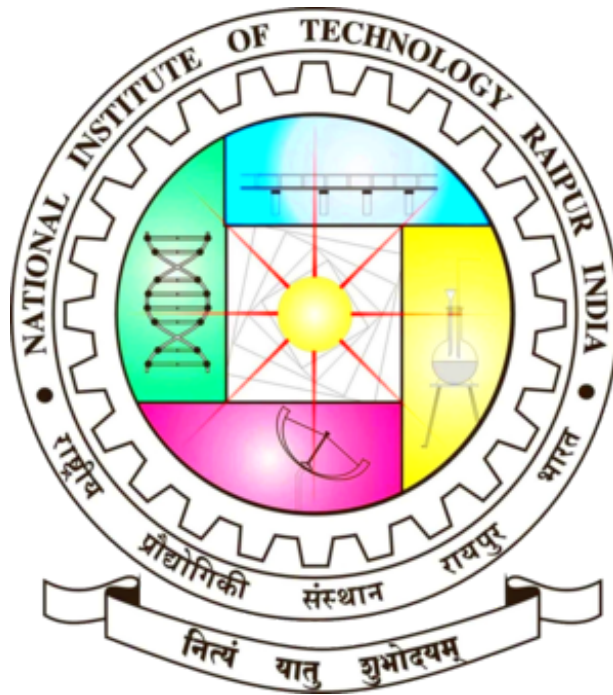


National Institute of Technology Raipur **(C.G.)**



Assignment 06

Basic Biomedical Engineering

Subject: 5 Solutions to Covid19 provided by **Biomedical Engineers**

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1 ”5 Solutions to Covid19 provided by Biomedical Engineers”

INTRODUCTION:

COVID-19, an infectious disease caused by the novel severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), is a global pandemic. Covid 19 was spread all over the country and abroad. Day by day the disease of covid 19 was increasing and people were dying continuously. In such a situation, the machines and technology made by the biomedical engineers proved to be very useful. The use of technology can reduce the disease to a great extent, the number of people who died in the hospital decreased, due to which the treatment of covid 19 was found more conveniently.

JUSTIFICATION:

The use of medical devices in the COVID pandemic is the unfortunate indication that the patients are displaying severe respiratory distress symptoms and need a form of assistance to breathe.

TREATMENT MECHANISMS:

a) VENTILATORS:

Patients who cannot breathe spontaneously need to be put on a ventilator. Ventilators are capable of replacing the breath function and patients in an advanced state of respiratory distress are usually intubated and sedated at the beginning of the treatment.

Ventilators are capable of replacing the breath function and patients in an advanced state of respiratory distress are usually intubated and sedated at the beginning of the treatment. They are complex systems providing the healthcare professionals with a lot of flexibility to adapt the assisted breathing settings and to be able to wean recovering patients off the ventilator gradually.

Modern ventilators are typically closed loop pressure controlled and capable of detecting spontaneous breathing to synchronise assistance for recovering patients. They also enable the control of the composition of the gas the patient breathes from normal air to 100 percentage oxygen, usually taking their supply from the hospital's gas supply network but can also be coupled to oxygen tanks or oxygen concentrators if used in a setting where there is no gas network.

b) PATIENT MONITORING:

An essential element of the ICU equipment is the monitoring equipment that keeps track of some of the patient vitals especially when they are ventilated and sedated but also during their recovery phase to ensure the regime of ventilation is optimised for their condition. Ventilators already provide their set of patient parameters, but usually patient monitors are separate devices as they continue

to be useful after the patient can resume breathing on their own unassisted. One of the key parameters for COVID-19 patient is the amount of oxygen in their bloodstream (SpO_2), measured by pulse oximetry which uses optics within a finger clamp. Pulse oximetry tends to be used for the duration of the patient's stay in ICU.

Modern patient monitors provide many more patient parameters all the way to breathing waveforms to enable clinicians to fine tune their care of the patients.

c) OXYGEN CYLINDER:

Oxygen cylinders contain oxygen under pressure, and the pressure gauge gradually falls as the cylinder is depleted. A full-size E cylinder (the size fitted to most anaesthetic machines) contains approximately 680 l of gas. Manufacturers label the cylinders to confirm this. Oxygen cylinders will probably be prescribed if you only need oxygen for a short time – for example, if you need to relieve sudden periods of breathlessness.



Pure oxygen, at high pressure – such as from a cylinder – can react violently with common materials, such as oil and grease. Other materials may catch fire spontaneously. Nearly all materials, including textiles, rubber and even metals, will burn vigorously in oxygen. But oxygen cylinder is very useful and important for covid Patient.

d) PULSE OXIMETRY:

Pulse oximetry is a noninvasive method for monitoring a person's oxygen saturation. Peripheral oxygen saturation readings are typically within 2 percentage accuracy of the more accurate reading of arterial oxygen saturation from arterial

blood gas analysis.

e) HIGH FLOW NASAL CANNULA (HFNC):

High flow nasal cannula HFNC is a device that delivered the warmed and humid air on high flow rate through nose. HFNC is different from BIPAP or non invasive ventilator because it provides high flow oxygen alongwith pressure which relieves the air hunger of the patient. It is different from a ventilator as the patient is conscious and there is no tube in the patient's lungs. and it's also very useful and important for covid 19 patients.

CONCLUSION:

Covid 19 is such a disease that failing to stop is a big challenge for the whole world. Day by day covid was taking a very big and huge form.

People were being killed continuously in the country and abroad. Somewhere due to lack of medical facilities or due to lack of space in the hospital. It was very difficult to stop all these together or to control a big and huge disease like corona.

The tools made by the Biomedical Engineers have contributed a lot in providing some relief or complete cure to the Corona-affected Marijones. Therefore we can say that the biomedical equipment was God's goods for corona patients.