

Bilateral External Oblique and Rectus Abdominis Plane Block as a Primary Anesthetic Approach for Open Incisional Hernia Repair

Açık İnsizyonel Herni Onarımı için Primer Anestezik Yaklaşım Olarak Bilateral Eksternal Oblik ve Rektus Abdominis Plan Bloğu

^{1b} Aycan KURTARANGİL DOĞAN^{a,b}, ^{1b} Korgün ÖKMEN^b, ^{1b} Ceren YAĞDIRAN ERTUŞ^b

^aKütahya City Hospital, Clinic of Anesthesiology and Reanimation, Kütahya, Türkiye

^bUniversity of Health Sciences Bursa Faculty of Medicine, Bursa Yüksek İhtisas Training and Research Hospital, Department of Anesthesiology and Reanimation, Bursa, Türkiye

ABSTRACT Plane blocks play a crucial role in multimodal analgesia for abdominal surgeries. This case report presents a 77-year-old female who underwent open incisional hernia repair under bilateral external oblique and rectus abdominis plane (EXORA) block as the primary anaesthetic technique. Under ultrasound guidance, 25 mL of 0.25% bupivacaine was administered on each side, totaling 50 mL bilaterally, effectively achieving sensory blockade from T7-T12 dermatomes. Minimal sedation with propofol and ketamine was sufficient, and no additional intraoperative or postoperative analgesia was required. Postoperatively, visual analogue scale scores ranged between 1-3 over 24 h, demonstrating effective pain control. This case highlights the EXORA block as a promising alternative to general anaesthesia, particularly for patients with comorbidities.

Keywords: Acute pain; incisional hernia; nerve block; pain management; postoperative pain

ÖZET Plan blokları, abdominal cerrahilerde multimodal analjezinin önemli bir bileşenidir. Bu olgu sunumu, bilateral eksternal oblik ve rektus abdominis plan (EXORA) bloğu altında açık insizyonel herni onarımı geçiren 77 yaşındaki bir kadın hastayı ele almaktadır. Ultrason eşliğinde, her iki tarafa 25 mL %0,25 bupivakain uygulanmış, toplamda 50 mL lokal anestezik ile T7-T12 dermatom seviyelerinde etkili bir duyu blok sağlanmıştır. Minimal düzeyde propofol ve ketamin sedasyonu yeterli olmuş, intraoperatif veya postoperatif ek analjezi gereksinimi olmamıştır. Postoperatif dönemde, 24 saat boyunca görsel analog skala skorları 1-3 arasında seyretmiş, etkin ağrı kontrolü sağlandığı gösterilmiştir. Bu olgu, EXORA bloğunun, özellikle komorbiditesi bulunan hastalarda, genel anestezie alternatif bir yöntem olarak potansiyelini vurgulamaktadır.

Anahtar Kelimeler: Akut ağrı; insizyonel herni; sinir bloğu; ağrı yönetimi; ameliyat sonrası ağrı

The anaesthetic approach for incisional hernia repair is influenced by factors such as hernia size, location, and the presence of incarceration. While general anaesthesia remains the standard approach, regional techniques have gained prominence due to their benefits in reducing opioid consumption and postoperative complications.

Peripheral nerve blocks are essential in multimodal pain management strategies targeting the anterolateral abdominal wall, whose sensory innervation is primarily derived from intercostal nerves (T7-T12). Plane blocks, including the external oblique plane block and transversus abdominis plane (TAP) block, provide effective abdominal wall

Correspondence: Aycan KURTARANGİL DOĞAN

Kütahya City Hospital, Clinic of Anesthesiology and Reanimation, Kütahya, Türkiye

E-mail: akurtarangil@gmail.com

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analgesia. Deep blocks, such as the quadratus lumborum block (QLB), paravertebral block, and erector spinae plane (ESP) block, are also employed in abdominal surgeries.¹ The external oblique and rectus abdominis plane (EXORA) block is a novel regional anaesthesia technique that involves depositing local anaesthetic at the level of the 8th costal cartilage, between the rectus abdominis muscle and costal cartilage. This facilitates anaesthetic spread into the fascial plane between the external oblique and rectus abdominis muscles, effectively blocking the T6-T11 dermatomes.²

This report describes a case in which bilateral EXORA block was used as the primary anaesthetic technique for open incisional hernia repair in a patient with multiple comorbidities.

