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Article Review

The Role of Regional Anaesthesia During and After COVID-19: A Safer Alternative to General Anaesthesia

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ABSTRACT

The COVID-19 pandemic has dramatically impacted surgical and anesthetic practice, challenging anesthesiologists to prioritize more emphasis on safer treatment methods. General anesthesia (GA) carries a high risk of virus transmission as it is associated with Aerosol-Generating Medical Procedures (AGMPs), such as tracheal intubation, which would subsequently spread the virus within health facilities. Anaesthesiology societies have strongly supported the use of regional anesthesia (RA) over GA for most patients, especially those with COVID-19. There are several advantages of RA: It minimizes exposure to aerosols, reduces the requirements for anesthetic agents, and has a lower rate of postoperative respiratory complications. Moreover, it preserves the immunological function of the patient and reduces demand for crucial resources, such as mechanical ventilation, thereby making it differently suitable for usage in global health emergencies. This review discusses the difficulties associated with GA during the pandemic. The review emphasizes on RA techniques such as ultrasound guidance and interfascial plane blocks. Choosing RA even in post COVID era is a choice, because it holds an advantageous risk-benefit profile and helps in the recovery of the patients.

INTRODUCTION

COVID-19 caused by Severe Acute Respiratory Syndrome Corona Virus-2 has widely spread and left medical facilities exhausted and disrupted leading to cessation of elective surgeries.(1)

Anesthesiologists have performed crucial task in the management of cases of COVID-19 in clinical and surgical intensive care units, including airway management, sedation, and mechanical ventilation protocols, ultrasound-guided procedures, regional or systemic analgesia, and fast response resuscitations.(2) Selecting safe and right anesthesia plays a crucial role in the patient and health care team. The production of aerosols during GA contributes to the spread of respiratory infections. Resulting in anesthesiologists to consider avoiding GA as a means of reducing viral transmission.(3)The European and American Societies of Regional Anesthesia recommend RA over GA in COVID-19.(4).

This review discusses the difficulties associated with GA during the pandemic. The review emphasizes on RA techniques such as ultrasound guidance and interfascial plane blocks. Choosing

RA even in post COVID era is a choice, because it holds an advantageous risk-benefit profile and helps in the recovery of the patients.

RESEARCH METHODS

This study used a qualitative approach with secondary data analysis from various studies and relevant literature. Data were collected from medical journals, research articles, and clinical practice guidelines that addressed the use of RA and GA in the context of COVID-19. Inclusion criteria included studies published within the time span of 2018 to 2022, which addressed the clinical experience and outcomes of both anesthesia methods.

RESULTS AND DISCUSSION

The results of the review indicate that RA has several advantages over GA in the management of COVID-19 patients. Some of the key findings include:

Challenges of General Anaesthesia during the COVID-19 pandemic

The COVID-19 pandemic has limited the surgical procedures due to high demands of anesthetic drugs, alterations in hospital capacity, risk of contamination, and drug interactions.(5)Despite majority of staff engaged in tracheal intubation of Covid positive confirmed or suspected patients wore airborne PPE about 10% of them eventually developed symptoms of SAR-CoV-2 infection or tested positive antigen test.(6)Compared to RA, the need for airway management under GA is associated with a higher risk of perioperative pulmonary complications. It is noted that postoperative respiratory complications like pneumonia, atelectasis, respiratory distress, and the need for mechanical ventilation are the most commonly seen complications, which also impact the quality of the patient's life.(7)

Aerosol Generating Medical Procedures (AGMPs) and COVID-19

AGMPs refer to those machines that produce and aerosolize aerosols and procedures that cause patient aerosol generation. Bronchoscopy and tracheal intubation are said to cause violent coughing that in turn leads to the emission of virus-bearing aerosols. Nosocomial spread of SARS-CoV has been associated with NIV techniques like CPAP, BiPAP, and HFOV. AGMPs can aerosolize infected fluids while performing surgeries and laser procedures. Thus, it is only when the AGMP is identified and its environment understood to ascertain the connection between the AGMP and nosocomial virus transmission.(8,9)

Benefits of Regional Anaesthesia

RA can be a choice of approach as it has a good risk-benefit ratio. Its benefits include decreased AGMPs, preserving immunity, minimal exposure to contamination, reduced drug demand, fewer pulmonary complications, limited nausea/vomiting and cognitive dysfunction, limited muscle paralysis, postoperative follow-up can be performed in the room without shifting the patient to the recovery room, enhanced postoperative pain relief, decreased opioid use, and early discharge.(4,5,10).

