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LETTER TO THE EDITOR

Erector spinae plane block for urgent pleuroscopy: a possible change in anesthetic approach for high-risk patients

Dear Editor,

Pleuroscopy, also known as medical thoracoscopy, is a commonly performed diagnostic and therapeutic procedure regarded as the cornerstone of pleural disease management. The anesthetic management of these patients is not standardized, ranging from sedation with local anesthesia to general anesthesia with definitive airway control. Even if a considerable proportion of pleuroscopy patients have multiple comorbidities besides respiratory disease, pleuroscopy is usually performed in a bronchoscopy suite on an outpatient basis. The challenges in managing pleuroscopy cases include lateral decubitus positioning, iatrogenic pneumothorax, pendelluft ventilation, and sedation effects, which may result in significant respiratory compromise and potentially life-threatening complications. A trocar (6.5 to 11.5 mm) and a video thoracoscope with a 0° optical telescope are inserted 1 to 2 cm on the midaxillary line between the fourth and seventh intercostal spaces; the procedure is painful, especially in the case of talc insufflation or biopsies, making perioperative pain control one of the fundamental goals of its anesthetic management.[1]

The erector spinae plane block (ESPB), a newer regional anesthetic technique, is an ultrasound-guided interfascial plane block that provides somatic, visceral, and sympathetic nerve block at multiple dermatome levels. The first report of the successful use of this procedure was in 2016, when the block was used to manage thoracic neuropathic pain.[2] Since then, the block has been reported to be used successfully in a multitude of procedures. Either using a single-injection technique or via catheter placement for continuous infusion, the technique is relatively easy to perform, and it has become a frequent choice for anesthesiologists who are looking for an effective option for postoperative analgesia. Following the current recommendation of multimodal approach for thoracic procedures, ESPB is highly recommended as an option for postoperative analgesia.[3] Due to its simplicity of performance, efficacy, and safety it has gained much popularity in thoracic surgery as an alternative to more invasive blocks, such as paravertebral and epidural.[4]

Anesthesia and analgesia for thoracic procedures, specifically pleuroscopy, present unique challenges given the spectrum of underlying pulmonary disease and susceptibility to respiratory complications in this group of patients. Other clinical conditions, such as obesity or cardiomyopathy, may make the management of these patients even more problematic. In this report, we present ESPB as a sole anesthetic technique for pleuroscopy in a high-risk patient.

A 79-year-old man was referred to the bronchoscopy service for urgent pleuroscopy after computerized chest tomography had revealed a left massive pleural effusion of unknown origin. The patient's medical history included morbid obesity (BMI $> 40\ kg.m^{-2}$), confirmed obstructive sleep apnea (OSA), chronic kidney disease (Stage 3a), chronic liver disease (Child-Pugh category B), chronic respiratory failure, arterial hypertension, and predicted difficult airway. Arterial blood gas analysis showed severe hypoxia (PaO_2 50 mmHg on room air and $PaCO_2$ 49 mmHg). The patient presented with leukocytosis and mild anemia with normal clotting screen and albumin concentration ($30\ g.L^{-1}$). Regular medication therapy included angiotensin converting enzyme inhibitors, beta-2 agonist inhalers, and aspirin. Upon arrival in the bronchoscopy suite, the patient was cooperative, hypertensive (180/110 mmHg), with sinus tachycardia on electrocardiogram (110 bpm), and complained of chest pain (Numerical Rating Scale [NRS 7/10]). Oxygen saturation (SpO_2) was 91% on a Venturi oxygen mask (FiO_2 45%). The patient had been in the Emergency Room for 12 hours already and a previous thoracentesis attempt had been unsuccessful. Due to the patient's foreseeable risk of worsening cardiorespiratory function in case of sedation, we decided to perform pleuroscopy using ESPB as the sole anesthetic technique. The decision to proceed was made along with the surgical team and the procedure was explained to the patient.

