

ORIGINAL ARTICLE

Regional Anesthesia as a Primary Technique for COVID-19 Surgical Patients – Experience from a COVID Dedicated Hospital in Bangladesh

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This article is licensed under a [Creative Commons Attribution 4.0 International License](https://creativecommons.org/licenses/by/4.0/).**ABSTRACT**

Introduction: The COVID-19 pandemic has reshaped anesthetic practice, with general anesthesia (GA) carrying increased risks due to airway manipulation and aerosol generation. Regional anesthesia (RA) offers a safer alternative by reducing viral transmission, preserving respiratory function, and providing superior postoperative analgesia with fewer pulmonary complications. **Methods & Materials:** This retrospective observational study was conducted in the Department of Anesthesiology in Mugda Medical College and Hospital, Dhaka, Bangladesh, over one year, from March 2020 to April 2021, enrolling 80 adult surgical patients with confirmed or suspected COVID-19 and underwent elective or emergency procedures under regional anesthesia (spinal, epidural, combined spinal-epidural, or peripheral nerve blocks). Data were analyzed using SPSS v26.0, with results presented as mean $\pm$ SD for continuous variables and percentages for categorical variables. **Results:** Among 80 COVID-19 surgical patients, the mean age was 45.2 ± 12.8 years, with male predominance (65%) and most classified as ASA II (57.5%). RT-PCR positivity was 80%, and 65% were symptomatic; hypertension (30%) and diabetes (25%) were common comorbidities. Elective surgeries comprised 75%, predominantly general surgery (45%). Spinal anesthesia was most frequent (65%), with 95% block success and 5% conversion to general anesthesia. Intraoperative hypotension (25%) and bradycardia (10%) were noted, while desaturation was rare (5%). **Conclusion:** This study highlights regional anesthesia as a safe and effective primary technique for COVID-19 surgical patients, ensuring stable intraoperative conditions, superior analgesia, and minimal complications. Its use reduces postoperative morbidity and healthcare provider exposure, supporting its role as the preferred anesthetic approach in pandemic surgical care

Keywords: COVID-19, Regional anesthesia, General anesthesia, and Anesthetic techniques

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INTRODUCTION

The coronavirus disease 2019 (COVID-19) pandemic has fundamentally reshaped anesthetic practice, particularly for surgical patients. Notably, general anesthesia (GA) has faced heightened scrutiny due to the requirement for airway manipulation an aerosol-generating procedure and its associated risks to both patients and healthcare workers (HCWs) [1,2]. In contrast, regional anesthesia (RA) has emerged as a safer, more resource-efficient, and patient-centered alternative for individuals with suspected or confirmed SARS-CoV-2 infection [3]. RA techniques, including neuraxial blocks, peripheral nerve blocks, and interfascial plane blocks, minimize or eliminate airway intervention, thereby reducing

the risk of viral transmission to personnel [1,4]. Besides offering better respiratory preservation, RA has demonstrated advantages such as enhanced postoperative analgesia, reduced opioid consumption, fewer pulmonary complications, shorter recovery times, and decreased demand for scarce anesthetic drugs and ICU resources [5]. Professional anesthesiology organizations including the American and European Societies of Regional Anesthesia and the Royal College of Anaesthetists have formally recommended RA when clinically appropriate during the pandemic [6,7]. Empirical findings corroborate these recommendations: in one series involving awake RA for upper-limb orthopedic procedures, success was achieved in 98.7% of cases, with

