Institutional Perioperative Preparedness during the COVID-19 pandemic

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# Abstract

When the world is experiencing a global viral pandemic, this is apparent that hospital preparedness at different level has become a priority for the global health agenda. Different guidelines and standard operating procedures ( SOP) have been formulated by international as well as Indian societies to control this highly contagious disease. These have been simplified for the convenience and easy implementation for end-users, particularly in the Indian context.

Key words : COVID -19, pandemic, operation theatre preparedness, standard operating procedures, guidelines.

# Introduction

Hospitals around the world are currently dealing with a crisis caused by the novel coronavirus pandemic. COVID-19 (Coronavirus Disease 2019) is caused by the virus SARS-CoV-2 (severe acute respiratory syndrome coronavirus 2) [1]. The virus originated in Wuhan, China and has spread rapidly throughout the globe. It is a zoonotic virus, and similarities can be seen with other coronavirus types which cause diseases like severe acute respiratory distress syndrome (SARS) and Middle East respiratory syndrome (MERS). [2] [3].

On March 11, 2020, the World Health Organization(WHO) declared the coronavirus outbreak a pandemic. The first case in India was identified in Thrissur, Kerala on 30 January[4]. As of 26 July 2020, India has 467882 active cases and 32063 deaths [5].

The government workers and healthcare professionals have been working tirelessly to control the spread of the pandemic. However, infections in healthcare workers is a major concern. Particularly, anaesthesiologists have a greater risk of exposure because of direct contact and having to deal with aerosol generating procedures. Since transmission can also occur from patients who are asymptomatic, all should be considered to be positive, until there is evidence to the contrary.

It is, hence, advisable to postpone elective surgeries even in asymptomatic patients, till a negative test is received.[6] However, there will be a need to conduct emergency surgeries like cesarean sections, acute abdomen and trauma .

This warrants the establishment of dedicated COVID Operation Theatres.

Recently, the Indian Society of Anaesthesiologists has published guidelines [6] for hospital preparedness. This has been summarised and simplified in the proceeding section.

# Setting Up the Operation Theatre

**Location:** It is recommended to use dedicated operation theatres for suspected and confirmed COVID-19 patients. These theatres should be in their own dedicated *COVID Block* and have their own *COVID ICU.*

**Donning and Doffing Areas:** There should be a dedicated donning room, with adequate stock of sterile PPE (personal protective equipment), chairs to sit for donning and hand sanitization, next to the scrub room. Similarly, a dedicated doffing room with hand sanitization and biomedical waste disposal facilities is needed.

**Air Conditioning and Air Exchange:** The operation theatre air conditioning must follow the *airborne infection isolation requirements (AIIR).* Many OTs in India are not negatively pressurized. Hence, we need to convert them to a non-recirculatory system. For emergency situations, it is helpful to have an independent exhaust blower to discharge the air into the atmosphere after exhaust air treatment. Another option which can be used is a setup with two stand-alone room air-conditioners (split) per OT with two ton capacities. This option also needs slightly open windows for outdoor air intake and exhaust by natural exfiltration. The best option is to have a unidirectional laminar flow having a minimum of 12 air changes every hour. The room temperature should be set between 24 to 30 degrees celsius, and relative humidity between 40% and 70%. Exhaust air should preferably undergo HEPA (high efficiency particulate air) filtration, although disinfection by 1% hypochlorite is also acceptable. HEPA filter exhaust ducts should be checked for leaks. UV irradiation for 15 minutes or heating (45 min, 75 ℃) are the other disinfection options.

**Equipment Handling:** All non-essential items should be removed from the operation theatre. Anaesthetic equipment and drugs are to be placed in a tray and handling of the drug trolley during the procedure is avoided. Similarly surgical linen, dressings and equipment are kept separately.

Transparent water resistant plastic covers are used for monitors, workstation, trolley, table, and are replaced after each case. Disposable equipment should be used whenever possible like breathing circuits, face masks and tracheal tubes.