After obtaining informed consent and placing the patient in right lateral decubitus, the attending anesthesiologist performed unilateral ESPB. By palpation of spinous processes from C7 downward, the T5 spinous process was identified, and a 6—13 MHz linear array transducer (Mylab One, Esaote, Florence, Italy) was positioned 2 to 3 cm lateral to it, parallel to the thoracic spine. After obtaining clear visualization of the trapezius, rhomboid major, and erector spinae muscles superficial to the T5 transverse process, a 21G, 85-mm needle (Echoplex, Vygon, Padova, Italy) was inserted in a cephalad direction with an in-plane technique, until the

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needle tip lay in the plane below the erector spinae muscles. Correct needle tip location was confirmed by injection of 2 ml of 0.9% NaCl which was followed by 25 ml of 0.5% ropivacaine. The patient's baseline heart rate and blood pressure decreased to 70 bpm and 105/67 mmHg, respectively, after a few minutes as pain intensity significantly decreased (NRS2). Fifteen minutes later, a sensory blockade to cold was evident between T4 and T8 vertebral level in the anterior, lateral, and posterior sections of the left hemithorax. Oxygen was supplemented with a non-rebreathing oxygen mask with reservoir bag (set to 15 $L.min^{-1}$ for about 95% of FiO_2) and SpO_2 was 96% with respiratory rate of 18 breaths/min. A 7.5 mm trocar was inserted under ultrasonographic guidance in the 5^{th} intercostal space, midaxillary line. Drainage of 1200 ml of fluid was followed by pleural biopsies and talc pleurodesis; a 24Fr chest drain was inserted at the end of the procedure. The patient remained comfortable throughout, with improved peripheral oxygenation after drainage. Postoperative analgesia management was based on acetaminophen 1 g intravenous (IV) every 8 hours, reserving opioid analgesia only in case of NRS $\geq$ 4 because of the increased risk for respiratory depression. The patient's subsequent recovery was uneventful, not requiring rescue analgesia over 48 hours.

Pleuroscopy can usually be performed safely with a combination of midazolam, opioids, and local anesthesia. Although ketamine is largely used for procedural sedation and analgesia, especially in the emergency department, it can cause vomiting or nausea and post-procedural agitation. Moreover, although ketamine induced hemodynamic changes make it suitable for patients with cardiac conditions, it is contraindicated in patients with serious myocardial disease or heart failure particularly in the context of increased myocardial oxygen consumption.[5] Since we did not have a recent cardiac echocardiogram for this patient, we felt ketamine was not the best choice in this case. Based on these observations, in patients with precarious respiratory status and at high risk for sedation-related adverse events, regional anesthesia might represent a safer solution. The idea of using regional anesthesia as a sole nerve block to provide effective anesthesia for a procedure, especially in high-risk patients, is not a new approach;[6] the use of thoracic epidural anesthesia (TEA) and paravertebral block (PVB) for pleuroscopy has been previously reported.[7] Still, both techniques are potentially difficult in morbidly obese patients because of issues with anatomical landmark identification, patient positioning, needle length choice, and local anesthetic dosage. ESPB allows for different patient positions during the procedure, easily identifiable landmarks with the appropriate ultrasound probe, and a reliable volume-dependent block. ESPB complications are rare with proper ultrasound visualization, as the target area is distant from the pleura, blood vessels, and nerves. As ESPB is recommended for thoracic surgery, it could be argued as sufficient to provide anesthesia and analgesia for less invasive thoracic procedures.[4]

Ropivacaine as a single shot local anesthetic can be considered safe in patients with liver and kidney disease.[8] In patients with chronic end-stage liver disease, peak plasma concentrations of ropivacaine after a single intravenous ropivacaine dose are similar to those in healthy subjects.[8,9] Additionally, uremic patients have significantly higher alpha-1-acid glycoprotein plasma concentrations than non-uremic patients, so the peak plasma concentrations of free ropivacaine (related to toxicity) are similar in both groups.[8]