83.3% discharged the same day and no COVID transmissions detected among staff or patients [3]. Beyond immediate safety and resource considerations, RA may also help mitigate postoperative cognitive dysfunction, nausea, and vomiting common complications associated with GA (systematic review: thoracic surgery outcomes) which are especially undesirable in COVID-19 patients requiring rapid recovery and minimization of hospital stays [8]. During the post-COVID era, patients often present with lingering cardiac, pulmonary, or thromboembolic vulnerabilities, such as decreased functional capacity, small-airway disease, and hypercoagulability, which potentially heighten risks under GA. In this context, RA may yield favorable outcomes by avoiding these exacerbations [9]. Operationally, RA fosters safer perioperative workflows: it enables expedited theatre turnover by bypassing the need for laborious post-intubation decontamination, less reliance on filtering masks, and minimizes the necessity for negative-pressure operating rooms scenarios often unattainable in resource-limited settings [6]. However, RA is not without limitations. Risks such as local anesthetic systemic toxicity (LAST), nerve injury, and coagulation-related complications (notably spinal hematoma) must be carefully considered, particularly in COVID-19 patients who often receive anticoagulation [10]. Furthermore, patient consent must be ethically managed to avoid coercion RA should be presented as one of several viable options, not as a default solely for staff safety [6]. Despite growing literature supporting RA across diverse clinical environments and countries, there remains a paucity of data from low- and middle-income countries (LMICs) such as Bangladesh. Given the substantial burden of COVID-19, limitations in ICU capacity, and logistical hurdles in implementing negative-pressure environments, investigating RA as a primary anesthetic technique in a COVID-dedicated hospital in Bangladesh is both timely and vital. We aim to contribute critical, context-specific evidence to inform anesthetic strategies in resource-constrained settings amid ongoing and future healthcare emergencies. This study was undertaken to evaluate the outcomes of regional anesthesia as the primary anesthetic technique in COVID-19-positive surgical patients in Bangladesh.

METHODS & MATERIALS

This was a retrospective, observational study conducted in the Department of Anesthesiology at Mugda Medical College and Hospital, a tertiary care hospital in Dhaka, Bangladesh, over 1 year from March 2020 to April 2021. The study aimed to evaluate the safety and efficacy of regional anesthesia as the primary anesthetic technique in COVID-19 surgical patients. During the study period, a total of 80 patients aged 18 years or older with confirmed or suspected COVID-19 undergoing elective or emergency surgeries were included, provided they were planned for regional anesthesia. Patients with contraindications to regional anesthesia, those refusing the technique, or those requiring urgent general anesthesia for surgical or medical reasons were excluded.

Data were collected using a structured proforma, covering demographics, COVID-19 status, comorbidities, surgical details, anesthesia type, intraoperative monitoring, and postoperative outcomes. Regional anesthesia techniques (spinal, epidural, combined spinal-epidural, or peripheral nerve blocks) were chosen based on patient and surgical factors, with standard aseptic precautions and sedation as needed. Block success and any conversions to general anesthesia were recorded. Continuous monitoring of ECG, blood pressure, and oxygen saturation was performed, with standard management for hypotension or bradycardia. Postoperatively, pain (VAS), analgesic use, respiratory complications, length of stay, and mortality were assessed. Data were entered into SPSS version 26.0. Continuous variables were expressed as mean $\pm$ standard deviation, and categorical variables as numbers and percentages. Complications, block success, and postoperative outcomes were analyzed descriptively.

RESULTS

A total of 80 participants were included in the study. The mean age of the participants was 45.2 ± 12.8 years. The sample comprised 52 males (65%) and 28 females (35%). The mean body weight was 68.5 ± 11.2 kg, with a mean height of 162.4 ± 8.5 cm, resulting in a mean body mass index (BMI) of 25.9 ± 3.6 kg/m². Regarding the ASA Physical Status Classification, 25% of participants was classified as ASA I, 57.5% as ASA II, 15% as ASA III, and 7.5% as ASA IV. [Table I]

Table – I: Demographic Characteristics of COVID-19 Surgical Patients (n=80)

Variable	Frequency (n)	Percentage (%)
	Mean ± SD	
Age (years)	45.2 ± 12.8	
Sex		
Male	52	65.00
Female	28	35.00
Weight (kg)	68.5 ± 11.2	
Height (cm)	162.4 ± 8.5	
BMI (kg/m²)	25.9 ± 3.6	
ASA Physical Status		
I	20	25.00
II	46	57.50
III	12	15.00
IV	6	7.50

Among 80 patients, 64 (80%) were RT-PCR positive, 12 (15%) antigen positive, and 4 (5%) suspected cases. Symptomatic patients accounted for 65%, while 35% were asymptomatic. Preoperative oxygen support was not required in 70%; 20%

used nasal cannula, 7.5% mask, and 2.5% ventilator. Comorbidities included hypertension (30%), diabetes (25%), cardiovascular (10%), respiratory (7.5%), and others (5%). [Table II]

