

## Locoregional Anesthesia for Major Abdominal Surgeries during COVID-19 Outbreak: An Experience in a Tertiary Care Hospital of Kathmandu, Nepal

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### ABSTRACT

**Introduction:** Locoregional Anesthesia (LA) has many benefits over general anaesthesia in major abdominal surgeries with high risks including avoidance of endotracheal intubation thus avoiding aerosol contamination during coronavirus disease 2019 (COVID-19).

**Methods:** A retrospective analysis was performed among patients undergone major abdominal surgery under loco regional anesthesia during April 2019 and March 2020 in 750 bedded tertiary care hospital during COVID- 19 pandemic. In all cases, locoregional anesthesia (spinal, epidural, or combined spinal-epidural anesthesia) was performed. Intraoperative and postoperative complications were monitored and was analyzed.

**Results:** A total of twenty-four cases were included during the study period. Among the cases, majority of cases belonged to gastrointestinal, n=17(70.83%). The mean operative time was 94 minutes (minimum 55 minutes; maximum 168 minutes). None of the cases required conversion to general anesthesia. Postoperative pain was always well controlled. None of them required postoperative intensive care support. No perioperative major complications (Clavien–Dindo  $\geq 3$ ) occurred. Three cases were found to be infected with COVID -19 infection postoperatively.

**Conclusion:** Our study showed that major abdominal surgeries under loco regional anesthesia resulted feasible, safe, painless, and, in specific cases, was the only viable option. In such a pandemic, it could become a vital strategy to avoid contamination among Health care workers (HCWs) and could limit viral transmission inside theatres.

**Keywords:** COVID-19, Combined spinal-epidural anesthesia (CSE); Locoregional anesthesia (LA).



### INTRODUCTION

The pandemic due to corona virus (SARS-COV-2) has forced healthcare workers (HCWs) face many difficulties and confusion. At the beginning, elective surgeries were usually postponed, and only high-priority and urgent operations were continued.<sup>1</sup> But, as time progresses, surgical interventions and preoperative screening have become clinical problems to be solved, particularly for asymptomatic cases.<sup>2,3</sup> The pandemic has had a substantial effect on surgeons and patients who require surgical care.<sup>4,5</sup> As such, the surgical workforce has faced distinct challenges compared with non-surgical specialties during the COVID-19 pandemic.<sup>6</sup> Specific issues include the best approach to protect health care personnel and

the patient; the ability to efficiently regulate delivery of surgical care and the detrimental effects on patients with surgical disease due to delay in care.<sup>7,8</sup> There is always an increased risk of morbidity and mortality while operating on patients with either asymptomatic or symptomatic COVID- 19 disease.<sup>9</sup> With this in background, elective surgery has been drastically limited. Moreover, minimally invasive surgery (MIS) and intubation are aerosol-producing procedures and carries risk of transmission of COVID -19 infection, hence performing major abdominal surgeries under loco regional anesthesia could be feasible in selected cases.<sup>10-12</sup> This study aims to assess the outcome of anesthesia among patient undergoing

major abdominal surgeries during COVID 19 outbreak.

## METHODS

This is a retrospective hospital-based study conducted in Shree Birendra Hospital (SBH), Chhauni, Nepal. The data were collected during new coronavirus (SARS-COV-2) pandemic on patients who underwent emergencies major abdominal surgery under loco regional anesthesia between April 2019 and March 2020. All the patient with suspected COVID-19 infection needing emergency major abdominal surgery due to gastro-intestinal, colorectal, urological emergencies and oncological diseases who underwent awake open surgery at our hospital were included in this study. Those Surgeries performed under spinal anesthesia (SA), epidural anesthesia (EA) and combined spinal-epidural (CSE) were enrolled in this study whereas, surgeries performed in general anesthesia (GA), coagulopathy and those with incomplete data were excluded from the study. The Performa was designed and data were taken from pre-recorded files regarding; operative evaluation, high risk patients (>65 years), severe cardio-respiratory disease or multiple major comorbidities, patient who are unlikely to tolerate GA and preoperative ASA score  $\geq 3$ . Each patient underwent the nasopharyngeal swab test for COVID-19 diagnosis preoperatively but was considered positive by healthcare professionals until proven otherwise, following our internal "pandemic-specific". We also collected information of the patients' medical history and operative results (surgical time, conversion to GA, LA-related complications, intraoperative blood transfusion, ICU admission, urinary catheter removal, first bowel movement [gas and feces] after operation, early postoperative complications, postoperative length of stay [LOS], readmission due to postoperative complications occurred after discharge). This was followed by the Clavien-Dindo classification to assess postoperative complications. After data collection, data were thoroughly screened, reviewed, compiled and checked for its completeness, consistency and accuracy by the researcher and data analysis was done as per the objectives of the study. Editing, classifying, coding and entry of data were done using Microsoft Excel and analysis was done using Statistical Package for Social Science (IBM SPSS) version 24. The study protocol was performed in accordance with the principle of the declaration of Helsinki and after approval by the Institutional ethical review board obtained from Nepal Army Institute of Health Sciences (NAIHS).

