

## Pectoral nerve block (Pecs block) with sedation for breast conserving surgery without general anesthesia

Eun-Jin Moon, Seung-Beom Kim, Jun-Young Chung, Jeong-Yoon Song<sup>1</sup>, Jae-Woo Yi

*Departments of Anesthesiology and Pain Medicine, <sup>1</sup>Surgery, College of Medicine, Kyung Hee University, Seoul, Korea*

Most regional anesthesia in breast surgeries is performed as postoperative pain management under general anesthesia, and not as the primary anesthesia. Regional anesthesia has very few cardiovascular or pulmonary side-effects, as compared with general anesthesia. Pectoral nerve block is a relatively new technique, with fewer complications than other regional anesthesia. We performed Pecs I and Pec II block simultaneously as primary anesthesia under moderate sedation with dexmedetomidine for breast conserving surgery in a 49-year-old female patient with invasive ductal carcinoma. Block was uneventful and showed no complications. Thus, Pecs block with sedation could be an alternative to general anesthesia for breast surgeries.

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**Key Words:** Breast conserving surgery, Nerve block, Pectoral nerves

### INTRODUCTION

The growing increase in the number of breast surgeries as therapy for breast cancer and cosmetic purposes, has resulted in an increased need for anesthetic techniques with improved pain reduction and safety, and fewer complications.

In breast surgery, acute postoperative pain from injured muscles and nerves is a consistent risk factor for chronic pain in association with its severity. Management of acute postoperative pain is required for better outcome and patients' satisfaction. Regional techniques are regarded as the best choice to reduce acute postoperative pain and incidence of chronic pain after breast surgery [1].

Regional anesthesia techniques, such as thoracic epidural block, thoracic paravertebral block (TPVB), and intercostal nerve block, have been used in anesthesia and/or analgesia in breast surgery. However, these invasive regional techniques lead to some complications during the perioperative period;

therefore, they are not appropriate on a day-stay basis. Also, many anesthesiologists are reluctant to use invasive techniques in breast surgery.

The pectoral nerves block (Pecs block) is less invasive and has less complications, as compared to the other procedures. It is a novel superficial nerve block, alternative to neuraxial and paravertebral blocks, which provides good analgesia during and after ambulatory breast surgery.

Pecs block has been performed as postoperative pain management and not as a primary anesthesia in breast surgeries under general anesthesia (GA). However, when conducted in combination with monitored anesthesia care (MAC), it could suffice as primary anesthesia. In this case, we introduced a novel technique of Pecs block in a patient who underwent breast surgery, with better outcomes in terms of reducing postoperative pain and avoiding complications related to GA.

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**Corresponding Author: Jae-Woo Yi**

Department of Anesthesiology and Pain Medicine, College of Medicine, Kyung Hee University, 26 Kyungheedaero, Dongdaemun-gu, Seoul 02447, Korea