**HMEF**: A Heat and Moisture Exchange Filter *HMEF* of high standard (should be able to remove 99% of airborne particles of size 0.3 microns or greater) is placed between the tracheal tube and breathing circuit. Another is placed between the expiratory limb and anaesthesia machine.

**Scavenging:** Since, a majority of hospitals in India do not have the facility for active scavenging, a possible method is to use corrugated tubing applied to the scavenging port and dipped in 1% hypochlorite.

**AGP (Aerosol Generating Procedures):** Another factor which needs to be considered is aerosolization that occurs in procedures like tracheal intubation and extubation, tracheostomy, suctioning, nebulization, CPAP, BiPAP or high-flow nasal oxygen therapy and bronchoscopy. This increases when there are multiple attempts at intubation. Healthcare professionals must necessarily wear full PPE kits including mask (N95), coverall gown, eyeshield, cap, double gloves and shoe covers.

**OT Personnel:** The number of personnel in the OT should be as few as possible. Ideally, there should be two surgeons (one, if possible), one nurse, two anaesthesiologists (one, if possible), one anaesthesia technician (not needed with two anaesthesiologists), one paediatrician for cesarean sections, one sweeper.

All OT personnel must wear proper and certified personal protective equipment. A PPE kit contains one coverall, one N95 mask, one pair of shoe covers, one pair of goggles, one face shield or visor, two pairs of sterile gloves and one waste collection bag.

There should be a practiced sign language to be used after donning.

**Sterilization and Decontamination:** There should be enough time between cases, preferably at least an hour, to allow decontamination of the OT. The decontamination should be done by hydrogen peroxide spray or 1% sodium hypochlorite solution and 75% alcohol is used for surface mopping. Floors and walls must be cleaned with 1% sodium hypochlorite solution. Breathing circuit, mask, tracheal tube, HME filters, gas sampling line, soda lime, surgical linen and dressings are discarded after every surgery. Water trap is also changed if it becomes potentially contaminated. Also, a double-sealed ziploc bag is needed to seal all used airway equipment. This is then removed, decontaminated and disinfected. All reusable items are kept in 1% sodium hypochlorite solution for half an hour, then washed and wiped clean. Histopathological specimens are kept in tight-fit plastic boxes, then sealed in plastic bags. These are wiped clean before sending for examination. All equipment sent to the Central Sterile Supply Department (CSSD) should be covered by clearly labelled plastic bags. This is not mixed with items arriving from non-COVID areas.

**Wheeling in:** Once the OT and all personnel are ready, the patient should be wheeled directly in, preferably through a separate or isolated corridor. The patient should wear OT clothes, mask (surgical or N95), cap, and should be covered with a plastic sheet.

**Wheeling out** : The mask is immediately replaced after tracheal extubation. The patient is observed postoperatively in the OT and transferred directly to the isolation ward, without keeping in the recovery room. If the patient cannot be extubated, they are shifted to the designated ICU attached with a single patient use Ambu bag with HME viral filter.

Transport personnel must remove existing PPE, cleanse hands and wear new PPE before transporting patients to the ward or ICU.

# Conclusion

In this article, we have studied the important guidelines related to hospital infection control during Coronavirus pandemic. These guidelines have been framed taking into account the safety of healthcare workers and patients. These recommendations can be modified according to the feasibility and facilities available. However, safety should never be compromised. We have simplified and summarised the standard operating processes so that they are easy to understand and can be easily implemented and practised further. Care must be taken that the normal processes of patient care in the hospital are disturbed as little as possible.

Everyone must participate in a comprehensive plan to contain the viral transmission. This includes everything from careful planning, discussion with heads of administration, formulation of SOPs for different areas and training of all healthcare workers, including regular mock drills.

Finally, the guidelines in this article follow from the information we have on similar viral infections, and is not based on research specific to COVID 19 in particular. The current situation is evolving quickly and our response must be dynamic and responsive enough to deal with it effectively. Finally, this situation is a great opportunity to improve the shortcoming in clinical care and make us more ready to face future outbreaks.

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