Ultrasound-Guided Midpoint Transverse Process to Pleura Nerve Block for Medical Thoracoscopy: A Case Report

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We performed the midpoint transverse process to pleura (MTP) block in a patient with a recurrent pleural effusion requiring medical thoracoscopy, drainage of pleural effusion, talc poudrage, and placement of tunneled pleural catheter under sedation while in the left lateral decubitus position. Forty milliliters of a combination of bupivacaine hydrochloride and lidocaine, with dexamethasone and clonidine as adjuvants, was injected at the T6 level under ultrasound guidance with satisfactory intra- and postoperative analgesia. (A&A Practice. 2020;14:e01240.)

GLOSSARY

ESP = erector spinae plane; **ESM** = erector spinae muscle; **G** = gauge; **LA** = local anesthetic; **MTP** = midpoint transverse process to pleura; **P** = pleura; **PVB** = paravertebral block; **RM** = rhomboid muscle; **TM** = trapezius muscle; **TP** = transverse process; **US** = ultrasound; **X** = injection point of the local anesthetic at the midpoint between the transverse process and the pleura

Medical thoracoscopy is increasingly performed by interventional pulmonologists for pleural fluid evacuation, pleural biopsy, and chemical pleurodesis.¹ This procedure is typically done under sedation in the bronchoscopy suite or in outpatient facilities, using propofol, midazolam, and fentanyl as well as local anesthetic infiltration at the incision site, intercostal nerves, and pleura.^{2,3} Hypoxemia, hypotension, and need for airway rescue have been reported as major complications.³ Additionally, moderate-to-severe pleuritic chest pain, mainly attributed to the inflammatory response induced by the sclerosing agent,⁴ may require supplemental analgesia with potential respiratory side effects or the need to convert to general anesthesia while the patient is in the lateral decubitus position.

Several fascial blocks have been described to provide analgesia and anesthesia during thoracic procedures. The midpoint transverse process to pleural (MTP) block has been reported by Costache et al⁵ as an alternative to a paravertebral block (PVB), with promising results in patients with rib fractures⁶ and those undergoing modified radical mastectomy.^{7,8}

Herein, we describe the use of high volume–low concentration MTP block as the main intra- and postoperative analgesic technique in a patient undergoing right-sided medical thoracoscopy, drainage of pleural effusion, talc poudrage, and tunneled pleural catheter placement.

This article adheres to the applicable Equator guidelines. Written informed consent and Health Insurance Portability and Accountability Act authorization were obtained from the patient for the procedure and for the publication.

CASE DESCRIPTION

A 55-year-old woman (175 cm, 83 kg) with breast cancer metastatic to the lungs and pleura presented for medical thoracoscopy, lysis of adhesions, and talc poudrage under sedation for the management of a recurrent, loculated, malignant right-sided pleural effusion. Following placement of standard American Society of Anesthesiologists monitors, the patient was placed in the left lateral decubitus position and intravenous sedation initiated with propofol (150 µg/kg/min). Supplemental oxygen was administered via nasal cannula at 3.0 L/min, and end-tidal carbon dioxide was monitored. After ultrasound (US) evaluation of the thorax by the pulmonologist for confirmation and marking of the pleural space access site, additional marks were placed on the spinous processes and 3 cm laterally at the level and on the side of the planned incision (Figure 1). The MTP block was performed under US guidance (Sonosite Edge II; FujiFilm Inc, Tokyo, Japan), using a linear 6–13 MHz probe, as previously described.⁵ After locating the transverse process at the T6 vertebral level and the pleura, a point midway between the 2 was determined (Figure 2A). A 22-gauge (G) 50-mm echogenic needle was inserted in plane with the US beam and advanced toward the MTP as the final end point (Figure 2B). After hydrodissection of the space with 1 mL of normal saline, 30 mL of 0.25% bupivacaine hydrochloride,

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Accepted for publication May 5, 2020.

Funding: None.

The authors declare no conflicts of interest.

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DOI: 10.1213/XAA.0000000000001240

Figure 1. Patient in the left lateral decubitus, with the incision site marked at T6. Marks are placed to identify the spinous processes and 3 cm lateral at the level and on the side of the planned incision.

10 mL of 2% lidocaine, 4 mg of dexamethasone, and 100 µg of clonidine were injected in 5-mL increments, with negative aspiration between aliquots. Sonographic flattening of the pleura was observed at the site of the injection (Figure 3) and along 3 intercostal levels above and below the primary injection site, for a total of 6 dermatomes. The patient tolerated the procedure well and did not require additional analgesia for the duration of the procedure or for the following 16 hours. She was stable in the recovery unit and was transferred to the hospital floor for further care.