**Tel:** +82-2-440-7809, **Fax:** +82-2-440-7808

**E-mail:** mdyjwchk@khu.ac.kr

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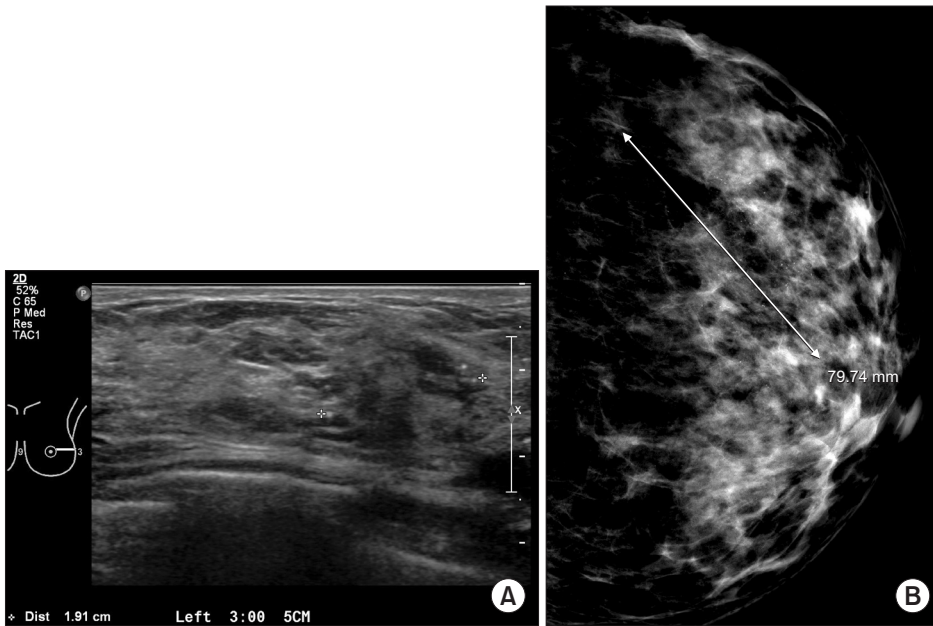
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## CASE REPORT

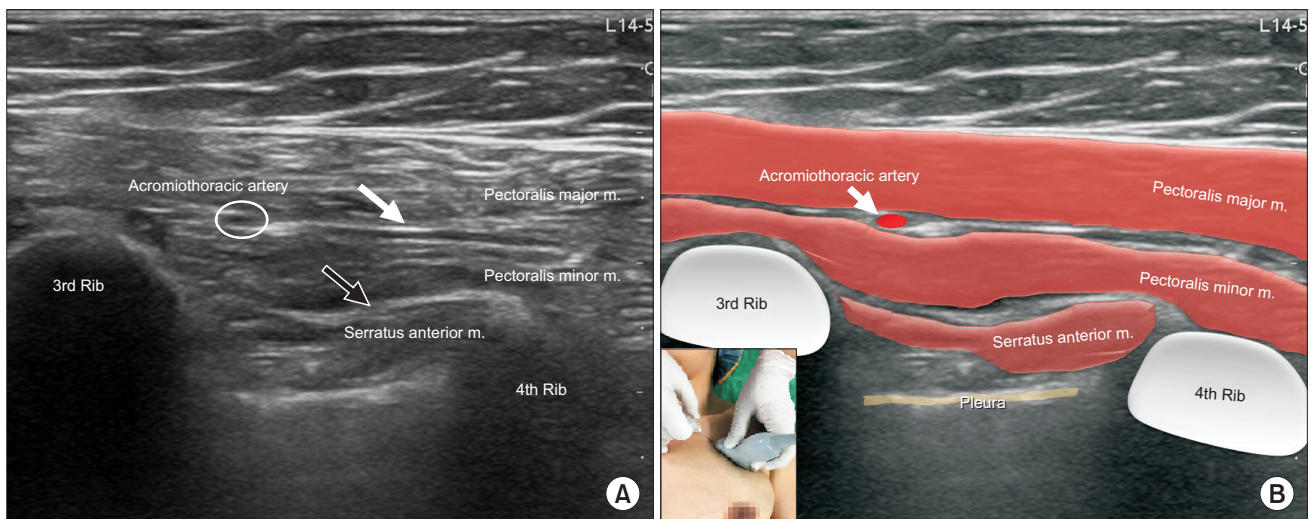
A 49-year-old female (154.6 cm, 50.8 kg) presented with a mass on her left breast that was identified by the ultrasound imaging, and mammography (Fig. 1). The patient was diagnosed with invasive ductal carcinoma by core biopsy. She had no medical history and was scheduled to undergo breast conserving surgery (BCS) at 2 weeks after the completion of neoadjuvant chemotherapy. Because the patient was reluctant to go under the GA, the Pecs I and II block with MAC was prepared.

The left infraclavicular and axillary regions were cleaned with potadine, the ultrasound probe was placed obliquely between the third and fourth ribs under the lateral one third of the clavicle. After recognition of the appropriate anatomical structures, the skin puncture point was infiltrated with 1% lidocaine. The block was performed using a medial in-plane approach with a 22-G Tuohy needle (Fig. 2).

