



The Effect of Regional Anesthesia in the Management of High-risk Abdominal Emergencies During Pandemics

Salgın Dönemlerinde Yüksek Riskli Abdominal Acillerin Yönetiminde Rejyonel Anestezinin Etkisi

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Abstract

The Coronavirus disease-2019 pandemic has shown us that the number of intensive care beds can be severely limited for postoperative care of high-risk patients. This situation has led to the need to develop a perioperative plan without intensive care support in the management of high-risk abdominal emergencies that cannot be postponed. In this case series, we shared our experiences of awake laparotomy under combined spinal epidural anesthesia in four cases in the related patient group. The patients' age and ARISCAT score median (min-max) values were respectively 73 years (56-85) and 68 (52-74), ASA scores were III, and all were at high risk for pulmonary complications. The probabilities of mortality, serious complications and expected hospital stay were 23% (11-36%), 40% (34-48%), and 15.5 (13.5-19) days. It was planned to operate the patients under combined spinal-epidural anesthesia. Epidural catheters were placed to cover the dermatome range of the planned surgical incision. Spinal anesthesia dose and initial level target was individualized according to the age and hemodynamic status of the patients, and 0.5% heavy-bupivacaine was administered. All patients underwent gastrointestinal resection at different levels, accompanied by anastomosis or stoma opening. The median (min-max) of the surgical times was 155 (120-210) minutes. No new clinical condition requiring intensive care or not in the preoperative period was observed in the service care of any patient. The hospital stay was observed as 7.5 (5-13) days.

Keywords: COVID-19, epidural anesthesia, laparotomy, major abdominal surgery, pandemic, regional anaesthesia

Öz

Koronavirüs hastalığı-2019 pandemisi bize yoğun bakım yatak sayısının yüksek riskli hastaların postoperatif takibi için ciddi şekilde kısıtlanabileceğini göstermiştir. Bu durum, ertelenemeyecek yüksek riskli abdominal acillerin yönetiminde yoğun bakım desteği olmaksızın bir perioperatif plan geliştirme ihtiyacı doğurmuştur. Bu olgu serisinde, ilgili hasta grubunda olan dört olguda kombine spinal epidural anestezi altında uyanık laparotomi deneyimlerimizi paylaştık. Hastaların yaş ve ARISCAT skor medyan (min-maks) değerleri sırasıyla 73 yıl (56-85) ve 68 (52-74), ASA skorları III ve hepsi pulmoner komplikasyonlar yönünden yüksek riskliydiler. Mortalite ve ciddi komplikasyon olasılıkları ile beklenen hastane yatış süreleri sırasıyla %23 (%11-36), %40 (%34-48), 15,5 (13,5-19) gün şeklindeydi. Hastaların kombine spinal-epidural anestezi altında opere edilmesi planlandı. Epidural kateterler planlanan cerrahi kesinin dermatom aralığını kapsayacak şekilde yerleştirildi. Spinal anestezi doz ve ilk seviye hedefi hastaların yaş ve hemodinamik durumuna göre bireyselleştirilerek %0,5 heavy-bupivakain ile yapıldı. Tüm hastalara farklı seviyelerden gastrointestinal rezeksiyon ve beraberinde anastomoz veya stoma açılması uygulaması yapıldı. Cerrahi süreler medyanı (min-maks) 155 (120-210) dakikaydı. Hiçbir hastanın servis takibinde yoğun bakım ihtiyacı gerektirecek veya preoperatif dönemde olmayan yeni bir klinik durum izlenmedi. Hastane yatış süreleri 7,5 (5-13) gün olarak izlendi.

