

The midpoint transverse process to pleura (MTP) block for postoperative analgesia in patients undergoing modified radical mastectomy: A case series

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Abstract

Among the various regional anesthesia techniques used for postoperative analgesia in the modified radical mastectomy (MRM), thoracic paravertebral block (TPVB) is presently considered the technique of choice. Nevertheless, TPVB may lead to complications like inadvertent vascular puncture, hypotension, epidural or intrathecal spread, pleural puncture, or pneumothorax. Recently, a newer technique “midpoint transverse process to pleura” (MTP) block has been described in which the tip of the needle is placed at the midpoint between the transverse process and pleura. In this case series, we included ten patients of American Society of Anesthesiologist status I/II scheduled for MRM. Ultrasound-guided MTP block was performed and the catheter was inserted on the side of the surgery at the level of T4 level. The block was successful in the all patients as their median visual analogue score at rest and movement was 2 and 3, respectively, in first 24 h postoperatively. Only three patients required rescue analgesia in the first 24 h. No procedural-related complications were noticed in any patient. We concluded that MTP block provided effective perioperative analgesia with minimal rescue analgesia requirement and satisfactory safety profile.

Keywords: Analgesia, modified radical mastectomy, patient satisfaction, postoperative period, ultrasound

Introduction

Breast cancer is the commonest cancer among Indian females, accounting approximately 25–32% of all female malignancies.^[1] Modified radical mastectomy (MRM) is the surgical procedure commonly performed for breast cancer. In the postoperative period, patients who had MRM suffered moderate to severe pain.^[2] Regional anesthesia (RA) techniques including thoracic epidural,^[3] thoracic paravertebral block (TPVB),^[4] and pectoral nerve blocks^[5] have been used to provide analgesia after MRM.

TPVB is presently considered the technique of choice for postoperative analgesia after breast surgery.^[6] The standard approach to TPVB requires the deposition of drugs anterior to the superior costotransverse ligament (SCTL) putting the patients at the risk of developing complications.^[7] Recently, a newer approach of TPVB, “midpoint transverse process to pleura” (MTP) block, has been described which does not require piercing the SCTL, and the tip of the needle is placed at the midpoint between the transverse process and pleura [Figure-1a].^[8] In this case series, we evaluated the efficacy and safety of MTP block for providing postoperative analgesia in patients undergoing MRM.

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Material and Methods

In this case series, ten female patients between the ages of 25 and 65 who were scheduled for MRM and had American Society of Anesthesiologists (ASA) physical status I or II were enrolled after receiving approval from the institute's review board (reference number: AIIMS/IEC/2018/315; dated: 17/07/2018) and informed written consent.

The patients were explained about reporting of pain on the visual analogue scale score (visual analogue score (VAS); 0–10, 0 = no pain, 10 = worst pain). In the operating room, routine ASA standard monitors were connected and baseline vitals were recorded. MTP block was performed in a sitting position at T4 level on the operative side by using an ultrasound (US) machine (LOGIQe, GE Healthcare, Chicago, United States) fitted with a high-frequency (8–13 MHz) transducer. The US transducer was placed in the parasagittal plane (2.5–3 cm laterally from the midpoint of spinous process) and the paravertebral space was identified at the level of the transverse process. A 100-mm short 18 G echogenic needle (Contiplex, B BRAUN Melsungen, Germany) was advanced in plane in a caudal to cephalad direction. The target was the midpoint between the dorsal border of the transverse process and pleura. Twenty milliliters of 0.5% ropivacaine was injected, followed by the insertion of a 20 G catheter with its tip reaching about 2.5 cm beyond the needle tip. [Figure 1b] Sensory assessment of block was done with a cold swab along the midaxillary line, midclavicular line, and parasternal line 20 min after block performance. The standard general anesthesia technique was used in all the patients. Continuous infusion of 0.5% ropivacaine @ 0.1 mL/kg/h through MTP catheter was continued throughout the intraoperative period. At the end of surgery, the patients were transferred to the postanesthesia care unit (PACU) and further to the ward and monitored for 24 h after surgery. In the PACU immediately after shifting, all patients received intravenous (IV) paracetamol 10 mg/kg, then every 8 hourly, and continuous infusion of 0.2% ropivacaine @ 0.1 mL/kg/h for 24 h. Postoperatively, the assessment of pain was done with a VAS 0–10 (0 = no pain and

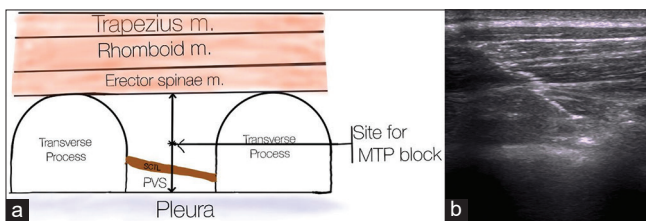


Figure 1: (a) Schematic line diagram representing the needle position in the mid-transverse process to pleura (MTP) block. (b) Ultrasound image of the MTP block with an in-plane needle at the target level. PVS indicates Paravertebral space. SCTL indicate superior costotransverse ligament

