



**CASE REPORT**

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**Ultrasound guided thoracic paravertebral block for breast surgery in a patient with severe cardiopulmonary disease**

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**Abstract**

Thoracic paravertebral block (PVB) thoracic epidural and pectoral nerve blocks can be used as a regional anesthetic option for breast surgery. Thoracic PVB is defined as injection of local anesthetic solution at the site where spinal nerves emerges from paravertebral foramen. It produces unilateral motor, sensory and sympathetic block, hence PVB could be an anesthetic choice in patients with severe cardiopulmonary disease. We report a case of an 78 year old patient with severe cardiopulmonary disease undergoing simple mastectomy by thoracic paravertebral block without any hemodynamic or respiratory derangement during perioperative period. In high risk patient, the use of PVB provides hemodynamic and respiratory stability with satisfactory anesthetic and analgesic efficacy

**Keywords:** Breast surgery, torasik paravertebral blok, cardiopulmonary disease

**Introduction**

Breast surgeries are usually performed under general anesthesia and requires endotracheal intubation. Patients with significant cardiac and respiratory problems have higher risks for general anesthesia. Herein we report thoracic PVB in a patient with severe chronic obstructive pulmonary disease (COPD) and ischemic heart failure undergoing simple mastectomy without axillary lenf node dissection for breast papillary carcinoma.

**Case Report**

78 year old man 68kg, 170 cm, American Society of Anesthesiology (ASA) III was scheduled for righth simple mastectomy without axillary lenf node dissection after diagnosis of breast papillary carcinoma. He was diagnosed with ischemic heart failure grade III NHYA classification. His 2D echocardiography showed global ischemia with ejection fraction of 30%, with pulmonary hypertension. Electrocardiography revealed inferolateral wall ischemia. He was also suffering from severe COPD. On auscultation he had prolonged expirium. Arterial blood gases showed pH:7.38 SO<sub>2</sub>%90 PCO<sub>2</sub>:46 mmHg PO<sub>2</sub>:54 mmHg. His spirometric evaluation was FEV<sub>1</sub>: 1.3 L/ min FVC: 2.5 L/min FEV<sub>1</sub>/FVC: 52% Performing the procedure under thoracic PVB was discussed with the patient as the patient had higher risk of complications for general anesthesia.

Upon arrival to operating room the patient was monitorized. The initial noninvasive blood pressure, heart rate and peripheral oxygen saturation were 110/68 mmHg, 80 beats/min and 90% respectively. The patient was sedated with IV 2mg midazolam and 50 mcg fentanyl. Paravertebral injections were performed with the patient in the sitting position by using ultrasound guidance. The superior aspects of the Th 3-6 spinous processes were marked by counting down to vertebra prominens (C7). Under aseptic conditions the skin and subcutaneous tissue of the patient were anesthetized with total 6 mL lidocaine (10 mg/mL). Linear array probe (Esaote MyLab 5, Genova, Italy) was placed longitudinally in a sagittal plane ,2-3 cm lateral to the midline. The two transvers processes were visualized as a hyperechoic line and the parietal pleura was located deep to the adjacent transvers process as a bright structure. The 22 gauge echogenic needle (Pajunk, Germany) was inserted using in plane technique through caudad to cephalad direction. Superior costavertebral ligament was punctered and paravertebral space was deposited with local anesthetics after aspiration for blood or air. True placement of needle and was confirmed by hydrolocation. By injection of local anesthetics the parietal pleura displace anteriorly. Total 20 mL %5 bupivacaine was deposited at righth Th3, Th4, Th5 and Th6 equally. During the procedure the patient's vital signs were normal. Adequacy of block was checked by loss of sensation to cold and pinprick test of affected chest wall. The surgery was lasted 100 minutes without any complication. He was prescribed 500 mg paracetamol every 6 hr. The visual analog scores (VAS) of the patient were assesed every 4 hours

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postoperatively. IV 20 mg tenoxicam was administered once the reported VAS was  $\geq 4$ . The patient was discharged on the second postoperative day.

### Discussion

In this case we reported the use of PVB in a patient with ischemic heart failure and severe COPD undergoing simple mastectomy. General or regional anesthetic techniques can be performed for breast surgery. Regional anesthetic techniques include thoracic epidural anesthesia, thoracic paravertebral block and pectoral nerve blocks (PECS I, II). We made the anesthetic management of this patient on the basis of avoiding mechanical ventilation and hypotension in order not to cardiopulmonary derangement. By this way we decided to perform regional anesthetic techniques.

Thoracic epidural anesthesia (TEA) can result in bilateral sympathetic block and subsequent profound hypotension compare to PVB [1-2]. Ischemic heart of the patient may not compensate toward hypotensive periods. PECS I, II block also could be used in anesthetic management of this patient. However there are multiple reported benefits of paravertebral block such as analgesic efficacy, patient satisfaction, enhanced surgical recovery and decreased conversion of acute to chronic pain [3-4]. In consequence, we decided to introduce PVB in order to avoid aforementioned possible side effects of general and thoracic epidural anesthesia and limited number of studies describing benefits of PECS blocks compared to paravertebral block.

TEA has the potential to provide efficacious surgical anesthesia for breast surgery. Besides technical difficulty, urinary retention, postdural puncture headache are potential side effects. During PVB unilateral part of the chest is affected, hence PVB preserves respiratory function better and produces fewer side effects than TEA. Local anesthetics introduced to paravertebral space produce anesthesia with small number of sympathetic ganglion blockade. So the hemodynamic consequences seen thereafter PVB are less than those seen in TEA.

PECS I block is an interfascial block in which local anesthetic was deposited between pectoral minor and major muscles. PECS II block places additional local anesthetic between pectoralis minor and serratus anterior muscles and extend analgesic effect to the axilla [5]. Both PECS I and II could be used in simple mastectomy. As the PECS blocks are peripheral nerve blocks, they do not result in sympathectomy. From this point of view PECS blocks seem to be the best choice of anesthetic management for this patient. However there are no data to validate benefits of PECS blocks as an anesthetic technique compare to paravertebral or epidural block, hence PVB was applied to the patient.

The reported complications of PVB are hypotension, vascular puncture, pleural puncture and pneumothorax

[1]. Hypotension is rare after PVB in normovolemic patients. But may be a concern in ischemic heart failure patients with elevated catecholamine level as a compensatory mechanism. It can be treated with small amounts of fluids as compare to TEA. Inadvertent injection or dural puncture related complications can be minimized by using low doses of local anesthetic at several levels. Inadvertent pleural puncture may not always result in a pneumothorax which is usually minor and managed conservatively [4,6]. However even small pneumothorax may result in respiratory derangement in COPD patients. The risk of penetrating pleura could be decreased by visualization of the needle path with ultrasound-guided technique. There are few papers mentioned favor of PVB as sole anesthetic technique in high risk patients undergoing breast surgery [7-8]. In these three reported cases including our patient there were no reported possible complication of PVB. Frequent use of ultrasound may increase application of PVB without any complications.

This case shows us, the use of thoracic PVB is a good anesthetic choice for patients with COPD and heart failure. It provides safe and effective surgical anesthesia and high patient satisfaction. With the increased use of Pecs blocks, it might be a valid alternative to conventional techniques, especially in high anesthetic risk patient beyond PVB.

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