

CASE REPORT

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Combined Thoracic Paravertebral Block-Interscalene Block as a Primary Anesthetic for Modified Radical Mastectomy: A Case Report

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ABSTRACT

Background: Regional anesthesia as a primary anesthetic can offer merits over general anesthesia for patients having multiple comorbidities who are at a high risk of perioperative morbidity and mortality. Thoracic paravertebral block (TPVB) and interscalene block (ISB) have been used widely to improve the quality of postoperative analgesia after breast surgery. **Objective:** There are limited data on the feasibility of combining TPVB-ISB as a sole anesthetic technique for extensive breast surgery with axillary lymph nodes dissection. **Case presentation:** In this report, the author presented a successful use of a combined TPVB and ISB as a sole anesthetic with conscious sedation in a 52-year-old patient with multiple comorbidities, including heart failure with reduced ejection fraction, who underwent modified radical mastectomy with left axillary lymph nodes dissection. **Conclusion:** Combining TPVB-ISB can be used as a sole anesthetic for extensive breast surgery in patients with a high risk for general anesthesia.

Keywords: conscious sedation; general anesthesia; modified radical mastectomy; regional anesthesia

1. BACKGROUND

A combined surgical intervention and chemoradiotherapy are usually required in patients diagnosed with breast cancer which mainly depends on the stage of the disease.

Modified radical mastectomy (MRM, a late surgical choice to treat resectable breast cancer disseminated to the adjacent axillary lymph nodes, is frequently performed under general anesthesia (GA).

GA might pose a high risk of perioperative morbidity and mortality, particularly in those with multiple comorbidities which results in a prolonged hospital stay [1].

Ultrasound-guided thoracic paravertebral block (TPVB) and interscalene block (ISB) have been widely used for years to provide adequate perioperative analgesia for abdominothoracic, shoulder and upper arm surgeries [2] [3]. Both blocks are frequently used in conjunction with GA for breast surgery [4].

Previous publications demonstrate the feasibility of using the TPVB as a sole anesthetic with an excellent improved postoperative course and reduced postoperative opioid requirements and the duration of hospital stays [5]. However, sole use of TPVB is not sufficient for extensive axillary dissection. Combining TPVB and ISB would improve the quality of analgesia after extensive breast surgery with axillary lymph node dissection performed under general anesthesia.

2. OBJECTIVE

A 52-year-old Asian female patient (weight of 62 kilograms and a height of 155 centimeters) presented with a left breast lump with a bloody discharge which was discovered accidentally by the patient one year before her current presentation to the author's center. She had no history of pain, swelling, or skin thickness related to the breast lump or weight loss over the past six months. On examination, there was a left breast palpable, immobile, irregular mass of a size of 6 X 4 cm, fixed to the chest wall with skin retraction and serous discharge from the left nipple. There were palpable left axillary

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lymph nodes. A preoperative mammogram demonstrated a suspicious spiculated mass on the left breast with a size of 7 x 6 cm and an irregular border at the left upper quadrant of the left breast. The screening workup showed no distant metastasis. Stereotactic biopsy confirmed the diagnosis of intraductal carcinoma of the left breast with no invasion beyond the basement membrane.

She had a history of hypertension, type II diabetes mellitus, dyslipidemia, non-ischemic cardiomyopathy and decompensated heart failure with a reduced ejection fraction (HFrEF). Her physical activity was limited (metabolic equivalent of tasks (METs) of 5).

She was receiving aspirin, bisoprolol, atorvastatin, lisinopril, pantoprazole, and insulin. Her blood pressure (BP) was 131/85 mmHg, pulse rate (PR) was 87 beats/min, respiratory rate (RR) was 16 breaths/min, and peripheral oxygen saturation (SPO₂) was 99% on room air. Chest X-Ray and electrocardiogram (ECG) showed no abnormalities. Echocardiogram demonstrated systolic heart failure with a left ventricular ejection fraction of 38%, global left ventricular hypokinesis, mild left ventricular concentric hypertrophy and moderately dilated left atrium. Preoperative laboratory tests showed hemoglobin of 11.5 g/dl, white blood cell of 6.5 x 10³ cells/L, and platelet count of 329 x 10³ cells/L. The liver function, renal function tests and coagulation profile values were within the normal range.

A multidisciplinary team discussion involving the breast surgeon, oncologist, cardiologist, anesthesiologist, intensivists and family was performed, emphasizing the need for an urgent modified radical mastectomy with extensive axillary lymph node dissection. The risks-benefits of surgery and the risk of perioperative morbidity and mortality of different anesthetics were discussed. The decision was taken ultimately to proceed with surgery under a combined thoracic paravertebral block and left interscalene block as a sole anesthetic with conscious sedation. Informed written consent was taken from the patient for the anesthesia and surgery.

In the operating room, the standard American Society of Anesthesiologist monitors (five-lead electrocardiography, non-invasive blood pressure (BP), capnograph, and pulse oximeter) were connected to the patient. Midazolam 1 mg and fentanyl 25 mcg were administered intravenously. Air-enforced warming mattress was used.