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Table 1: Comparing Regional and GA in context of COVID-19(4,5,7–10)

Condition	Regional Anaesthesia	General Anaesthesia
Aerosol Generation	Minimal	Significant aerosol generation
Pulmonary complication	Minimum complication	Higher risk of pneumonia and respiratory distress
Post Operative Pain Relief	Enhanced Pain relief, Reduced Opioid use	Increased opioid use
Recovery time	Early discharge	Delayed recovery
Healthcare Professional Safety	Minimum exposure to virus bearing aerosol	Increased risk during intubation/extubation
Room Setup	Minimum adjustment required	Required negative pressure

Best practice for Regional Anesthesia during COVID-19

Surgeries during COVID-19 have to be categorized into urgent and non-urgent surgeries. If the surgery is not urgent, it can be delayed until the patient tests negative. If the surgery is urgent then COVID-19 is an incidental comorbidity.(11)

Urgent surgeries must be performed in COVID-19 dedicated operating rooms under RA.(12) It avoids airway management, decreasing potential for aerolization and hence decreasing chances of transmission. Avoiding sedation reduces oxygen supplement demand, which will reduce the chances of unplanned airway management. In cases of the requirement of GA, positive pressure room ventilation has to be converted to negative or neutral pressure rooms. number of air exchanges has to be increased to maximum. Staff entry to the operating room has to be anteroom so that there is no opening and closing of the inner and outer doors at the same time. Use of neuromuscular agents promotes apnea and reduces coughing, decreasing the aerosol generation. avoiding suboptimal sealing devices like face masks and supraglottic airways to reduce aerosol generation. Opiod or local anesthetics have to be used during extubation to suppress coughing (11,13)

Table 2: Selection of patients and anaesthesia for surgery during COVID 19

Step	Action	Condition
1	Assess Patient	Determine urgency of surgery
2	If Urgent	Proceed to COVID-19 dedicated OR
3	If Non-Urgent	Delay surgery until negative COVID-19 test
4	In COVID-19 Dedicated OR	Use regional anesthesia (RA) if possible
5	If General Anesthesia (GA) Required	Convert room to negative or neutral pressure
6	Airway Management	Avoid airway devices that increase aerosol generation
7	Anesthesia	Use neuromuscular blocking agents to reduce coughing
8	Post-Operative Care	Use opioids or local anesthetics for extubation to suppress coughing

Pre anesthetic consideration during COVID-19

Anaesthesiologist must wear N95 or three-ply face mask throughout pre-anesthesia assessment. Patients must wear a three-ply mask and level III PPE. Patient's medical history has to be

recorded, including inquiries about previous hospital visits, travel history, or movement into contaminated areas. Crowding should be limited in PAC. We must encourage people to avoid social contacts. The room's air oxygen level and temperature have to be recorded. Sanitizing equipment frequently is mandatory. Consider contamination when obtaining necessary consent. (14)Elective surgery can be postponed if the patient is symptomatic.(14,15).

Techniques and innovations in regional anesthesia

After the era of COVID-19, most anesthesiologists began the practice of RA over GA for COVID-19 patients. (16)There were guidelines from various societies that enhanced RA techniques. In neuraxial blocks, intrathecal opioids were used with care as they depressed the airway. Epidural analgesia with continuous infusion was the approach of choice for postoperative pain management.(17).There is reduced local anesthetic volume when the technique is ultrasound guided. (17,18)

Post-COVID Shift Towards RA:

Leon et al. discovered 55 long term complications of COVID-19.Most complications correspond to clinical symptoms like fatigue,headache,joint pain,cough,chest discomfort,sleep apnea,etc.other diseases like stroke and diabetes mellitus are also identified.(19). Gurkhan et al.concluded that interfascial plane blocks are practical alternatives to central neuraxial blocks in abdominal and thoracic surgeries and should be used in daily practice by anaesthesiologist's to reduce post operative opioid consumption.(20)RA possess minimum complications like nausea vomiting extended sedation resulting in faster recovery and reduced hospital stay. Risk of intraoperative transmission is minimal in RA. Effective use of RA requires skilled and trained anaesthesiologist.(21)

CONCLUSION

The COVID-19 pandemic has emphasized on improving anaesthesia techniques to improve patient and healthcare workers safety and wellbeing. RA has been chosen as safer alternative to GA considering its minimal systemic complications, reduced need of healthcare resource and reduced viral transmission. The anaesthesiologists continue to choose RA whenever possible even in the post covid era because of its safety profile.

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