

# Perioperative Implications of Obstetric Anaesthesia Care during COVID-19 Crisis

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## Abstract

This article reviews the WHO and CDC guidelines related to obstetrics keeping in view the current Covid-19 pandemic. We are currently facing an unprecedented healthcare crisis caused by the novel coronavirus, severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The infection is spread by human-to-human transmission through droplet and direct contact, causing mild symptoms in the majority of cases, but critical illness, bilateral viral pneumonia, and acute respiratory distress syndrome (ARDS) in a minority.

We suggest how personal protective equipment's (PPE's) and specific infection control policies related to the risk of viral transmission to the anaesthetists, intensivists and other healthcare workers can be minimised particularly in obstetric patients.

Although pregnancy doesn't appear to exhibit higher susceptibility to COVID-19 than the general population but implementing strict infection control in the maternity department presents unique challenges. Particularly it necessitates decreasing the risk of postnatal transmission from mother to neonate and methods to accommodate emergency patients to labour ward and emergency care with a high patient turnover. Performing routine and emergency procedures for obstetric patients, such as neuraxial anaesthesia, is made more technically difficult and time consuming by wearing a PPE. These new challenges have anaesthetic implications and mandate a change in approach for team working, protocols for perioperative anaesthesia care and infection prevention policies. With limited evidence as of now but antenatal vertical transmission appears to be rare. Placental samples, amniotic fluid, cord

blood, neonatal throat swabs and breast milk samples from COVID-19 infected mothers have all tested negative in various case series. There is currently no evidence concerning transmission through genital fluids. Pregnant patients presenting to the emergency room and labour ward should be risk stratified and then screened for covid-19 irrespective of being symptomatic or not before admission and subsequent care provided taking all the precautions. Aerosol generation during labour, particularly when coupled with symptoms secondary to COVID-19 lung sequelae, may increase airborne transmission. For these reasons, surgical facemasks should be worn by the parturient.

Proper donning and doffing of PPE is paramount for decreasing the risk of transmission of infection for labour epidural, OT's and obstetric ICU's and needs creation of space within the older system and newer guidelines and protocols to be implemented in letter and spirit.

**Keywords:** Coronavirus disease 2019 (COVID-19), Aerosol-generating procedures (AGP'S), Personal Protective Equipments (PPE'S), Powered Air Purifying Respirator (PAPR).

## Introduction

Severe acute respiratory syndrome coronavirus 2 (SARS CoV-2) emerged in Wuhan, China late 2019 and has become a pandemic causing coronavirus disease 2019 (COVID-19) throughout the world. Despite its lower mortality compared to the other coronaviruses, it has a high human-to-human transmission rate. This article reviews the present

evidence for perioperative management of obstetric patients associated with Covid-19.

#### Keypoints

- Coronavirus disease 2019 (COVID-19) the main mode of transmission is aerosols, droplets and direct contact.
- Disease transmission can be minimised with thorough perioperative planning.
- Airborne precautions are required for aerosol-generating procedures such as manual ventilation, intubation, extubation, non-invasive ventilation (NIV) and cardiopulmonary resuscitation (CPR).
- Modification for airway management is required to minimise aerosol generation.
- Regional anaesthesia is preferred over general anaesthesia.
- Tracheal intubation being a high-risk procedure for aerosol generation requires a proper PPE viz; respirator, disposable gown, double gloves and eye protection.
- Specific infection control measures and modifications are required for Critical Care, obstetrics and paediatric management to minimise transmission.

#### Provisional recommendations for Emergency obstetric Anaesthesia specific to COVID-19 Crisis

Transfer arrangement in different scenarios for a parturient who needs an emergency caesarean delivery needs to be considered e.g. labour ward room to theatre.

Donning and doffing of PPE needs to be practised and one should undertake simulation training

Donning of PPE is time consuming and has an impact on the decision to delivery time for category 1 caesarean delivery.

Hospitals should also prepare local protocols based on their requirements and as per the recommendations laid by the national guidelines.

Provide epidural or spinal anaesthesia as and when required.

Avoid general anaesthesia unless absolutely indicated in case of an emergency. The type of anaesthesia used for Category 1 delivery may need to be revised and modified.

This virus identified as a novel ribonucleic acid (RNA) coronavirus, with phylogenetic similarity to SARS-CoV3 (which causes SARS) has been named

severe acute respiratory syndrome coronavirus 2 (SARSCoV-2) or coronavirus disease 2019 (COVID-19). This disease requires a different strategic approach for management as compared to SARS, most notably because of the exceptionally large number of hospitalised patients and a very rapid rate of transmission. On January 30, 2020, the WHO announced that the COVID-19 outbreak was a Public Health Emergency of International Concern. Shortly afterwards, on March 11, 2020, the WHO upgraded the situation to pandemic-the first pandemic caused by a coronavirus.