## RESULTS

A total of 24 cases were included during the study period. Among the cases, majority of cases belonged to

Gastrointestinal followed by colorectal, n=4 (16.6%), urosurgical, n=2 (8.3%) and hepatobiliary surgery, n=1 (4.1 %) (Table 1).

**Table 1: Diagnosis and number of the cases operated**

S.no	Diagnosis	No.	Type of Surgery
1.	<b>GB perforation</b>	01	Emergency
2.	<b>Gastrointestinal</b>		Emergency
	i.SAIO	06	
	ii.Perforated appendix	05	
	iii.Traumatic ileal perforation	02	
	iv.Duodenal ulcer perforation peritonitis	04	
3.	<b>Colorectal</b>		Emergency
	i.Right Ascending colon mass causing obstruction	01	
	ii.Sigmoid volvulus	02	
	iii.Rectal ca causing obstruction	01	
4.	<b>Urosurgical</b>		Emergency
	i.Traumatic bladder rupture	02	
	<b>TOTAL</b>	<b>24</b>	

The mean age was among the patients was 69.58, with a range of 60 –87 years. The number of males were 14 (58.3 %) and females 10 (41.6%), giving a male to female ratio of 1.4:1. 19(39.6%) patients had multiple comorbidities (hypertension, diabetes mellitus, coronary artery disease) while five patients had either one of the mentioned comorbidities. Majority of patient had multiple comorbidities with 21 patients with ASA score  $\geq 3$  (Table 2).

**Table 2: Demographic characteristics &and Pre-operative ASA**

S.no	Category	Value
1.	<b>Age</b>	
	Mean (years)	69.58
	Range (years)	60 –87
2.	<b>Gender</b>	
	Male n (%)	14 (58.3%)
	Female n (%)	10 (41.6%)
	Ratio	1.4:1
3.	<b>Preoperative ASA score n (%)</b>	
	I	Nil
	II	01 (%)
	III	21 (%)
	IV	02 (%)

\*ASA score- American society of Anesthesiologists physical status classifications system

Emergency exploratory laparotomy was performed in majority of case. Majority of surgery 16 (66.6%) cases were performed under combined spinal-epidural (CSE) anesthesia, 07 (29.1 %) cases in spinal anesthesia (SAB) and 01 (4.1 %) cases under epidural anesthesia (EA).

**Table 3: Intraoperative profile of the patients**

S.no	Category	Value
1.	Use of anesthesia	
	CSE n (%)	16 (66.6%)
	SAB n (%)	07 (29.1%)
	EA n (%)	01 (4.1 %)
2.	<b>No. of epidural doses used</b>	
	Mean	3.2
	range	2-5
3.	<b>No. of sedatives used n%</b>	
		7 (29.16 %)
4.	<b>Duration of surgery</b>	
	Mean time	94 min
	Range	(55-168) min
5.	<b>Complications</b>	
	Hypotension	02
	Shivering	04

**\*CSE-Combined Spinal Epidural  
SAB-Sub-Arachnoid Block  
EA-Epidural Anesthesia**

Intraoperatively, hypotension was noted in two cases. Nine patients required sedation during surgery for a better discomfort control. Sedation was obtained through intravenous administration of midazolam 1mg/ml and propofol 50mcg/kg/min. The mean operative time was 94 minutes (minimum 55 minutes; maximum 168 minutes) among the cases . The longest operative time being 168 minutes for rectal carcinoma. None of the cases required Postoperative analgesia was managed with morphine sulfate (50 mcg/kg) epidural two times daily and ondansetron (8 mg) thrice a day at an infusion speed of 2 ml/hour. Postoperative pain, regularly assessed through Visual Analogue Scale VAS score < 3 in all the patients after POD 3.

Mean postoperative length of stay (LOS) was 5 days. Only one of the patient had post-operative Clavien-Dindo classification above grade II while 23(95.83%) patients had Clavien-Dindo classification below grade II and was found to be statistically significant with p value<0.05(Table 4 ).Only one of the patient had postoperative Clavien – Dindo classification above grade II (Table 4).