For Pecs I block, the needle was advanced to the tissue plane between the pectoralis major muscle and pectoralis minor muscle at the vicinity of the pectoral branch of the acromiothoracic artery and 10 mL of 0.25% levobupivacaine was injected.



**Fig. 1.** (A) On ultrasound imaging, 1.7 × 2.6-cm irregular ill-defined hypoechoic nodule with microcalcifications is observed. Microcalcification is observed around the mass. (B) On left mammography, about 8-cm segmental fine pleomorphic microcalcifications is observed.



**Fig. 2.** (A) The needle was advanced to the tissue plane between the pectoralis major muscle and pectoralis minor muscle (m.) (white arrow) for Pecs I block and to the tissue plane between the pectoralis minor muscle and serratus anterior muscle (black arrow) at the level of the third rib for Pecs II block. (B) Graphics representing probe position and the anatomical structures of ultrasound image. White arrow points at the pectoral branch of the acromiothoracic artery.

For Pecs II block, 20 mL was deposited at the level of the third rib above the serratus anterior muscle with intent to spread the local anesthetics over the axilla. The overall procedure of Pecs block took about 15 minutes, and the onset time of analgesia was an average of 3 minutes after completion of the procedure. However, sufficient analgesia for surgical procedure was obtained after 15 minutes from that time. We confirmed the anesthetic area over T2–T6 of dermatomes by a pinprick test. Subsequently, dexmedetomidine was infused with a loading dose of 1 mcg/kg for 10 minutes, followed by a maintenance dose of 0.2–0.7 mcg/kg/h with titration, for targeting Ramsay sedation scale of 3, responding to verbal commands. The sentinel node was identified intra-operatively and dissected; then the 10 × 10 × 6-cm mass, 5 cm lateral to the nipple was excised. After the sentinel lymph node was confirmed as metastasis on frozen biopsy, the incision for axillary dissection was extended from the border of the pectoralis major muscle to the border of the latissimus dorsi muscle along the naturally occurring skin lines. Dissection along the anterior serratus muscle was carefully conducted, taking care to preserve the integrity of the long thoracic nerve. The neuromuscular bundle, comprising the subscapular vessels, the thoracodorsal vessels and nerves, was identified and dissected from the axillary contents, while being preserved intact, adjacent to the latissimus dorsi muscle. The entire adipose tissue with the axillary lymph nodes was removed by *en bloc* resection. Closed suction drain was inserted at the axillary site and the operation was completed. The total operating time was approximately 3 hours 30 minutes. In the post anesthesia care unit (PACU), vital signs were stable, and visual analogue scale (VAS) score for pain was 1. Also, postoperative nausea and vomiting (PONV) were absent. The analgesic effect of Pecs block lasted about 8 hours; and analgesics were not required for 1 day.

## DISCUSSION

Most regional anesthesia techniques have some benefits of postoperative pain control with decreasing opiate dosage and decreased side effects for patients undergoing breast surgery. Currently, TPVB is considered the gold standard of regional anesthesia technique for breast surgery. It is an accurate, simple and safe method that has more significant advantages over intercostal or epidural block, including less incidence of pneumothorax, total spinal anesthesia and inadvertent intravascular injection. However, it is still an invasive technique and some complications are reported such as inadvertent vascular puncture (6.8%), hypotension (4%), epidural or intrathecal spread (1%), pleural puncture (0.8%), and pneumothorax (0.5%) [2]. Therefore, this technique may not be suitable for many breast surgeries under day care surgery.

