BBRC
Bioscience Biotechnology Research Communications

"Happy Hypoxia in Covid-19"- A New Threat

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ABSTRACT

Spread of the novel COVID-19 virus observed all across the globe. It is an international public health emergency as the cases have rised up to millions. On 11 March, WHO characterized COVID-19 as a global Pandemic. Even in India, there was outbreak of virus with alarming level of spread and severity. Air in the Earth's atmosphere contains about 21% of oxygen which is enough for all living being to survive. Due to COVID-19 infection in lungs, oxygen saturation decreases causing HYPOXIA. If the patient does not show any sign and symptom of breathless and live normal life is called as happy hypoxia. There are many cases all over the world where patient suffers from happy hypoxia. In a survey, among 1712 patients with COVID-19 64.7% that is 1107 patients do not complain of shortness in breathe at time of admission. It is a dangerous threat to life if not intervene early. The correct line of treatment for both COVID-19 and happy hypoxia is very important. It helps in faster recovery of patient. Identifying comorbid condition and personal past history of patient, all the required blood investigation are to be done with HRCT scan. This helps an easy diagnosis and also reveals current health status. Oxygen saturation also plays main role in treatment part. The happy hypoxia state has worst effect in COVID-19 positive patients. If not taken seriously, this can lead to more oxygen deficiency. It is very difficult task to bring back the patient to normal natural oxygen, when once oxygen level is below 50%. Proper measures should be taken to avoid such complicated condition.

KEY WORDS: HYPOXIA, COVID-19, SARS-COV-2, HAPPY HYPOXIA, CO-MORBID CONDITION, HRCT SCAN, HEPARIN.

INTRODUCTION

India celebrated its seventy-first Republic Day on 26 January 2020.In New Delhi, the parade spring with the President hoisting the National Flag. The Indian army, navy and air forces displayed their military potency and followed by various finely decorated floats of different states. Over 100,000 people were in attendance, enjoying freedom. At the same time, 5600km away, China was fighting with the most deadly virus [COVID-19] on the Earth. Within a month later, majority countries imposed lockdown. People all across world were forced to stay at home. It was the largest quarantine in human history (Jennifer Couzin-Frankel 2020). "Viruses pose the single biggest threat to man's continued dominance on the planet." -Joshua Lederberg, 1985 Noble Prize Winner in Physiology or Medicine.

Novel Corona virus disease [COVID-19], is the clinical syndrome associated with infection by severe acute respiratory syndrome corona virus 2 [SARS-CoV-2]. COVID-19 is a public health emergency of international concern with millions of confirmed cases globally. It is a communicable and droplet-borne disease. Early stage symptoms are fever, cough, running nose, loss of taste and smell, tiredness, vomiting, rash on skin, aches and pains etc. COVID-19 clinical manifestation has wide range, including hypoxia, viral pneumonia , acute respiratory illness, respiratory failure that needs mechanical ventilation and intensive care . Amid the various surprise of the corona virus is the one that seems to defy basic biology. Around millions of people from

Biosc Biotech Res Comm P-ISSN: 0974-6455 E-ISSN: 2321-4007

Identifiers and Pagination
Year: 2021 Vol: 14 No (7) Special Issue
Pages: 127-130

Article Information
Received: 16th April 2021
Accepted after revision: 05th June 2021

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DOI: *http://dx.doi.org/10.21786/bbrc/14.7.31*

every part of world had lost their lives. This is due to lack of data-driven treatment strategies. All the researchers and scientists are working hard to study molecular and genetic structure of corona virus, so that vaccine can be developed as soon as possible (Sahu D et al., 2020).

