ORIGINAL RESEARCH PAPER
Volume-9 | Issue-5 | May-2020 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

ANAESTHESIA CONCERN IN COVID-19 PANDEMIC

Anaesthesiology

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ABSTRACT

The current outbreak of COVID-19 has rapidly expanded over a short time and now became a pandemic. We can expect to encounter more of these patients presenting for surgical intervention andAnaesthesiologist works at the front line of the management of surgical patients worldwide.They are experts in airway management and will important in managing critically ill patients.

This article explores the considerations and recommended measures for conducting anaesthesia in this group of patients, focusing on control measures geared towards ensuring patient and staff safety, equipment protection, and infection prevention.Infection prevention entails reducing aerosol-generating procedures (i.e., airway manipulation, face mask ventilation, open airway suctioning, and patient coughing) as far as possible. By doing so, we hope to address an issue that may have implications in the way we practice infection control in anaesthesia, with particular relevance to this new era of emerging infectious diseases and novel pathogens.

KEYWORDS

Coronavirus; COVID-19; Anaesthesia; Airway management

INTRODUCTION

"Corona virus" This term was known only to medical and microbiology professionals until, in December 2019 when an outbreak of unknown origin pneumonia occurred in Wuhan of Hubei province of China. Soon thereafter despite of measures taken to contain the disease in China, the disease spread worldwide.It was originally referred to as 2019-nCov, now as SARS-CoV-2; the disease it caused has been namedCOVID-19 (Corona Virus Disease 2019) by the World Health Organization (WHO) on 11 February 2020.[1]

The COVID-19 outbreak was initially labelled a "public health emergency of international concern",[2] but with more than 12,79,000 confirmed cases of infection, and 72,000 deaths globally at the time of writing. WHO declared COVID-19 a pandemic on 11 March 2020, triggering up scaling of emergency response mechanisms worldwide.[3]

Anaesthesiologist works at the front line of the management of surgical patients, and with the rapidly increasing number of COVID-19 cases worldwide, we can expect to encounter more of these patients presenting for surgical intervention. To make matters worse, as there are unconfirmed reports of transmission before symptoms manifest, it may be challenging to identify and isolate patients carrying the virus before deciding to institute appropriate precautions. Also COVID-19 primarily being a respiratory tract infection it becomes a prime importance for anaesthesiologist working as intensivist.

This article explores the practical considerations and recommended measures for conducting anaesthesia in this group of patients, focusing on control measures geared towards ensuring patient and staff safety, equipment protection, and infection prevention. By doing so, we hope to address an issue that may have implications in the way we practice infection control in anaesthesia, with particular relevance to this new era of emerging infectious diseases and novel pathogens.

Literature search

A thorough literature search was done till March 2020 using databases/search engines (Medline, Embase, Scopus, PubMed and Google Scholar). The articles were manually searched by the authors for cross-referencing. All the articles published in English were searched. We used the following keywords 'anaesthesia covid-19', 'anaesthesia corona virus', 'corona virus disease', 'SARS-CoV-2'.

General Measures

Social Distancing, Wash your hands frequently with soap and water or usage of alcohol based sanitizer, Use face masks and N 95 masks. N95 masks offer protection against droplet and airborne transmission of 95% of particles more than 0.3 microns in size. Surgical face masks protect against COVID-19 droplet transmission but do not protect against aerosolized small particles[4]. Wear disposable caps and beard covers to decrease the risk of hand contamination by touching hair that may have been exposed to droplets.[4]

Pre-Anaesthetic Check-ups

- In case when community spread is suspected all patients entering hospital unless otherwise confirmed should be considered COVID-19 positive and anaesthesiologist should were mask all the time.
- Restrict number of patients, attendants in (Pre-Anaesthetic Check-ups) PAC room, maintain distance with each other.
- Take through history regarding contact with COVID-19 positive case, travel to area with COVID-19 positive case, history for fever, cough, breathing difficulty.
- Examine patient for above symptoms, take precautions while examine and doing aerosols generating procedures. Make sure that FFP2/3 masks sit tightly; bearded men may require shaving.
- Different standards of infection control precautions as recommended by World Health Organisation.[5] Droplet precaution and contact precaution should be applied to patients who are highly suspected or have confirmed to have COVID-19. Airborne precaution also applied for Aerosols Generating Procedure which requires fit-tested N95 (P2) respirators, eye protection, gown, gloves and caps.

Operating room

Anesthesia should be planned with two goals in mind: patient safety and infection prevention. Infection prevention entails reducing aerosol-generating procedures (AGP) (i.e., airway manipulation, face mask ventilation, open airway suctioning, and patient coughing) as far as possible.[6]

In the context of the COVID-19, the following measures were identified as most important risk situations: intubation, noninvasive ventilation, masks ventilation and manipulation of oxygen masks [7,8] as well as resuscitation [9].