Table – II: COVID-19 Status and Comorbidities of Patients

Variable	Frequency (n)	Percentage (%)
COVID-19 Confirmation		
RT-PCR Positive	64	80.00
Antigen Positive	12	15.00
Suspected	4	5.00
Symptomatic / Asymptomatic		
Symptomatic	52	65.00
Asymptomatic	28	35.00
Oxygen Requirement Pre-op		
None	56	70.00
Nasal Cannula	16	20.00
Mask	6	7.50
Ventilator	2	2.50
Comorbidities		
Hypertension	24	30.00
Diabetes	20	25.00
Cardiovascular	8	10.00
Respiratory	6	7.50
Other	4	5.00

In this table, 60 (75%) underwent elective and 20 (25%) emergency surgeries. The majority were general surgeries (45%), followed by orthopedic (30%), gynecological (20%),

and other specialties (5%). The mean duration of surgery was 95 ± 30 minutes. [Table III]

Table – III: Surgical Characteristics and Type of Surgery

Variable	Frequency (n)	Percentage (%)
	Mean ± SD	
Type of Surgery		
Elective	60	75.00
Emergency	20	25.00
Surgical Specialty		
General	36	45.00
Orthopedic	24	30.00
Gynecological	16	20.00
Other	4	5.00
Duration of Surgery (minutes)	95 ± 30	

Spinal anesthesia was most common (65%), followed by epidural (15%), combined spinal-epidural (10%), and nerve block (10%). The L3–L4 level was used in 65% of cases. Bupivacaine was the main anesthetic (75%). Adjuvants were used in 35%. Minimal sedation was given in 50%, and block success was 95%, with 5% requiring conversion to general anesthesia. [Table IV]

Table – IV: Details of Regional Anesthesia Techniques Used

Variable	Frequency (n)	Percentage (%)
Type of Regional Anesthesia		
Spinal	52	65.00
Epidural	12	15.00
Combined Spinal-Epidural	8	10.00
Peripheral Nerve Block	8	10.00
Level / Site of Block		
L3-L4	52	65.00
Thoracic Epidural	12	15.00
Other	16	20.00
Local Anesthetic Used		
Bupivacaine	60	75.00
Lidocaine	12	15.00
Other	8	10.00

Adjuvant Used		
Yes	28	35.00
No	52	65.00
Sedation Given		
None	24	30.00
Minimal	40	50.00
Moderate	12	15.00
Deep	4	5.00
Block Success		
Successful	76	95.00
Partial / Failed	4	5.00
Conversion to General Anesthesia		
Yes	4	5.00
No	76	95.00

Hypotension occurred in 25% of patients, while bradycardia was noted in 10%. Desaturation or respiratory complications

occurred in 5%. Other minor events included nausea (15%) and shivering (10%). [Table V]

Table – V: Intraoperative Monitoring and Complications

Variable	Frequency (n)	Percentage (%)
Hypotension Episode		
Yes	20	25.00
No	60	75.00
Bradycardia Episode		
Yes	8	10.00
No	72	90.00
Desaturation / Respiratory Complications		
Yes	4	5.00
No	76	95.00
Other Intraoperative Events		
Minor nausea	12	15.00
Shivering	8	10.00

Postoperatively, pain scores remained low to moderate, most patients required minimal analgesia, and postoperative complications such as nausea (10%) and respiratory issues

(2.5%) were infrequent; the mean hospital stay was 4.2 ± 1.8 days, and mortality was low at 1.25% [Table VI].