**Table 4: Clavien- Dindo classification following laparotomy**

S.N	Clavien-Dindo classification following laparotomy	N (%)	Mean hospital stay (days)	p-value
1.	No complications	19 (79.16%)	4.7	<0.05
2.	Grade I	03 (12.5 %)	5.1	
3.	Grade II	01(4.1%)	9.0	
4.	Grade III	01(4.1%)	11.0	
5.	Grade IV	Nil		
6.	Grade V	Nil		

## DISCUSSION

At present, hospitals have drastically limited elective surgery (including surgical oncology) not only to limit spreading contagions inside hospitals (which were not built to guarantee “clean” and “dirty” pathways), but also to preserve ICU beds, personnel and equipment for critically ill COVID-19 patients.<sup>13</sup> Since COVID-19 outbreak began, MIS and GA are being under great debate as they are both aerosol generating procedures and may contribute to spread contamination inside operating theatres. Pneumoperitoneum creation/ desufflation and electrical/ultrasonic devices’ smokes put healthcare operators at potential risk and initial reports advise against their use. Besides surgery, intubation before GA and emergence from GA represent other main potential phases of contagion inside theatres.<sup>14</sup> While airway manipulation necessarily requires close contact to the patient, Loco regional anesthesia reduces exposure to patients’ respiratory secretions and the risk of perioperative viral transmission during pandemics such as COVID-19. Furthermore, Loco regional anesthesia preserves patient’s cardiorespiratory function. On the contrary, GA can be associated with delayed recovery after anesthesia and can lead to the admission of the patient to the ICU.<sup>15-16</sup>

A total of twenty four cases who underwent Locoregional Anesthesia we included during the study period. In this study, Locoregional Anesthesia was applied to a variety of surgical procedures with specific anesthetic considerations including laparotomy for gastrointestinal, hepatobiliary and urosurgical emergencies, thus demonstrating the versatility of epidural anaesthesia. Similarly, Bhosle et al.<sup>17</sup> in a previous retrospective study demonstrated the feasibility and safety of TEA in a

variety of upper and lower abdominal surgeries including emergency procedures. The mean age of the patient undergone Locoregional Anesthesia in our study was 69.58 years. As most of the patient with extreme age had multiple comorbidities making GA less feasible option for conducting surgery. This study showed that 19 (39.6%) patients had multiple comorbidities (hypertension, diabetes mellitus, coronary artery disease) while five patients had either one of the mentioned comorbidities. Majority of patient had multiple comorbidities with 21 patients with ASA score  $\geq 3$ . Among the cases performed in LA, majority of cases belonged to Gastrointestinal 14 (58.3 %) followed by colorectal 4 (16.6%), urosurgical 2 (8.3%) and hepatobiliary surgery 1 (4.1 %). Our study also showed that majority of surgery 16 (66.6%) cases were performed under combined spinal-epidural (CSE) anesthesia, 07 (29.1 %) cases in spinal anesthesia (SAB) and 01 (4.1 %) cases under epidural anesthesia (EA). No major complications were recorded during the study however 2 of the patients developed hypotension. These complications was recorded in a 87-year-old female who had a Hartmann's procedure for rectal carcinoma. These may be attributed to hypovolemia following blood loss that occurred intraoperatively.

The patient was successfully managed with intravenous fluid, ephedrine, pentazocine and metoclopramide. Similar study done previously<sup>17</sup> documented hypotension warranting the use of vasopressors in 23.33% of their patients; no shivering, nausea or vomiting was recorded. In support to open surgery, CSE helped to limit the intubation-related risk of contagions in the theatre. Moreover, loco regional anesthesia limited the use of the ventilator and the following replacement of the high-efficiency particulate air (HEPA) filter.<sup>11-13</sup> Nevertheless, although case performed in CSE did not entail a relevant elongation of the operative time, it may cause discomfort to the patient who becomes intolerant to long procedures. Postoperative pain was well controlled. The limited administration of opioids maximized loco regional anesthesia benefits: adequate pain control, short-lasting paralytic ileus, mild nausea and vomiting.<sup>17</sup>

Loco regional Anesthesia appears as a precious alternative to GA for patients presenting fragile cardiovascular and respiratory reserves and in whom GA would presumably increase morbidity and mortality in such pandemics such as COVID 19.<sup>18-20</sup>

### CONCLUSION

This study showed the feasibility of major abdominal surgeries among fragile patients (old patients with

multiple major comorbidities) can undergo loco regional anesthesia with minimal to no anesthetic complications. Also, this approach can prove as a vital strategy to avoid contamination among Health care workers (HCWs) and could limit viral transmission inside theatres during

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