On 25 March 2020, first time the Indian Government declared lockdown as the number of covid-19 cases rise. Till date the many phase of lockdown were imposed timely according to the conditions in country and its severity. It as an epic challenge for medical sector to treat and manage huge numbers of patients daily. At the same time, there have been horrific incidents of tens of thousands of migrant workers being stranded without transportation, desperately wish to go back home. Recently the second wave of covid-19 has strike the nation. This time the virus has attacked in its update version which is more powerful and destructive. It has created havoc in human life once again. At this moment there is shortage of medical equipments and staff. The situations now are much more difficult as the cases are rising every day (Kutikuppala LV et al., 2021).

The covid-19 infection around the globe has put a stress on oxygen requirements in many countries. Normally the oxygen saturation in a human is approx. 97%. The covid-19 virus targets the human respiratory system. It gradually damages the lungs and finally alveoli [exchange surface for oxygen gas]. This directly affects the oxygen saturation in human body. In such condition the saturation level of oxygen is drop down. The condition when there is less supply of oxygen or an absence of enough oxygen in the tissues to sustain body function is known as HYPOIXA. Here the level of oxygen is lowered down. It is less than 90%. The common symptoms of hypoxia are change in color of skin, sweating, cough, confusion, shortness of breath, headache, fast heart rate etc. Hypoxia is most commonly observed in patients with diabetes, coronary artery disease, obese, stroke, embolism, tobacco smoking etc (Negri EM et al., 2020). Hypoxia is also seen in corona infected patients where the patient does not actually show any symptoms. They do not feel any breathlessness or fatigue. They continue to live their normal life and follow regular routine. But the oxygen saturation is low (Wanjari, A. K et al., 2020).

Analysis of Situation: Happy Hypoxia refers to the condition where the patient has low oxygen saturation, but does not feel any kind of symptoms. As the result they do not alarmed until the disease has progressed and there is severe damage to lungs. The patients often do not experience any kind of breathlessness or related symptoms even when oxygen saturation level falls below 80. Usually symptoms like breathlessness and discomfort in chest are experienced when oxygen levels fall below 90% of saturation. But in the case of happy hypoxia patients get alarmed late. There is sudden deterioration seen in such patients and often there is little time for treatment due to late admission in hospital. COVID-19 positive patients with hypoxia normally do daily chore, walk confidently, scroll their phones, chats with doctors and generally describe themselves as comfortable. Of total COVID-19 patients, majority do not complaint of shortness of breath. The HRCT scan shows signs compatible with covid pneumonia. Patients with symptomatic hypoxemia have a very poor outcome. Lack of shortness of breath is not a sign of well being in COVID-19 positive patient instead its happy hypoxia (Bawiskar 2020 & Butola 2020).

Happy Hypoxia is seen in all age group people of COVID-19 patients. At present, this phenomenon is particularly seen in younger population because their immunity is high so they can withstand some amount of hypoxia. They are comfortable even at 80% saturation level. This is the main reason for late admissions. Young adults are also exposed to the virus as they are economically more active. All these factors add up to risk severe infection. The fact that huge numbers of youngsters are getting affected and seek late medical aid results in more death in younger population. However, the most vulnerable continue to be elderly and immune-suppressed people. The patients with co-morbid condition [which include diabetes, blood pressure, obesity, COPD, bronchial asthma, ischaemic heart disease, malignancy, alcohol intake, smoking, surgeries and transplant etc] are more prone to infections. There is no indication or realization of low oxygen saturation. As there immunity is very poor, patient condition become progressively worse (Butola et al., 2020).

Case Study: A 40 year old female from Nagpur was found COVID-19 positive and admitted in hospital with chief complaint of weakness, fever, cough, loss of taste and smell, pain in body since last 4 days. Regular medication for COVID-19 was started. No any significant family history. At time of admission and examination- Pulse rate=100; B.P=160/100 mm Hg; oxygen saturation= 70%; JVP not raised; no odema feet; RS- crepitation present all over chest; Abdomen- soft/liver spleen not palpated. On doing blood investigation CRP, D-DIMER; LDH and ferritin level were raised. HRCT chest was done and the score was 15/25. Scan also showed ground glass opacities with viral covid pneumonia. The line of treatment followed as oxygen therapy, IV antibiotic, mechanical ventilation, heparin and nebulization. The patient was fully recovered after 10 days. During this course, she was found to be undiagnosed case of diabetes and hypertension. From this case it is very clear that she was in a state of happy hypoxia which was unnoticeable.