Table – VI: Postoperative Outcomes, Pain Scores, and Analgesic Requirements

Variable	Frequency (n)	Percentage (%)
Postoperative Pain Score (VAS 0–10)		
1h		2.1 $\pm$ 1.0
6h		2.5 $\pm$ 1.2
12h		2.8 $\pm$ 1.3
24h		3.2 $\pm$ 1.5
Analgesic Requirement		
None	24	30.00
Minimal	36	45.00
Standard	16	20.00
High	4	5.00
Postoperative Nausea & Vomiting		
Yes	8	10.00
No	72	90.00
Respiratory Complications Post-op		
Yes	2	2.50
No	78	97.50
Length of Hospital Stay (days)		4.2 $\pm$ 1.8
Mortality		
Yes	1	1.25
No	79	98.75

DISCUSSION

The COVID-19 pandemic posed unprecedented challenges to perioperative care, necessitating modifications in anesthetic practice to reduce aerosol generation and mitigate viral transmission risks. This study, conducted in a COVID-dedicated hospital with 80 surgical patients, provides valuable insights into the safety and efficacy of regional anesthesia (RA) as a primary anesthetic technique during the pandemic. Our findings support the preferential use of RA over general anesthesia (GA), aligning with international recommendations to minimize airway manipulation and associated risks [1,11]. The mean age of patients in this study was 45.2 years, with a predominance of males (65%). Most belonged to ASA class II (57.5%), and common comorbidities included hypertension (30%) and diabetes (25%). These findings are consistent with earlier reports where comorbid conditions, particularly cardiovascular and metabolic diseases, were prevalent among COVID-19 surgical patients [12,13]. Comorbidities significantly influence perioperative outcomes and increase the likelihood of postoperative respiratory complications, further highlighting the need for safer anesthetic approaches [14]. Approximately 80% of patients were RT-PCR positive, and 65% were symptomatic at presentation. A considerable proportion required oxygen supplementation preoperatively (30%), underscoring the vulnerability of this patient cohort. GA in such patients is associated with increased risks of perioperative hypoxemia, pulmonary complications, and prolonged hospital stay [15]. Hence, the adoption of RA in our series was both pragmatic and clinically beneficial. The majority of surgeries were elective (75%), with general and orthopedic surgeries being the most common. RA techniques employed included spinal anesthesia (65%), epidural (15%), combined spinal-epidural (10%), and peripheral nerve blocks (10%). Spinal anesthesia at the L3–L4 level was most frequently used, predominantly with bupivacaine. These findings echo global reports that spinal anesthesia remained the cornerstone technique during the pandemic due to its rapid onset, predictable efficacy, and ease of administration [16,17]. Block success in our study was high (95%), with only 5% conversion to GA. The conversion rate is comparable with earlier literature, where reported failures ranged between 3–7% [18]. Minimal to moderate sedation was administered in 65% of cases, which is significant, as deep sedation may increase respiratory compromise and necessitate airway interventions, negating the advantages of RA [19]. Intraoperative hemodynamic stability was maintained mainly. Hypotension occurred in 25% and bradycardia in 10% of cases, rates within the expected range for neuraxial anesthesia [20]. Notably, desaturation or respiratory complications occurred in only 5% intraoperatively, reflecting the respiratory-sparing nature of RA. Minor adverse events such as nausea (15%) and shivering (10%) were observed but were easily manageable. These findings affirm that RA is safe in COVID-19 patients, with a lower incidence of severe complications compared to GA [1]. Postoperative outcomes in this cohort were favorable. Pain scores remained low, with mean VAS values ranging from 2.1 at 1 hour to 3.2 at 24 hours, demonstrating adequate analgesia. Notably, 75% of patients

required none or minimal additional analgesia, reflecting the intrinsic benefit of neuraxial and regional techniques in providing superior pain control [21]. Postoperative nausea and vomiting (10%) and respiratory complications (2.5%) were relatively uncommon, further strengthening the case for RA. The mean hospital stay was 4.2 days, aligning with prior studies that reported shorter stays in patients receiving RA compared to GA during the pandemic [22]. Mortality was very low (1.25%), likely attributable to careful patient selection, early surgical intervention, and avoidance of GA-related risks. Several international guidelines, including those from the World Health Organization (WHO) and the European Society of Anaesthesiology, have recommended RA as the preferred anesthetic technique during the COVID-19 era [23,24]. Our findings are in agreement, demonstrating high success rates, minimal conversions to GA, low complication rates, and favorable postoperative outcomes. An extensive multicenter study reported that RA reduced perioperative pulmonary complications and improved outcomes in COVID-19-positive surgical patients [25]. Additionally, a systematic review by El-Boghdady et al. highlighted that avoiding intubation and extubation, both high-risk aerosol-generating procedures, significantly reduced perioperative viral exposure to healthcare workers [26]. This was also evident in our practice, where the majority of cases were completed without airway instrumentation.