- Understanding airflow within the OR is crucial to minimizing the risk of infection.[10] Operations on confirmed cases involving AGP should be performed in an airborne infection isolation room (AIIR). Existing operating theatre may be converted to AIIR after modifying a room's ventilation to maintain negative pressure and an adequate seal.[11]
- A team meeting should take place before surgery to ensure everyone understands the plan for anaesthesia and surgery. This enables seamless teamwork and ensures that all necessary drugs and equipment have been prepared. It also minimizes the need to leave and re-enter the OR to bring in missing equipment.[12]
- During transfer, the team should wear proper personal protective equipment (PPE) outside the operating room. The patient should

be covered with one disposable operating sheet and then transferred through a dedicated lobby and elevator. The patient must wear a surgical mask or N95 mask during transfer.

- Patients who are not yet intubated should wear mouth-nose protection until induction and also immediately after end of anaesthesia. Because of the risk situations at applying the monitoring, intubation and extubation as described, only experienced staff in small teams wearing full personal protection should be deployed.[13]
- Efforts must also be made to facilitate timely performance of N95 fit testing for at risk staff, as non-fit tested application of N95 may be a contributing factor of transmission in health-care workers.[14]
- All staff should be aware that communication is more difficult after PPE (and especially PAPR) have been donned, and pay special attention to facilitate communication during the procedure [15]
- Use disposable instruments wherever possible and, reusable instruments should be cleaned and sterilise after every use.
- Before anaesthesia induction, a HEPA (High Efficiency Particulate Air) filter should be connected to the patient end of the breathing circuit, and another between the expiratory limb and the anaesthetic machine.[6].Both filters and the soda lime are changed after each case.
- Pre-oxygenation should be carried out via well-fitting face mask.[16]Avoid high flow oxygen to prevent aerosolization. Ask the patient not to cough. It is prudent to cover the patient's nose and mouth with two layers of wet gauze to block some of the secretions. Rapid sequence induction should be carried out to reduce the need for bag-mask ventilation.[16] If bagmask ventilation cannot be avoided, small tidal volumes (at low pressure) should be administered.[16]
- Deep anaesthesia and neuromuscular blockade should be achieved before attempting intubation, and the latter can be assessed by train-of-four monitoring. Ensure full expiration into the face mask before lifting it off the patient's face.
- The most experienced operator should intubate. [16] A video-laryngoscope is recommended because a PPE hood or goggles may hamper vision during direct laryngoscopy. A video-laryngoscope also keeps the intubator further from the patient's airway during intubation.[17]following intubation, the cuff should be inflated and the circuit connected before initiating positive pressure ventilation. Immediately wrap used the laryngoscope blade post intubation with the outer glove worn by the operator.
- Closed, in-line tracheal suction should be used instead of open suction.[6] Minimizing circuit disconnections is ideal, but if this is unavoidable, ensure positive pressure ventilation is ceased, turn the adjustable pressure limiting valve to zero, and consider clamping the endotracheal tube prior to disconnection.[10] This technique may also be used before switching a patient from intensive care from the transport ventilator to the anesthetic machine. The patient should be preoxygenated and the duration of disconnection should be kept to a minimum to avoid exacerbating hypoxia in critically ill COVID-19 patients with respiratory failure. A rigid suction catheter may be used to reduce the chance of contaminating the surroundings with the soft flexible suction catheter.
- All equipment in contact with patient secretions should be carefully manipulated. This includes the suction device, endotracheal tube, nasogastric tube (if used) and even the tape used to cover the eyes. Following extubation, the patient should wear a surgical face mask. Supplemental oxygen may be administered via nasal prongs underneath the face mask.[16] Venturi masks should be avoided as they may aerosolize the virus.[16]
- Tracheal extubation should be done on table, as far as possible. After tracheal extubation, patient to be transferred to the isolation ward. If the patient is kept intubated, a single-patient-use Ambu bag with HME filter attached must be used during transfer. Do not use a ventilator during transfer.
- Discard breathing circuit, mask, tracheal tube, HME filters, gas sampling line and soda lime after every patient. Water trap to be changed if it becomes potentially contaminated. Seal all used airway equipment in a double zip-locked plastic bag. It must then be removed for decontamination and disinfection. After removing protective equipment, avoid touching your hair or face before washing hands.[4] All unused items on the drug tray and airway trolley should be assumed to be contaminated and discarded. All staff has to take shower before resuming their regular duties.[4]
- In resource limited settings, where adequate personal protective equipments are not available, it is imperative to refer the patient to a centre with such facilities.[4]