Treatment: The main challenge is to manage COVID-19 and happy hypoxia together at the same time. The first basic step is to check the oxygen of the patient timely with an instrument called as pulse oximeter. Many COVID-19 patients frightened to visit hospital and arriving only when their symptoms have dangerously advanced. So it is very important to consult the doctor whether the patient should monitor oxygen saturation at home or need medical help and care. This will help to reduce or prevent all bad outcomes in COVID. Some patients might present with happy hypoxia with less

than 90% of oxygen saturation but are not in respiratory distress syndrome and often are clinically stable. It is confusing to the doctor to identify and may affect the line of treatment. Pathology test should be done which include HRCT scan, CRP, D-DIMER, CBC, KFT and LFT. If still the condition of patient is deteriorating IL-6 is suggested. This all pathological investigation helps the doctor to identify the early cytokine strom. Many time happy hypoxia in a critical COVID-19 positive patient need to put on ventilator in ICU. If not timely hospitalized, the condition of patient may get worsen and finally lead to death. Few protocols are to be followed when the COVID patient is in happy hypoxia state (Gawai et al., 2020).

Primary Treatment: This is the first and basic step. When the patient has no medical help and first time feels breathlessness and there is less oxygen percentage different body position can help lungs to breathe better and oxygen saturation can be increase a bit. Position of body like prone, right lateral recumbent, left lateral recumbent and sitting up at angle of 60-90 degrees at least for 30 minutes help to relieve breathlessness. Also breathing exercises help to improve air in the lungs. But the patient should be admitted in hospital as soon as possible (Gawai 2020 & Godhiwala 2021).

Secondary Treatment: Here the admission in hospital is important. Oxygen saturation to be monitored at regular intervals with pulse oximeter. The line of treatment depends upon the sign and symptoms. Intravenous fluid and antibiotic can be given ((Gawai 2020 & Gupta).

CONCULSION

The state of happy hypoxia is often unnoticeable in all age group. There is no sense of discomfort or fatigue. The patient normally walks into the hospital with no complaints related to breathing difficulty. After examination by doctor with help of pulse oximeter, the oxygen saturation is less than 90%. By the patient's appearance it is difficult to say that patient is in happy hypoxia state as the patient is normally walking and talking with no sign of breathlessness. In COVID-19 positive patient, happy hypoxia state is even more dangerous as initially there is no symptoms seen and sudden drop in oxygen saturation level is detected in later stage. This can be recovered by admission in hospital. This situation of happy hypoxia can be avoided by regular check on oxygen saturation level by pulse oximeter. The capacity of lungs can be elevated by doing breathing exercise [like balloon blowing or blowing candles] repeatedly and even with help of instrument known as spirometer.

To determine is drop in oxygen level, 6 minute walk test can be done. This is a simple test for those COVID-19 patients who are being treated at home. By regularly performing this test, they can figure out if there is need of hospitalization. At first while sitting [at rest] the oxygen level should be measured by pulse oximeter and then again after a 6 minute walk or after mild exercise. Normally, oxygen saturation is 95% above at rest and it should remain same or improve after 6 minute of walking. The drop in oxygen level is first sign. If the oxygen level is drop less than 93% in COVID-19 patients is the indication of involvement of lungs to an extent where patient may need admission. So immediately contact doctor or the nearest Covid care center. Many times patients arrive late to hospital as there is unnoticeable happy hypoxia state and no monitoring of oxygen saturation at home which sometime lead to critical condition of patients. If no proper treatment is given, it can lead to the death of patient also.

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