CASE REPORT

A 77-year-old female, weighing 63 kg, presented for open incisional hernia repair. The patient had a history of hypertension, rheumatoid arthritis, Alzheimer's disease (moderate stage, Mini-Mental State Examination score: 17/30, requiring daily assistance with Activities of Daily Living), and bronchiectasis with moderate restrictive lung disease. The hernia developed following a previous diagnostic laparotomy and small bowel anastomosis, which was performed 6 months prior due to ileus secondary to percutaneous endoscopic gastrostomy (PEG) placement. The patient's PEG tube remained in situ for nutritional support. The hernia defect was approximately 30 cm in diameter, with no signs of incarceration. Given her moderate cognitive impairment, impaired respiratory function, and opioid sensitivity due to frailty, general anesthesia posed significant risks, including postoperative delirium, prolonged recovery, and respiratory depression. After informed written consent was obtained from the patient's legal representative, regional anesthesia was selected over general anesthesia to reduce systemic anesthetic exposure and facilitate early recovery. Spinal anesthesia was ruled out due to the high location of the laparotomy incision (T6-T7 level), which would have necessitated a high-level neuraxial block.

Informed written consent was obtained from the patient and their legal guardian for the publication of this case report. Preoperative sedation was achieved with 1 mg of midazolam. A bilateral EXORA block was performed under ultrasound guidance using a linear ultrasound probe (Esaote MyLab 30 Gold, 8-18 MHz, Florence, Italy). The probe was placed sagittal along the parasternal line, lateral to the xiphoid process. It was advanced in the cranial caudal direction and the 5th, 6th, 7th and 8th ribs were identified first. At the level of the 8th costal cartilage, the probe was transversely positioned and the rectus muscle and the external oblique muscle lateral to it were observed. Using an in-plane technique, a 22G, 100-mm block needle was advanced, and 25 mL of 0.25% bupivacaine was injected on each side, totaling 50 mL bilaterally (Figure 1). The dose was calculated based on the patient's body weight, remaining within the recommended safety limit of 2 mg/kg, and was consistent with dosages reported in previous studies utilizing the EXORA block technique in abdominal wall surgeries.^{2,3} To minimize the risk of local anaesthetic systemic toxicity (LAST), careful aspiration was performed before each injection and the total volume was administered gradually under

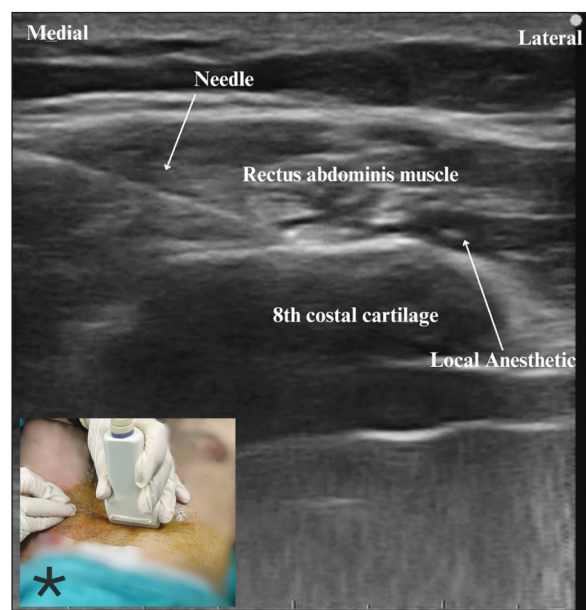


FIGURE 1: Ultrasound-guided visualization of the EXORA block, thumbnail image; demonstration of ultrasonography position and needle placement

*The image is for illustrative purposes only and does not depict the actual patient presented in this case report.

continuous monitoring. No signs of LAST were observed during or after the procedure. Plasma bupivacaine levels were not measured because there were no clinical signs suggestive of systemic absorption or toxicity. A pinprick test confirmed sensory blockade at the T7-T12 dermatomes within 30 minutes. Due to the patient's moderate cognitive impairment, cold sensation testing could not be reliably performed. Motor blockade was not formally assessed, but no significant motor weakness was recorded intraoperatively.