Regional Anaesthesia

- Prefer regional anaesthesia, where ever possible.
- If a regional technique is chosen, the patient should wear a surgical face mask at all times.[18]
- Labour epidural procedures should also be considered as a means to avoid general anaesthesia because the in-situ catheter allows extension for cesarean delivery anaesthesia should an urgent cesarean delivery be needed. In general, the risk of causing meningitis or encephalitis is extremely low with neuraxial procedures, even in infected patients.[19]
- It would be advisable to review a recent platelet count given that a third of patients with COVID-19 infection have been reported to have thrombocytopenia compared with 7-12% of patients during pregnancy alone.[20]
- Sedation should be used with caution in COVID-19 patients as they may have co-existing respiratory compromise from COVID-19 pneumonia. If sedation is administered, supplemental oxygen may be administered via nasal prongs underneath the surgical mask.[16]
- Oxygenation and ventilation should be closely monitored if the patient is sedated. Although it is recommended that carbon dioxide (CO2) monitoring should be immediately available for any patient undergoing sedation,one should avoid connecting the CO2 sampling line directly so as to prevent contamination of the patient monitor.
- Prior to the start of surgery, the block should be tested to ensure optimal operating conditions so as to avoid urgent conversion to GA when surgery is already underway. Anaesthesiologists may be stressed to quickly don PPE and convert to GA, increasing the risk of an inadvertent breach of infection control.
- Potential complications specific to brachial plexus blocks include pneumothorax and phrenic nerve involvement causing diaphragmatic paralysis that may cause further respiratory compromise in the COVID-19 patient. The most experienced operator should perform the block and the needle tip should always be visualized to prevent a pneumothorax. Diaphragmatic paralysis occurs because of the inhibitory effects of local anaesthetics on the phrenic nerve or its nerve roots from C3–5. Various methods can be adopted to minimize the occurrence of diaphragmatic paralysis. These include modifying the local anaesthetic dose via volume and concentration or the injection site and technique in an interscalene block, or performing an entirely different RA technique such as a suprascapular or infraclavicular block instead.[21]

Intensive Care

- Treatment with non-invasive ventilation or high-flow oxygen, as has become established for primary hypoxemic lung failure in the last few years, but many experts reject this approach for COVID-19 patients.[22,23,24].
- Success rates in critically ill COVID-19-patients are limited, delayed intubation is associated with poor outcome and the treatment as well as a possibly necessary emergency intubation in cases of treatment failure increase the risk for transmission to staff [25,22,26,23]; however, in situations with an imbalanced resources-needs ratio, this approach could help bridge the time until decision-making and intubation, or it could also be a therapeutic option in cases of lacking ventilatory capacities.
- Classical rescue therapies for severe oxygenation failure, such as recruitment, relaxation and prone positioning are primarily successful in most patients [22,26].

CONCLUSION:

Anaesthesiologists play an important role in the epidemic, as suspected or confirmed cases may require anaesthesia for surgical interventions, as well as airway management expertise in critically ill cases. Knowledge about the way Sars-CoV-2 spreads, infection control measures and the risk it poses for health care personals will be helpful in battle against COVID-19

REFERENCES

1. World Health Organization. WHO Director-General's remarks at the media briefing on 2019-nCoV on 11 February 2020. Available from URL: https://www.who.int/dg/speeches/detail/who-director-general-s-remarks-at-the-media-briefing-on-2019-ncov-on-11-february-2020 (accessed April 2020).
2. World Health Organization. COVID 19 Public Health Emergency of International