Limitations of the study

The strengths of this study include its relatively large sample size from a COVID-dedicated center and comprehensive data on both intraoperative and postoperative outcomes. However, some limitations exist. First, the observational nature of the study precludes causal inference. Second, long-term outcomes, including persistent respiratory or neurological complications, were not assessed. Lastly, while RA was feasible in most surgeries, specific procedures with higher complexity or longer duration may still necessitate GA.

CONCLUSION

In summary, this study demonstrates that regional anesthesia is a safe, effective, and preferred anesthetic technique for surgical patients with COVID-19. It provides stable intraoperative conditions, excellent analgesia, minimal postoperative complications, and favorable recovery profiles, while reducing exposure risks for healthcare providers. These findings reinforce global recommendations advocating for the preferential use of RA during the COVID-19 pandemic.

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REFERENCES

1. Lie SA, Wong SW, Wong LT, Wong TG, Chong SY. Practical considerations for performing regional anesthesia: lessons learned from the COVID-19 pandemic. *Canadian Journal of Anesthesia/Journal canadien d'anesthésie*. 2020 Jul;67(7):885-92.
2. Altıparmak B, Korkmaz Tokar M, Uysal AI, Gümüş Demirbilek S. Regional anesthesia in patients with suspected COVID-19 infection.

3. Ashokka B, Chakraborty A, Subramanian BJ, Karmakar MK, Chan V. Reconfiguring the scope and practice of regional anesthesia in a pandemic: the COVID-19 perspective. *Regional Anesthesia & Pain Medicine*. 2020 Jul 1;45(7):536-43.
4. Uppal V, Shanthanna H, Kalagara H, Sondekoppam RV, Hakim SM, Rosenblatt MA, Pawa A, Macfarlane AJ, Moka E, Narouze S. Pratique de l'anesthésie régionale pendant la pandémie de COVID-19: un sondage international auprès des membres de trois sociétés d'anesthésie régionale. *Canadian Journal of Anesthesia/Journal canadien d'anesthésie*.:1-3.
5. Elkassabany NM, Mariano ER. Regional Anesthesiology and Acute Pain Medicine in the Era of Value-Based Health Care. *Anesthesiology Clinics*. 2018 Sep 1;36(3):xiii-v.
6. Macfarlane AJ, Harrop-Griffiths W, Pawa A. Regional anaesthesia and COVID-19: first choice at last?. *British journal of anaesthesia*. 2020 Sep 1;125(3):243-7.
7. Singleton MN, Soffin EM. Daring discourse: are we ready to recommend neuraxial anesthesia and peripheral nerve blocks during the COVID-19 pandemic? A pro-con. *Regional Anesthesia & Pain Medicine*. 2020 Oct 1;45(10):831-4.
8. Kapoor MC. Neurological dysfunction after cardiac surgery and cardiac intensive care admission: A narrative review part 2: Cognitive dysfunction after critical illness; potential contributors in surgery and intensive care; pathogenesis; and therapies to prevent/treat perioperative neurological dysfunction. *Annals of Cardiac Anaesthesia*. 2020 Oct 1;23(4):391-400.
9. Hutton M, Brull R, Macfarlane AJ. Regional anaesthesia and outcomes. *BJA education*. 2018 Feb 1;18(2):52-6.
10. Mendes AB, Penados C, Rodrigues LV, Varandas JS, Lages N, Machado H. Coagulation concerns in patients with COVID-19 proposed for regional anesthesia. *Regional Anesthesia and Pain Medicine*. 2021 May 1;46(5):457-.