Sedation was initiated with a single intravenous bolus of 10 mg propofol and 10 mg ketamine at the beginning of the procedure. No continuous infusion was required. The patient remained calm and responsive throughout the operation. According to the Ramsay Sedation Scale, the patient's sedation level was maintained at score 2-cooperative, orientated and calm. Given the patient's moderate Alzheimer's disease and underlying respiratory failure due to bronchiectasis, minimal sedation was deliberately chosen to avoid risks of respiratory depression and postoperative cognitive dysfunction. No additional sedation or analgesia was required during surgery.

Intraoperative monitoring included non-invasive blood pressure, electrocardiography, pulse oximetry, respiratory rate and end-tidal CO₂. Oxygen was administered to the patient via a face mask throughout the procedure. Haemodynamic parameters remained stable: systolic blood pressure ranged between 130-115 mmHg, diastolic pressure

between 75-70 mmHg, and heart rate was consistently in the low 80s. Oxygen saturation was maintained above 98% with supplemental oxygen. No episodes of hypotension, bradycardia or hypoxia occurred during the procedure.

The procedure lasted 60 minutes and was completed without technical difficulties. The surgical incision was completed, the fascia was repaired and the skin was sutured (Figure 2a, Figure 2b, Figure 2c). No surgical procedure was performed on abdominal organs. The surgical team reported favorable operating conditions, with adequate muscle relaxation and no patient movement throughout the intervention. The EXORA block was considered effective in providing suitable conditions for incisional hernia repair. No additional intraoperative analgesia or sedative agents were needed beyond the initial bolus, and at no point was deeper sedation or conversion to general anaesthesia necessary.

Postoperative visual analogue scale (VAS) scores were as follows: At Rest: 1 at 30 minutes, 1 at 2 h, 1 at 4 h, 2 at 6 h, 2 at 12 h, and 2 at 24 h. During Activity: 2 at 2 h, 2 at 4 h, 2 at 6 h, 3 at 12 h, and 3 at 24 h. The patient did not require rescue analgesia during the 24-h postoperative period. The patient was followed up for 24 h postoperatively, focusing primarily on VAS scores and the need for additional analgesia. No respiratory complications were observed during this time. However, oral intake and mobilization were not formally assessed or documented, and the length of hospital stay was not

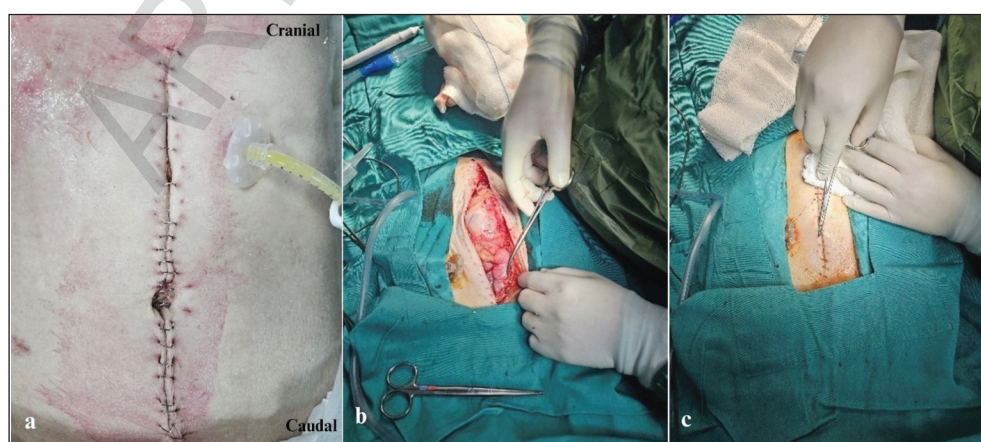


FIGURE 2: Incisional hernia image of the patient. a) Preoperative view, b) Intraoperative view, c) Postoperative view

recorded. No signs of postoperative delirium or cognitive decline were observed. Given the baseline Mini-Mental State Examination score, formal cognitive testing was not repeated, but clinical evaluations revealed no deterioration.