Importantly, we would like to highlight how our approach was different from the one adopted in the only other published study on this topic, a small retrospective case series highlighting the feasibility of ESPB for pleuroscopy.[10] Unlike that study, where all patients were brought to the operating room and ESPB and opioids were used as anesthetic technique,[10] we opted to perform ESPB in a bronchoscopy suite, taking the same precautions as in the operating room for urgent cases, due to our patient's high risk. ESPB allowed him to remain comfortable without the need for opioids; this is a previously shown opioid-sparing effect of ESPB, making it a suitable choice for patients with a significant risk of opioid-induced respiratory depression, particularly in the presence of OSA and/or a difficult airway.[11] Should rescue analgesia be needed, ESPB can be repeated at the ward or used in continuous mode.

Our patient was awake with no need for maintenance of the airway; in case of emergency, airway patency and lung ventilation would be established by placing a second generation supraglottic airway device.[12] We planned to maintain the patient's spontaneous breathing to avoid the risks of general anesthesia and consequent tracheal intubation. However, a difficult airway trolley was readily available in case of airway problems.

In summary, we demonstrated the efficacy and safety of ESPB for urgent pleuroscopy in a high-risk patient in the outpatient setting which, combined with the patient's risk factors, mandated avoidance of sedation and opioids. However, a single case report cannot demonstrate without doubt the superiority of any technique. More evidence about ESPB as a safe technique for pleuroscopy is needed from appropriately sized non-inferiority type studies to confirm its suitability for standardized adoption.

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Declaration of Competing Interest

The authors declare no conflicts of interest.

References

1. Wan YY, Zhai CC, Lin XS, et al. Safety and complications of medical thoracoscopy in the management of pleural diseases. BMC Pulm Med. 2019;19:125.
2. Forero M, Adhikary SD, Lopez H, et al. The erector spinae plane block: a novel analgesic technique in thoracic neuropathic pain. Reg Anesth Pain Med. 2016;41:621–7.
3. Feray S, Lubach J, Joshi GP, et al. PROSPECT guidelines for video-assisted thoracoscopic surgery: a systematic review and procedure-specific postoperative pain management recommendations. Anaesthesia. 2022;77:311–25.
4. Koo CH, Lee HT, Na HS, et al. Efficacy of erector spinae plane block for analgesia in thoracic surgery: a systematic

review and meta-analysis. J Cardiothorac Vasc Anesth. 2022;36:1387—95.
5. Natoli S. The multiple faces of ketamine in anaesthesia and analgesia. Drugs Context. 2021;23. 2020-12-8.
6. Zheng H, Hu XF, Jiang GN, et al. Nonintubated-awake anesthesia for uniportal video-assisted thoracic surgery procedures. Thorac Surg Clin. 2017;27:399—406.
7. Agnoletti V, Gurioli C, Piraccini E, et al. Efficacy and safety of thoracic paravertebral block for medical thoracoscopy. Br J Anaesth. 2011;106:916—7.
8. Jokinen M. The pharmacokinetics of ropivacaine in hepatic and renal insufficiency. Best Pract Res Clin Anaesthesiol. 2005; 19:269—74.
9. Jokinen MJ, Neuvonen PJ, Lindgren L, et al. Pharmacokinetics of ropivacaine in patients with chronic end-stage liver disease. Anesthesiology. 2007;106:43—55.
10. Sharp A, Mudda G, Braehler MR, et al. Erector spinae plane block: a novel anesthetic approach for pleuroscopy. J Bronchology Interv Pulmonol. 2022;29:109—14.
11. Jiao B, Chen H, Chen M, et al. Opioid-sparing effects of ultrasound-guided erector spinae plane block for adult patients undergoing surgery: a systematic review and meta-analysis. Pain Pract. 2022;22:391—404.
12. Shiraishi Zapata C. I-gel® airway for advanced uses: a case of successful utilization of this second-generation supraglottic airway device for controlled ventilation during general anesthesia in lateral decubitus position. Minerva Anestesiol. 2017;83:219—20.

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