Baseline BP was 124/75 mmHg, heart rate was 78 beats/min, respiratory rate was 18 breath/min, and SPO₂ was 96%. The patient was placed in the sitting position, and the prevertebral space was identified at the transverse process (T1 to T5 levels) using a linear probe 6-13 MHz of an ultrasound machine (Sonosite M-Turbo). A size 22 G, 50 mm echogenic needle (Sonoplex needle) was advanced into the paravertebral space by injecting a volume of 5 ml of a mixture of lidocaine 1% with 0.25% bupivacaine in each space (15 ml in total). The needle insertion site was marked and cleaned with

	Heart rate (beats/min)	MAP (mmHg)	SpO ₂ (%)	RR (breaths/min)	RASS
Baseline	87	91	96	22	0
After TPVB	79	93	97	20	0
After ISB	78	90	97	20	0
Start of TCI propofol	74	88	98	18	-1
Start of surgery	77	90	99	16	-1
During surgery					
15 min	79	91	100	16	-2
30 min	76	89	100	14	-2
45 min	78	88	99	14	-1
60 min	75	86	99	16	-2
75 min	73	87	100	18	-1
End of surgery	81	86	98	18	-1
PACU admission	83	89	100	16	0

Table 1: Intraoperative Hemodynamic and Oxygenation Variables and RAAS

iodine and alcohol under a strict aseptic technique. The overlying skin was infiltrated at each block level (T1-T2, T3-T4, T4-T5) with 2 ml of 2% lidocaine.

The patient was then positioned into the supine position; following skin preparation using povidone and alcohol solution and a strict aseptic technique; the linear ultrasound probe was used to guide the perineural block of the cords of the brachial plexus at the left interscalene space utilizing a total of 10 ml of a mixture of 0.25% bupivacaine with 1% lidocaine.

A facemask with a capnograph was applied to the patient. Sedation was accomplished using a target-controlled infusion of propofol infusion at plasma-site of 1.5 – 2.5 ug/ml to maintain Richmond Agitation Sedation score between 0 and -2. The right radial artery was catheterized for continuous arterial blood pressure monitoring. The surgery started 20 minutes after performing the interscalene block. Intraoperative hemodynamics and oxygenation parameters and sedation scores were presented in Table 1. No vasopressors or inotropes were needed intraoperatively to maintain stable hemodynamics. Left breast mastectomy with left axillary lymph nodes dissection was completed uneventfully over 75 minutes. Intraoperative total blood loss and urine output were 500 ml and 250 ml, respectively. The patient received a 1000 ml lactate ringer intraoperatively.

The patient was shifted to the post-anesthesia care unit, and she was comfortable, free of pain and hemodynamically stable. She was discharged to the surgical ward after a couple of hours. Intravenous paracetamol 1 g was administered 6-hourly for 48 hours postoperatively. On the 2nd postoperative day, the patient had a pain visual analog score of 2/10 and stable vital signs with no inotropes or vasopressors. She was discharged home uneventfully on the 3rd postoperative day.

3. DISCUSSION

General anesthesia has been used for plenty of breast surgical procedures. Although GA is considered a safe technique most of the time, it has some risks, particularly in patients who might be placed at high risk of periop-

erative morbidity and mortality, like those with decompensated cardiopulmonary function and hemodynamic instability (6). Thoracic epidural analgesia provided at T4-T8, paravertebral block, and intercostal block have been used as postoperative analgesic techniques following breast surgery (3, 7, 8), decreasing postoperative opioid consumption and offering adequate postoperative pain management and high patient satisfaction (9).

The utilization of TPVB for patients who will undergo mastectomy as a sole anesthetic has been demonstrated in the literature as an alternative and good choice for patients with a high risk of intraoperative and postoperative morbidity and mortality from GA (5, 10).

In the present case, the decision was taken to perform the whole procedure under a combined TPVB with a left-sided interscalene block. The effectiveness of TPVB as a sole anesthetic for MRM was described recently by Hu et al. (10). However, in our case, we used target-controlled propofol infusion to provide conscious sedation compared with deep sedation used by Hu et al (10), which might have relative risks for GA. Knowing that PVB can be used solely as a surgical anesthetic, we decided to perform this technique on our patient by an experienced regional anesthetist with the aid of ultrasound guidance to guide the block. As the surgeon decided to perform axillary lymph node dissection and the PVB doesn't cover the axillary side, we decided to perform a left interscalene block to block the left cord of the brachial plexus to cover the surgical site where they will do a dissection of the lymph nodes.

Although TPVB and ISB have been used widely as an adjunct to GA for postoperative pain management, their safety and efficacy as primary anesthetics are still non-conclusive and limited data exist in the literature.

4. CONCLUSION

Combining TPVB-ISB can be used as a sole anesthetic for extensive breast surgery in patients with a high risk for general anesthesia. Further prospective randomized control trials are needed to assess the efficacy and safety of that technique on a larger pool of patients carrying high risk from GA.

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