DISCUSSION

The MTP block is described as an alternative to a PVB.⁵ The local anesthetic injected at the midpoint between the transverse process of the vertebrae and the pleura is thought to penetrate the superior costotransverse ligament, thus reaching the paravertebral space, with cephalad and caudad spread. Large volumes of local anesthetics are used in fascial blocks, often in combination with adjuvants, to prolong the duration of the analgesic effect, if a catheter is not placed.

The main advantage of this block for minimally invasive thoracic cases, especially when done under sedation with spontaneous ventilation, is the ease of performance, particularly when the patient is already positioned for surgery. When compared with PVBs, the landmarks for the MTP block are clearly visible and readily accessible, possibly minimizing the risk of hypotension, epidural or spinal injection, vascular puncture, pneumothorax, or nerve damage reported with PVBs.⁹ As demonstrated in this case, the quality of analgesia may be comparable to a PVB, thus providing adequate pain control for the degree of surgical stimulation created by the incision, access to the pleural space, and chemical pleurodesis. Talc pleurodesis is known to cause intense burning pain, which often requires patient-controlled analgesia.

Figure 2. Parasagittal ultrasound image of the MTP block at T6-7 level. A, Longitudinal ultrasound scan of the transverse process, the pleura, and the MTP point before injection (X mark). B, Local anesthetic was injected at the midpoint between the posterior border of the transverse process and the pleura, with the arrow showing the needle direction. The area of injection of the local anesthetic is marked with a circle. ESM indicates erector spinae muscle; LA, local anesthetic; MTP, midpoint transverse process to pleura; P, pleura; RM, rhomboid muscle; TM, trapezius muscle; TP, transverse process; X, the injection point of the local anesthetic at the midpoint between the transverse process and the pleura.

Figure 3. Local anesthetic spread in the paravertebral space after the injection, with flattening of the pleura. The arrows indicate the superior costotransverse ligament. ESM indicates erector spinae muscle; LA, local anesthetic; P, pleura; RM, rhomboid muscle; TM, trapezius muscle; TP, transverse process.

The MTP block is a valid analgesic option for minimally invasive thoracic noncardiac surgery. Fascial blocks have recently gained popularity as an alternative to neuraxial analgesia. Both the erector spinae plane (ESP) and MTP blocks are speculated to share similar mechanisms of action and extent of spread of the local anesthetic from the respective injection points.^{5,10} In both blocks, the local anesthetic is postulated to reach the paravertebral space in a caudad, cephalad, anterior, and lateral direction, with a similar ultimate effect on the nerve roots and small branches that innervate the chosen dermatomes.¹⁰ At the present time, due to the lack of literature directly comparing the 2 blocks or detailing the specific mechanism of action for the MTP block, the choice between the ESP and MTP block remains an individual one.

We performed the MTP block in the procedure room, after the patient was positioned in the lateral decubitus and sedation administered. The level of the injection was determined based on the location of the incision. To our knowledge, this is the first report on the use of high volume–low

concentration of local anesthetic with adjuvants, for an MTP block during medical thoracoscopy. Of note, the volume chosen in this case is comparable to the volume used for the ESP block¹¹ and below the recommended maximum dose for this patient. Since she was sedated for the block, we were unable to check the sensory level of analgesia before incision. However, we observed a flattening of the pleura during injection and the spread of the local anesthetic above and below the injection site, like what is observed with a PVB. The patient did not move during the procedure, maintained spontaneous ventilation, adequate oxygenation, and did not require additional analgesia intraoperatively through the first 16 hours, postoperatively.

US-guided high volume–low concentration MTP block appears to be a safe and effective intra- and postoperative analgesic option for patients undergoing medical thoracoscopy and talc pleurodesis performed under monitored anesthetic care. This block can potentially become part of an enhanced recovery after surgery protocol, in the attempt to decrease the use of opioids by favoring multimodal analgesia. Further studies are required to define appropriate patient selection, elucidate optimal medication dosing and volumes, and compare with other regional anesthesia modalities. ■

DISCLOSURES

Name: Alessia Pedoto, MD, FASA.

Contribution: This author helped to conceive the case report, perform the block, and acquire the US images, as well as write and review the paper.

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