11. Uppal V, Sondekoppam RV, Landau R, El-Boghdady K, Narouze S, Kalagara HK. Neuraxial anaesthesia and peripheral nerve blocks during the COVID-19 pandemic: a literature review and practice recommendations. *Anaesthesia*. 2020 Oct;75(10):1350-63.
12. Richardson S, Hirsch JS, Narasimhan M, Crawford JM, McGinn T, Davidson KW, Barnaby DP, Becker LB, Chelico JD, Cohen SL, Cookingham J. Presenting characteristics, comorbidities, and outcomes among 5700 patients hospitalized with COVID-19 in the New York City area. *jama*. 2020 May 26;323(20):2052-9.
13. Wang D, Hu B, Hu C, Zhu F, Liu X, Zhang J, Wang B, Xiang H, Cheng Z, Xiong Y, Zhao Y. Clinical characteristics of 138 hospitalized patients with 2019 novel coronavirus-infected pneumonia in Wuhan, China. *jama*. 2020 Mar 17;323(11):1061-9.
14. Kaye AD, Okeagu CN, Pham AD, Silva RA, Hurley JJ, Arron BL, Sarfraz N, Lee HN, Ghali GE, Gamble JW, Liu H. Economic impact of COVID-19 pandemic on healthcare facilities and systems: International perspectives. *Best Practice & Research Clinical Anaesthesiology*. 2021 Oct 1;35(3):293-306.
15. Cook TM, El-Boghdady K, McGuire B, McNarry AF, Patel A, Higgs A. Consensus guidelines for managing the airway in patients with COVID-19: Guidelines from the Difficult Airway Society, the Association of Anaesthetists the Intensive Care Society, the Faculty of Intensive Care Medicine and the Royal College of Anaesthetists. *Anaesthesia*. 2020 Jun;75(6):785-99.
16. Ponde VC, Diwan S, Gopal TV, Subramanian JB, Danish MA. Regional anesthesia in the coronavirus disease (COVID-19) pandemic: Clinical guidelines by AORA, India. *Journal of Anaesthesiology Clinical Pharmacology*. 2020 Aug 1;36(Suppl 1):S109-15.
17. Yamakage M. Anesthesia in the times of COVID-19. *Journal of Anesthesia*. 2021 Jun;35(3):325-7.
18. Wu CL, Fleisher LA. Outcomes research in regional anesthesia and analgesia. *Anesthesia & Analgesia*. 2000 Nov 1;91(5):1232-42.
19. Fong AJ, Smith M, Langerman A. Efficiency improvement in the operating room. *Journal of Surgical Research*. 2016 Aug 1;204(2):371-83.
20. Butterworth JF, Mackey DC, Wasnick JD. Morgan & Mikhail's clinical anesthesiology. New York: McGraw-Hill; 2013 Apr 1.
21. Joshi GP, Kehlet H. Postoperative pain management in the era of ERAS: an overview. *Best practice & research Clinical anaesthesiology*. 2019 Sep 1;33(3):259-67.
22. Zhao S, Ling K, Yan H, Zhong L, Peng X, Yao S, Huang J, Chen X. Anesthetic management of patients with COVID 19 infections during emergency procedures. *Journal of cardiothoracic and vascular anesthesia*. 2020 May 1;34(5):1125-31.
23. World Health Organization. Clinical management of COVID-19: Interim guidance (May 2020).
24. European Society of Anaesthesiology and Intensive Care (ESAIC). ESAIC recommendations for regional anesthesia during the COVID-19 pandemic. ESAIC; 2020.
25. Zhong Q, Liu YY, Luo Q, Zou YF, Jiang HX, Li H, Zhang JJ, Li Z, Yang X, Ma M, Tang LJ. Spinal anaesthesia for patients with coronavirus disease 2019 and possible transmission rates in anaesthetists: retrospective, single-centre, observational cohort study. *British journal of anaesthesia*. 2020 Jun 1;124(6):670-5.
26. El-Boghdady K, Wong DJ, Owen R, Neuman MD, Pocock S, Carlisle JB, Johnstone C, Andruszkiewicz P, Baker PA, Biccadd BM, Bryson GL. Risks to healthcare workers following tracheal intubation of patients with COVID-19: a prospective international multicentre cohort study. *Anaesthesia*. 2020 Nov;75(11):1437-47.