Anahtar kelimeler: COVID-19, epidural anestezi, laparotomi, majör abdominal cerrahi, pandemi, rejyonel anestezi



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Introduction

The Coronavirus disease-2019 (COVID-19) pandemic has increased the demand for intensive care beds worldwide, resulting in serious disruptions in the follow-up and treatment of patients who need intensive care for non-pandemic reasons. This situation has also affected high-risk abdominal emergency cases that require surgical treatment and require intensive care follow-up in the postoperative period. The insufficient number of beds necessitated the creation of different perioperative plans that could reduce the need for intensive care for these patients. While the usual practice for emergency abdominal surgeons is general anesthesia, regional anesthesia techniques have become more preferred in order to avoid the need for postoperative intensive care hospitalizations during the pandemic period and to avoid aerosol exposure that occurs during general anesthesia in this patient group, whose COVID-polymerase chain reaction (PCR) result cannot be expected. In this series of 4 cases, it was aimed to share the experiences of the related patient group.

Case Report

Between November 2020 and July 2021, 4 patients who needed urgent abdominal surgery and whose age and ARISCAT score median (min-max) values were 73 years (56-85) and 68 (52-74) were consulted. The ASA scores of the patients were III, and all were considered to be at high risk for pulmonary complications. The probabilities of mortality and major complications and expected hospital

stay were 23% (11-36%), 40% (34-48%) and 15.5 (13.5-19) days. The preoperative characteristics of the patients are given in Table 1.

Each patient underwent PCR testing with nasopharyngeal swabs for the diagnosis of COVID-19 preoperatively. However, since the operations in question could not be postponed, they were carried out without waiting for the test results. Therefore, patients were considered positive until proven otherwise and were provided with a face mask during all procedures in the operating room.

There was no coagulation disorder, use of anticoagulant drugs, infection in the area where the procedure would be performed, or any other medical condition that would make neuraxial anesthesia an absolute contraindication. Therefore, they were planned to be operated under combined spinal-epidural anesthesia. Invasive arterial cannulation was performed with local anesthesia along with intraoperative routine anesthetic monitoring. The patients were placed in a sitting position, their feet were suspended from the operating table, and a step was placed under their feet. Epidural catheters (with 18 gauge Tuohy needle) were placed at different levels to cover the dermatome of the planned surgical incision. Spinal anesthesia (with a 27 gauge Quincke needle) dose and first level target was individualized according to the age and hemodynamic status of the patients, and 0.5% heavy-bupivacaine was administered at the L3-4 or L4-5 level. Anesthesia levels were checked with cold sensory loss test before the surgical incision. The data related to the regional techniques are given in Table 2.

Table 1. Preoperative data and risk scores

Patient no	Age	Preop SpO ₂	ARISCAT score	Lee index	ACS-NSQIP mortality	ACS-NSQIP major complications	Estimated hospital stay
1	85	94	74	2	34%	48%	19 days
2	64	90	73	1	36%	39%	15 days
3	56	93	52	2	11%	41%	16 days
4	82	93	63	1	12%	34%	13.5 days

ACS-NSQIP: It is a scoring system developed by the American College of Surgeons for predicting patient's mortality and morbidity probabilities and length of hospital stay.
Preop: Preoperative, SpO₂: Arterial oxygen saturation calculated by a pulse oximeter

Table 2. Data on regional interventions

Patient no	Surgical incision	Level of epidural catheter	Spinal block: Dose*/targeted dermatome level	First epidural injection	Total volume injected
1	T6-L1	T9-10	13 mg/T8	0 min	10 cc
2	T6-L1	T9-10	19 mg/T4	110 min	19 cc
3	T10-L1	T11-12	13 mg/T8	30 min	12 cc
4	T6-L1	T9-10	18 mg/T4	90 min	20 cc

*Isobaric Heavy-bupivacaine was administered

Mask oxygen therapy was avoided as long as SpO₂ was >90%. Only one patient received 2 liter/min oxygen therapy with a nasal cannula under a surgical mask.