The main mode of transmission for all coronaviruses is droplet exposure and direct contact. Droplets are heavy and usually disperse within a maximum 2 m radius after coughing and sneezing by an infected patient. A notable exception is when we carry out procedures with patients that generate artificial aerosols (small particle nuclei, which may penetrate standard surgical masks and contaminate a wider dispersal radius).<sup>1</sup> Aerosol generating procedures include tracheal intubation, non-invasive ventilation (NIV), high-flow nasal oxygen (HFNO), bronchial suctioning, bronchoscopy, sputum induction etc. These procedures place clinicians at a high risk of exposure being in close proximity to the upper respiratory tract which is a source of high viral load and has been linked to an increased risk spread of the disease to the health care workers.<sup>1</sup>

#### Recommendations for Labor and delivery<sup>2</sup>

##### *Consider pre-hospital screening*

- For elective procedures (e.g. planned caesarean delivery, elective induction of labor, cerclage procedures); patients should be admitted the night before surgery to screen for symptoms consistent with COVID.

##### *Training of Staff and readiness of equipment*

- Simulation drills of COVID19 patients, including the donning and doffing of PPE, transport to the OR and patient arriving for labor and delivery with symptoms concerning for COVID19.
- Plan judiciously and minimize the staff for COVID19 patients during labor, delivery and

caesarean section. Keep a record of all the staff going in and out of the room.

- Plan with the Neonatologist for separation of infant to prevent maternal-infant transmission.
- Separate COVID19 drug and equipment kits need to be created that would avoid contaminating the other drug dispensing trolleys and machines in an OR setting.
- Limit number of attendants and visitors for suspected and confirmed COVID19 patients as per the hospital policy.

### Donning of PPE specific to obstetric anaesthesia

#### *Labour epidural*

There is no evidence to suggest or correlate that epidural or spinal analgesia or anaesthesia is associated with any direct increase in the spread of COVID-19. All usual contraindications of neuraxial anaesthesia for labour remains the same.

Epidural analgesia is preferred for labour with suspected/confirmed COVID-19 to minimise the need for general anaesthesia if urgent delivery is required.

It is prudent to check the platelet count before insertion of epidural or spinal and possibly before removal of the epidural catheter. Approximately one third of patients infected with Covid in a case series from Wuhan developed thrombocytopenia (platelet count <150).

A microbiological and HMEF(heat and moisture exchange filter) should be used in the system both in the inspiratory circuit and the scavenging.

#### *Prior to entering room*

- Put on the theatre cap, fluid resistant surgical mask (FRSM) and eye protection
- Scrub up
- Put on disposable fluid resistant sterile gown, sterile gloves
- Perform epidural procedure and ensure epidural is working.

#### *Prior to exit of room*

- Remove gloves, clean hands with gel
- Remove gown and turn inside out
- Remove eye protection.
- Dispose of all items in clinical waste bin
- Gel hands

#### *Outside room*

- Remove FRSM (avoid touching outside) and cap
- Dispose off in clinical waste bin
- Wash hands with soap and water.

### Caesarean delivery spinal anaesthesia

#### *Theatre*

- Put on sterile PPE as described, in an area at least 2m away from the patient
- Perform spinal procedure routinely with all aseptic precautions.
- Wear this PPE throughout the case.

#### *Prior to transfer from theatre:*

- Ask patient to put on FRSM after cleaning hands with gel prior to transfer back to the room

#### *After transfer*

- Move at least 2m away from patient
- Remove PPE as described earlier
- Wash hands with soap and water.

### Caesarean delivery general anaesthesia

#### *Theatre*

- Use of PPE causes communication difficulties: an intubation checklist should be used with closed loop communication.
- Put on PPE in an area at least 2m away from patient prior to induction.