Pecs block is a peripheral nerve block that has been described

recently. Considered a safe and efficient procedure, anesthesiologists increasingly prefer Pecs block to TPVB and thoracic epidural analgesia [3]. Pecs block has some advantages, including no risk of sympathectomy that is usually associated with TPVB and epidural blockade. Additionally, the Pecs block has less restrictions on the use of anticoagulants, as compared to TPVB or neuraxial blocks. TPVB is unable to block medial and lateral pectoral nerves as well as long thoracic and thoracodorsal nerves. Therefore, in performing breast surgeries involving axillary dissection, there is potential for lack of adequate analgesia. A recent study showed reduced postoperative morphine consumption in the first 24 hours and lower pain scores in the first 12 hours in the Pecs block group, as compared to TPVB group for postoperative analgesia in modified radical mastectomy [4].

Although the Pecs block has lower risk of intravascular injection than TPVB, it has possibility of injection into the pectoral branch of the acromiothoracic artery. In addition, upper limb fistula can occur in Pecs block. However, these complications can be easily avoided with proper ultrasound training and determining the right pattern of spread of the local anesthetics. Many breast surgeries are performed on an outpatient basis; hence, this may be a safer anesthetic technique for shortening hospital stay and improving bed rotation rate.

The Pecs block is classified as 2 types including Pecs I and II. Pecs I is an easy and reliable superficial block that targets the lateral and median pectoral nerves at an interfascial plane between the pectoralis major and minor muscles. While it can be used for various breast operations, it is mainly used for the insertion of breast expanders and subpectoral prosthesis. Other potential indications are traumatic chest injuries, iatrogenic pectoral muscle dissections, pacemakers and chest drains. In our case of BCS, dissection along the anterior serratus muscle was needed. Pecs I alone was insufficient to block the entire surgical site; hence, we considered combination with the Pecs II block. Pecs II blocks the long thoracic nerve, thoracic intercostal nerves from T2–T6, and thoracodorsal nerve. It is designed under consideration that during breast expander and subpectoral prosthesis insertions, while the pectoralis major muscle is mainly affected, significant pain persists over the serratus muscle area. Pecs II blocks this region together with the lateral branches of the intercostal nerves that exit at the level of the mid-axillary line and innervate the mammary gland and the skin from T2 to T6 [3].

Most cases of Pecs block are performed under GA for postoperative pain management. Bashandy and Abbas [5] conducted a randomized clinical trial with 2 groups of GA alone and GA with the Pecs block. Pecs groups showed significantly lower VAS scores, lower postoperative morphine consumption, and lower intraoperative fentanyl consumption. In the PACU, PONV as well as sedation scores were lower in the Pecs group, as

compared with the control group. Despite the reportedly better outcomes of Pecs block with GA than GA alone, we selected Pecs block as the primary anesthesia with MAC for better patient satisfaction, reduced PONV, and avoidance of GA-associated complications. In breast surgeries under GA, patients showed 48%–72% incidence of PONV with inhalational anesthetics; and utilization of total intravenous anesthesia caused a further decrease to only 43.8% [6,7]. Only few cases of Pecs blocks have been reported as the primary anesthesia for breast surgery. Fujiwara et al. [8] reported successful placement of an implantable cardiac resynchronization device under Pecs I block (10 mL, 0.375% ropivacaine) combined with first and second intercostal nerve blocks (4 mL, 0.375% ropivacaine) and light intravenous sedation in a high risk patient who was intolerable to GA and neuraxial blockade. In our case, combined Pecs I and II block showed adequate anesthetic effect in BCS without GA.

Also, MAC with dexmedetomidine was beneficial to the patient and surgeon, due to its analgesic, sedative, anxiolytic

and sympatholytic properties. Interestingly, intravenous dexmedetomidine may prolong the duration of sensory block on spinal and peripheral nerve blocks [9]. Hence, intravenous dexmedetomidine with Pecs block is expected to have a supporting role.

Thus, the combination of Pecs blocks with MAC is helpful in patients undergoing simple breast surgeries. Although Pecs blocks have only recently been described and lack experimental evidence, they hold great promise due to their simplicity and relative lack of contraindications and complications. Pecs blocks could be recommended as an alternative to GA in certain breast surgeries. Prospective studies are required for better outcome in the future.

## CONFLICTS OF INTEREST

No potential conflict of interest relevant to this article was reported.

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