Concern (PHEIC). Global research and innovation forum: towards a research roadmap. Available from URL:https:// https://covid19-evidence.paho.org/handle/20.500.12663/714 (accessed April 2020).
3. WHO Director-General's opening remarks at the media briefing on COVID-19 - 11 March 2020. Available from URL: https://www.who.int/dg/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19—11-march-2020 (accessed April 2020).
4. Malhotra N, Joshi M, Datta R, Bajwa SJ, Mehdiratta L. Indian society of anaesthesiologists (ISA national) advisory and position statement regarding COVID-19. Indian Journal of Anaesthesia. 2020 Apr 1;64(4):259.
5. World Health Organisation. Epidemic-prone & pandemic-prone acute respiratory disease infection prevention & control in health-care facilities summary guidance 2007.https://www.who.int/csr/resources/publications/WHO_CDS_EPR_2007_8/en/ (accessed on 16/02/2020)
6. Tompkins BM, Kerchberger JP. Special article: personal protective equipment for care of pandemic influenza patients: a training workshop for the powered air purifying respirator. Anesth Analg 2010; 111: 933-45.
7. Raboud J, Shigayeva A, McGeer A, Bontovics E, ChapmanM, GravelD, HenryB, LapinskyS, LoebM, McDonald LC et al (2010) Risk factors for SARS transmission from patients requiring intubation: a multicentre investigation in Toronto, Canada. PlosOne5(5):e10717
8. Fowler RA, Guest CB, Lapinsky SE, Sibbald WJ, Louie M, Tang P, Simor AE, Stewart TE (2004) Transmission of severe acute respiratory syndrome during intubation and mechanical ventilation. Am JRespirCritCareMed169(11):1198–1202
9. ChristianMD, LoutfyM, McDonald LC, Martinez KF, Ofner M, Wong T, Wallington T, Gold WL, Mederski B, Green K et al (2004) Possible SARS coronavirus transmission during cardiopulmonary resuscitation. EmergInfectDis 10(2):287–293
10. Ti LK, Ang LS, Foong TW, Ng BS. What we do when a COVID-19 patient needs an operation: operating room preparation and guidance. Canadian Journal of Anesthesia/Journal canadien d'anesthésie. 2020 Mar 6:1-3
11. University of California San Francisco. Tuberculosis Infection Control: A Practical Manual for Preventing TB. https://www.currytbcenter.ucsf.edu/products/tuberculosis-infection-control-practical-manual-preventing-tb (accessed on17/02/2020)
12. Wong J, Goh QY, Tan Z, Lie SA, Tay YC, Ng SY, Soh CR. Preparing for a COVID-19 pandemic: a review of operating room outbreak response measures in a large tertiary hospital in Singapore. Canadian Journal of Anesthesia/Journal canadien d'anesthésie. 2020 Mar 11:1-4.
13. Foundation APS (2020) Perioperative considerations for the 2019 novel Coronavirus (COVID-19). In: Anesthesiapatient safety foundation.
14. Christian MD, Loutfy M, McDonald LC, Martinez KF, Ofner M, Wong T, et al. Possible SARS coronavirus transmission during cardiopulmonary resuscitation. Emerg Infect Dis. 2004;10(2):287-93
15. Tan TK. How severe acute respiratory syndrome (SARS) affected the department of anaesthesia at Singapore General Hospital. Anaesth Intensive Care 2004; 32: 394-400.
16. Kamming D, Gardam M, Chung F. Anaesthesia and SARS. Br J Anaesth 2003; 90: 715-8.
17. Wax RS, Christian MD. Practical recommendations for critical care and anesthesiology teams caring for novel coronavirus (2019-nCoV) patients. Can J Anesth 2020; DOI: https://doi.org/ 10.1007/s12630-020-01591-x.
18. Centers for Disease Control and Prevention. Coronavirus Disease 2019 (COVID-19) Situation Summary. Available from URL: https://www.cdc.gov/coronavirus/2019-ncov/summary.html (accessed March 2020).
19. Bauer ME, Chiware R, Pancaro C. Neuraxial procedures in COVID-19 positive parturients: a review of current reports. Anesthesia and analgesia. 2020 Mar 26.
20. ACOG Practice Bulletin No. 207: Thrombocytopenia in pregnancy. Obstet Gynecol 2019; 133: e181-e193.
21. El-Boghdadly K, Chin KJ, Chan VW. Phrenic nerve palsy and regional anesthesia for shoulder surgery: anatomical, physiologic, and clinical considerations. Anesthesiology 2017; 127: 173-91.
22. Medicine ESOIC (2020) ESICM Webinar—update on Coronavirus. In: ESICM Webinar. European societyof intensive care medicine.
23. Cheung JC, Ho LT, Cheng JV, Cham EYK, Lam KN (2020) Staff safety during emergency airway management for COVID-19 in Hong Kong. Lancet Respir Med. https://doi.org/10.1016/S2213- 2600(20)30084-9.
24. WHO (2020) Clinicalmanagement of severe acute respiratory infection when novel coronavirus (nCoV) infection is suspected. In.: World Health Organization, Genf. WHO Reference Number: WHO/2019-nCoV/clinical/2020. https://www.who.int/publications-detail/clinicalmanagement-of-severe-acute-respiratoryinfection-when-novel-coronavirus-(ncov)infection-is-suspected.
25. Yang X, Yu Y, Xu J, Shu H, Xia J, Liu H, Wu Y, Zhang L, Yu Z, Fang M et al (2020) Clinical course and outcomes of critically ill patients with SARSCoV-2 pneumonia in Wuhan, China: a singlecentered, retrospective, observational study. Lancet Respir Med. https://doi.org/10.1016/S2213-2600(20)30079-5.
26. Xie J, Tong Z,Guan X,DuB,QiuH, SlutskyAS (2020) Critical care crisis and some recommendations during the COVID-19 epidemic in China. Intensive Care Med. https://doi.org/10.1007/s00134-020-05979-7.