10 = worst imaginable pain) at rest, and during the abduction of the ipsilateral upper limb at immediate postoperative 1, 3, 6, 12, 18, and 24 h by an independent observer. Any patient having VAS score ≥ 4 at the immediate postoperative period was considered as block failure. Rescue analgesia in the form of IV diclofenac (aqueous) 1.5 mg/kg was administered on the recording of VAS score ≥ 4 or on patient demand. Time to first rescue analgesia and the total amount of rescue analgesics used in 24 h postoperatively were recorded. Any procedure-related and postoperative complications were also noted. At 24 h after surgery, patient satisfaction for the intervention was assessed using a numerical satisfaction score of 4 = excellent, 3 = good, 2 = fair, and 1 = poor.

Results

The demographic profile is described in Table 1. All patients belonged to ASA class I or II. The postoperative median (IQR) VAS score at rest and with arm movement at different time interval is described in Figure 2. Only three patients required rescue analgesia (single dose), out of which two patients required analgesia at 12 hours postoperatively, while one patient requested analgesia third hours postoperatively. Numerical satisfaction score was excellent in seven patients and good in three patients. No procedural and postoperative complications were noticed in any of the patients.

Discussion

In this case series, we observed that MTP block provides excellent postoperative analgesia with minimal requirement

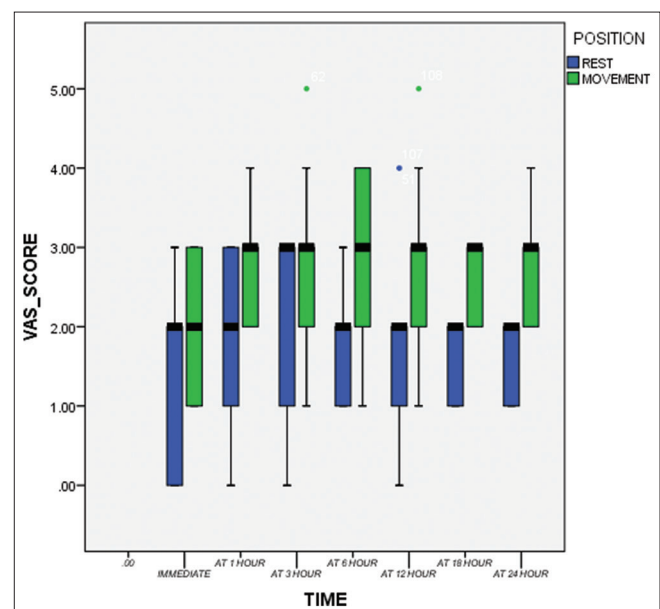


Figure 2: Box plot showing median VAS score rest at and with arm movement

Table 1: Demographic profile and rescue analgesic requirement

Parameters	Mean±SD /Median (IQR)
Age (years)	49.2±8.01
Weight (kg)	58.8±6.07
Height (Centimetres)	158.4±4.45
Duration of surgery (minutes)	182±15.56
BMI (Kg/m ²)	23.45±2.23
Median rescue analgesic dose requirement in 24-h postoperative period	1 (0–1)

of additional intraoperative analgesia and postoperative rescue analgesia, which also reflected in excellent patient satisfaction scores in most of the patients at 24 h postoperatively.

The increasing use of US in RA practices has led to the development of fascial plane blocks including erector spinae plane block, retrolaminar block, and MTP block. MTP block is most recent addition in this family.

Local anesthetic deposited at the midpoint of the posterior border of the transverse process and pleura can reach the paravertebral space through several possible mechanisms such as through the gap between SCTL and vertebral bodies, through fenestrations in the SCTL or through the internal intercostal membrane. Syal *et al.*^[9] described the role of this novel technique in a patient with multiple rib fractures. Swathi KB *et al.*^[10] in a randomized controlled trial found the results of MTP block comparable to conventional TPVB for postoperative analgesia in video-assisted thoracoscopic surgeries. The MTP block has successfully been used as a sole anesthetic technique in carcinoma of lung patients posted for rib resection and intercostal drain tube placement.^[11] Eskin in randomized study compared the postoperative analgesic efficacy of bilateral ESP and MTP blocks in patients who underwent lumbar spinal surgery.^[12]

The advantage of this novel technique is that it does not require identification of the SCTL and the injection point, which is midway between the pleura and transverse process, which makes this approach much safer than the conventional approach since the needle is farther from the vital structures like pleura, nerves, and vasculature.

To conclude, the MTP block provided adequate perioperative analgesia with minimal rescue analgesia requirement. It may be a safer alternative to conventional TPVB with the comparable analgesic property. Further studies with a large sample size and comparative group are required to validate our study results.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient (s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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