DISCUSSION

Regional anesthesia is increasingly preferred over general anesthesia in high-risk surgical patients, especially those with respiratory compromise and cognitive impairment. Plane blocks play a crucial role in multimodal analgesia for abdominal surgeries, with studies demonstrating their effectiveness in reducing postoperative pain and opioid consumption. Chesov et al. reported that TAP block effectively reduced pain scores and opioid use following ventral hernia repair.⁴ However, as the TAP block primarily covers the T9-L1 dermatomes, it may be less effective for extensive or upper abdominal procedures. The EXORA block, in contrast, provides broader dermatomal coverage (T6-T11), making it more suitable for mid-to-upper abdominal surgeries.² Compared to other fascial plane blocks, the EXORA block offers a distinct advantage by targeting both the lateral and anterior abdominal walls via local anaesthetic spread between the external oblique and rectus abdominis muscles. Unlike the rectus sheath block, which provides primarily midline anterior coverage, the EXORA block can potentially provide wider dermatomal coverage (T6-T11, T7-T12), making it suitable for procedures involving larger or more lateral incisions.^{2,3,11} While techniques such as the modified thoracoabdominal nerve block with perichondrial approach (M-TAPA) also aim to provide anterior abdominal wall analgesia, its dermatomal coverage remains controversial in the literature.⁸⁻¹⁰ Studies have reported variability in sensory distribution, particularly in the lateral cutaneous branches, which may result in inconsistent blockade in some patients.⁸⁻¹⁰ A recent randomized study comparing M-TAPA and EXORA in laparoscopic cholecystectomy found both effective; however, EXORA's anatomical basis supports more predictability.⁸ In this case, the EXORA block was chosen over M-TAPA because of its more predictable distribution pattern and demonstrated efficacy in abdominal surgery.

Favaro et al. reported that QLB, when used as the sole anaesthetic technique in endoscopic totally extraperitoneal inguinal hernia repairs, significantly reduced postoperative pain, hospital stay duration, and costs.⁵ However, QLB is a relatively more challenging block to perform, requiring specific patient positioning, whereas the EXORA block is a superficial technique that is easier to administer. Braun et al. reported successful anaesthesia with ilioinguinal-iliohypogastric and paravertebral blocks in an open inguinal hernia case in a patient with severe cardiopulmonary disease.⁶ However, the paravertebral block is technically challenging, requiring precise needle placement to ensure effective analgesia while minimizing complications. Altıparmak et al. demonstrated the efficacy of the ESP block with dexmedetomidine infusion for open ventral hernia repair in a patient with ankylosing spondylitis.⁷ While the ESP block provides extensive thoracic-to-lumbar coverage, its spread can be inconsistent. The EXORA block, targeting the external oblique and rectus abdominis planes, provides more localized and predictable analgesia.

This case demonstrates the feasibility of using the EXORA block as the sole anaesthetic technique for open incisional hernia repair, providing effective intraoperative and postoperative analgesia without the need for additional analgesics. The patient's hemodynamic parameters remained stable throughout the procedure under EXORA block and minimal sedation. Compared to the fluctuations often seen with general anaesthesia in elderly patients, this approach provided a more stable profile without the need for vasoactive support. Its simplicity, efficacy, and suitability for patients with significant comorbidities highlight its potential as an alternative to general anaesthesia. However, further research through comparative trials and larger clinical studies is necessary to establish its long-term effectiveness and safety.

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Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

Idea/Concept: Aycan Kurtarangil Doğan, Korgün Ökmen, Ceren Yağdırın Ertuğ; **Design:** Aycan Kurtarangil Doğan, Korgün

Ökmen, Ceren Yağdırın Ertuğ; **Control/Supervision:** Korgün Ökmen; **Data Collection and/or Processing:** Aycan Kurtarangil Doğan, Korgün Ökmen, Ceren Yağdırın Ertuğ; **Analysis and/or Interpretation:** Aycan Kurtarangil Doğan, Korgün Ökmen, Ceren Yağdırın Ertuğ; **Literature Review:** Aycan Kurtarangil Doğan, Ceren Yağdırın Ertuğ; **Writing the Article:** Aycan Kurtarangil Doğan, Ceren Yağdırın Ertuğ; **Critical Review:** Aycan Kurtarangil Doğan, Korgün Ökmen; **References and Fundings:** Aycan Kurtarangil Doğan, Ceren Yağdırın Ertuğ; **Materials:** Aycan Kurtarangil Doğan, Korgün Ökmen, Ceren Yağdırın Ertuğ.

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