%) patients and these were the patients needing pro- longed oxygen therapy. Patients with lung fibrosis had significantly greater number of ICU admission days (19 ± 8.7 days; P value = 0.001), older age (50.6 ± 12.6 years; P value = 0.02), higher chest radiographic scores [10 (0-15.3); P value = 0.04] and higher peak lactate dehydrogenase levels (315-370 U/L; P value = 0.001) when compared to patients without lung fibrosis.[6]

In a prospective study conducted at Millennium COVID-19 Care Center (MCCC), a makeshift hospital in Addis Ababa, the capital city of Ethiopia, the average duration of supplemental oxygen therapy requirement among COVID-19 patients was 6 days and being 70 years and older and having shortness of breath were found to be associated with prolonged duration of supplemental oxygen therapy requirement.[7]

Material And Methods

Inclusion Criteria

- Patients of age ≥ 18yrs with a positive RT-PCR COVID-19 report.
- 2 Patients with or without pre-existing lung conditions.

Exclusion Criteria

Patients who were already on home oxygen prior to infection with COVID-19.

Sample Size

100 patients with a positive RT-PCR COVID-19 report.

Study Design: Prospective observational study.

Study Period: 1st October 2020 to 31st May 2021

Place of Study

Hospitals attached to Bowring and Lady Curzon Hospital and Research Institute, Bangalore.

Methodology

After taking informed consent from 200 patients, data will be collected with the help of a proforma. Detailed history including history of exposure to COVID-19 positive patient, symptoms during admission, physical examinations and baseline investigations like complete blood counts, renal function test, liver function test, serum electrolytes, RBS, arterial blood gas analysis, inflammatory biomarkers like ESR, CRP, procalcitonin and LDH, D-Dimer, throat/ nasal swab for covid 19 by RTPCR, chest X-Ray, HRCT Thorax,

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electrocardiography was collected from cases between October to December 2020. We received a total of 35 cases during this period. Since the covid wave did not hit a nadir in early 2021, we decided to continue the prospective survey of the same between 1st January 2021 - 31st May 2021, out of which 65 cases were extrapolated, satisfying the above inclusion criteria. Therefore, the above study was conducted over a span of 8 months.

Statistical Tool For Analysis

Data will be summarized by mean, standard deviation (SD) and percentage. Statistical package for social sciences (SPSS) will be used for analysis. A p value of <0.05 indicates statistical significance. Sensitivity and specificity and other statistical tests, if relevant, will be applied. A multivariable logistic regression will be applied to study discrete outcomes in oxygen dependent patients requiring ≥ 1 week of oxygen therapy (eg: complete recovery, discharge on home oxygen or death.)

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