All of the cases were completed under neuraxial anesthesia without the need to switch to general anaesthesia. No complications related to local anesthetic or neuraxial block were encountered in any of the patients. An intraoperative routine sedation protocol was not applied. Only one patient needed sedation and after a 1 mcg/kg loading dose of dexmedetomidine was given to the patient within 15 minutes, 0.5 mcg/kg/hour infusion was started.

All patients underwent gastrointestinal resection at different levels, accompanied by anastomosis or stoma opening. The median (min-max) of surgical times was 155 (120-210) minutes. The characteristics of the surgeries performed are given in Table 3.

After the patients were observed in the recovery room and their Bromage scores were ≤1, they were taken to their services. No new clinical condition requiring intensive care or not in the preoperative period developed in any patient's service follow-up. All preoperative nasopharyngeal swabs for the diagnosis of COVID-19 were negative. The hospital stay was observed as 7.5 (5-13) days. Data regarding the intraoperative fluid-catecholamine requirement and the postoperative period are presented in Table 4.

Discussion

Despite the high complication rates predicted in our case series, which is particularly high-risk in pulmonary terms, no perioperative complications were observed, and all patients were discharged from the hospital within a shorter

period of hospitalization. This situation can be explained on several points. Neuraxial anesthesia has the advantages of not requiring airway manipulation, not affecting respiratory control, and not requiring neuromuscular blockade. Therefore, it is associated with a decrease in the need for postoperative respiratory support (1). In a review of 141 prospective, randomized studies comparing neuraxial blocks and general anesthesia, postoperative pulmonary (pneumonia, pulmonary embolism, respiratory depression, etc.) and cardiac complications, renal complications, in patients operated under neuraxial block. It has been shown that the incidence of insufficiency and deep vein thrombosis is reduced (2). Neuraxial anesthesia can improve postoperative complication and morbidity scores, and shorten hospital stays, especially in elderly and frail patient groups with a high risk of cardiovascular and respiratory complications (3-6).

Since general anesthesia requires the use of an endotracheal tube or laryngeal mask for airway control, it definitely requires close contact with the patient and causes aerosol formation (7,8). For this reason, it may be preferable to perform operations with central and peripheral blocks in cases where possible, to avoid airway interventions in patients who will be operated without a PCR result under emergency conditions.

Considering these situations, anesthesia management with combined-spinal epidural anesthesia in selected patients who require long-term emergency major abdominal surgery can be considered an effective, safe and advantageous alternative method both for the rational use of hospital/intensive care beds and for better patient outcomes (9).

Table 3. Surgical indications and surgeries performed

Patient number	Diagnosis	Surgery	Surgical time
1	Colon Ca-GIS bleeding	Total colectomy + end ileostomy	130 min
2	Brid ileus	Bridectomy	210 min
3	Strangulated hernia	Small intestine resection-anastomosis + hernia repair	120 min
4	Colon Ca-ileus	Right hemicolectomy + anastomosis	180 min

Ca: Carcinoma, GIS: Gastrointestinal system

Table 4. Intraoperative and postoperative period

Patient number	Total fluid	Vasopressor need	Sedation need	Length of hospital stay (days)	Postoperative complication
1	1500 cc	20 mg ephedrine	-	7	-
2	4500 cc	25 mg ephedrine	-	13	-
3	2500 cc	-	α-2 agonist	8	-
4	4000 cc	25 mg ephedrine	-	5	-

This case series includes experiences in a single center and a small group of patients. Patients were reviewed retrospectively. Although there are case reports and case series (10-12) on the subject, data on larger patient groups will be needed to reveal the advantages and disadvantages of the methods to be applied.

Ethics

Informed Consent: Informed consent was obtained from all 4 patients.

Peer-review: Externally peer-reviewed.

Authorship Contributions

Surgical and Medical Practices: H.C.G., Concept: H.C.G., F.G.Ö., Design: H.C.G., F.G.Ö., Data Collection or Processing: H.C.G., T.A., Analysis or Interpretation: T.A., Literature Search: T.A., F.G.Ö., Writing: H.C.G.

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