- For intubation video laryngoscopy is preferable, by the senior most anaesthetist available. Use an artery forceps to block the ETT and do not ventilate until cuff inflation is confirmed.
  - Determine the position of ETT without using auscultation – chest wall expansion and/or etc<sup>2</sup>.
  - The anaesthetist performing intubation is likely to get respiratory secretions on their gloves. Consider wearing a second pair of gloves and remove the outer pair once the ETT is secured.
  - Rapid sequence induction as per usual practice. Ensure a tight seal during pre-oxygenation to avoid aerosolization. HFNO for pre-oxygenation or apnoeic oxygenation are best avoided.
  - In case of difficult intubation, plan B is to use a 2<sup>nd</sup> generation supraglottic airway, plan C is to use Front of neck airway (FONA) scalpel-bougie-tube.
  - Keep wearing the PPE until after extubation.
  - Extubation is a high- risk procedure for aerosol generation. Avoid coughing and minimise the number of staff in the room at the time of extubation.
1. Admit to isolation room, preferably a negative pressure room, and limit the number of care providers strictly to minimum.
  2. All healthcare workers should take airborne and contact precautions with eye protection upon entering delivery or operating room (gown, gloves, mask, eye protection)
  3. Donning and doffing are time consuming procedures. So avoid any emergency crash situations by anticipating complications in high risk patients.<sup>5</sup>
    - Early epidural analgesia in the early stages of labor may reduce the need for general anaesthesia for emergent caesarean delivery.
    - A patient with COVID 19 diagnosis itself is not considered a contraindication for neuraxial anaesthesia.
    - Avoid emergent caesarean deliveries as much as possible - proactive communication with obstetrical and nursing teams.
    - Patients with Covid 19 disease who are in respiratory distress need early intubation and transport facilities using appropriate PPE.
    - Assign the most experienced and skilled anaesthesia provider whenever possible for procedures (neuraxial anesthesia, intubation)
    - Consider minimizing the number of trainees in direct care of COVID19 patients. Minimize the number of personnel in the room.
  4. If General anaesthesia is required;
    - Anaesthesia providers and necessary assistants should wear N95 and other personnel protective equipments prior to any aerosol generating procedures.
    - Use N95/PAPR and face shield (if PAPR is not used), impermeable gown, gloves and head covers. Ensure donning and doffing check list is followed strictly with trained observers. Double glove for all procedures and replace the outer layer of gloves after intubation.
    - Minimize the number of essential personnel during intubation. Keep all the safety measures available in case of an emergency and use your best judgement,

#### *Prior to transfer from theatre*

- Put a well fitted oxygen mask on the patient.
- Patient should be kept in the theatre till spontaneously and adequately breathing with normal haemodynamic parameters for the need of emergency measures.
- Hand over to the clean team who will be wearing standard PPE (midwife looking after patient) and transferred general ward with all precautions as described.
- Remove PPE as per doffing protocol.
- Wash hands with soap and water.

#### **Obstetric Anaesthesia related considerations<sup>2,7</sup>**

These general recommendations follow the APSF (Anaesthesia Patient Safety Foundation) guidelines for management of patients who tested positive for COVID19 or who are persons under investigation (PUI).

while making sure you have some assistance and change of plan readily available.

- In case of a life-threatening situation, if all of the staff were not wearing N95 or PAPR and were supposedly directly exposed should contact the occupational health experts, give their samples and get quarantined till their reports are available.<sup>3</sup>
  - Pre-oxygenation (»5 L/min flow) should be done with a circuit extension with a properly and tightly placed mask and HEPA filter at the patient side of the circuit.
  - Use a closed suction system (if available).
  - Rapid sequence induction is the preferred technique and efforts should be made on first attempt using video laryngoscope and minimize the need for bag-mask ventilation
  - Extubation is equally a high aerosol generating procedure; minimize personnel, utilize N95/PAPR and PPE precautions. If patient is not planned for extubation in OR transporting intubated patient to a negative pressure room (e.g. ICU) for emergence/ extubation if available.<sup>4</sup>
5. As per the WHO guidelines for rational use of N95 masks and/or PAPR, hospitals are recommended to utilise them in certain and specific areas only e.g. All aerosol generating procedures viz: intubation and extubation, bronchoscopy and endoscopy units, OR's, ICU's, microbiology labs etc.
  6. Different institutions may have their own local protocols and guidelines as required for proper utilisation of PPE's and for donning and doffing procedures.<sup>6</sup>
  7. Since the care of a COVID19 patient, including the time for donning and doffing, is time intensive, additional staffing may be needed who may be utilised at the time of crisis and therefore back-up strategies may

need to be developed.

## Conclusion

During COVID-19 pandemic, obstetric patients will continue to present to hospitals for delivery. The physiological changes during pregnancy makes them vulnerable for this set of infections and the evidence of COVID-19 and pregnancy in the literature is growing. We reviewed the literature and professional medical societies, expert opinions for considerations and recommendations in obstetric anaesthesia care during the COVID-19 pandemic. Obstetric anaesthesia providers should be part of an obstetric multidisciplinary team to develop surge plans for any emergency. Updates from time to time should be obtained directly from the relevant medical societies.

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