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Transient Upper Limb Weakness Following Ultrasound-Guided PECS II Block: A Case Suggestive of Long Thoracic Nerve Involvement

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Abstract

The pectoral nerve (PECS) II block is widely used for perioperative analgesia in breast surgery. We describe a case of transient upper limb weakness following a PECS II block performed in the infraclavicular area without accompanying sensory deficits. A 61-year-old woman underwent left reduction mammoplasty under general anesthesia. A left-sided ultrasound-guided PECS II block using 30 mL of 0.25% ropivacaine was performed. Postoperatively, she reported difficulty elevating her left arm above shoulder level, while elbow flexion, hand grip strength, and sensory function remained intact. The symptoms resolved spontaneously by the following day without intervention. This presentation suggests selective motor involvement, most likely affecting the long thoracic nerve. A two-site approach combining PECS I block and serratus anterior plane block may be considered as a potential alternative to reduce unintended motor effects, although further investigation is required.

Keywords

Breast, Muscle Weakness, Nerve Block, Pectoral Nerve

1. Introduction

The pectoral nerve (PECS) II block is an ultrasound-guided interfascial plane block commonly used for analgesia in breast and thoracic wall surgery [1]. It involves two injections of local anesthetic at the infraclavicular level: one between the pectoralis major and minor muscles and another between the pectoralis minor and serratus anterior muscles, targeting the anterolateral chest wall.

Although PECS II block involves several motor nerves, including the pectoral nerves, long thoracic nerve, and thoracodorsal nerve [2] [3], clinically significant

motor weakness is not commonly emphasized in the literature. We report a case of transient upper limb elevation weakness following PECS II block without associated sensory deficit.

2. Case Report

Written informed consent was obtained from the patient for publication of this case report. Institutional review board approval was waived in accordance with local policy for single case reports.

A 61-year-old woman (height 159 cm, weight 69 kg, American Society of Anesthesiologists physical status II) with a history of hypertension, dyslipidemia, and osteoarthritis was scheduled for breast surgery. She had previously undergone right nipple-sparing mastectomy with sentinel lymph node biopsy and tissue expander insertion 14 months earlier. Preoperatively, the patient had no history of left shoulder pain, weakness, or limitation in range of motion. She was able to elevate her left arm fully without discomfort. The current procedure included right tissue expander removal with implant insertion and left reduction mammoplasty with mastopexy.

General anesthesia was induced with propofol (150 mg), rocuronium (50 mg), and remifentanil (target-controlled infusion, 1 - 3 ng/mL), followed by endotracheal intubation. An ultrasound-guided left PECS II block was performed with the patient's arm abducted to 90 degrees.

Using a 6 - 13 MHz linear probe (SonoSite Inc., Bothell, WA, USA), the probe was positioned below the lateral third of the clavicle. After identifying the pectoral branch of the thoracoacromial artery, a 22-gauge spinal needle was inserted using an in-plane technique from lateral to medial [4].

For the first injection, 10 mL of 0.25% ropivacaine was injected lateral to the thoracoacromial artery, between the pectoralis major and minor muscles. For the second (deep) injection, 20 mL of 0.25% ropivacaine was injected between the pectoralis minor and serratus anterior muscles.

The surgery lasted approximately 4 hours. No additional intraoperative analgesics were administered apart from remifentanil. Neuromuscular blockade was reversed with sugammadex, and adequate recovery was confirmed prior to transfer.

Postoperatively, the patient reported difficulty elevating her left arm above shoulder level. The weakness was first noted after transfer to the ward following recovery from general anesthesia. On examination, shoulder flexion and abduction were reduced (Medical Research Council grade 3/5), while elbow flexion, wrist extension, and hand grip strength were preserved (grade 5/5) [5]. No obvious scapular winging was observed at rest, although dynamic assessment was limited. Sensory examination revealed reduced sensation over the anterolateral chest wall, consistent with the expected distribution of the PECS II block, while sensation in the axilla and upper limb was preserved. The patient reported persistent difficulty with arm elevation during the evening. By the next morning (approximately 8 a.m.), she noted complete resolution of symptoms without intervention.

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3. Discussion

This case describes transient upper limb weakness following a PECS II block without sensory deficits. The PECS II block is known to involve several motor nerves, particularly the long thoracic nerve [2] [3], yet clinically evident motor weakness is rarely reported.

Previous reports have primarily described brachial plexus involvement, presenting with combined sensory and motor deficits [6] [7]. In contrast, our case demonstrated isolated motor dysfunction, suggesting selective involvement of the long thoracic nerve.

Alternative causes of postoperative weakness were considered. Residual neuromuscular blockade was unlikely, as adequate reversal with sugammadex was confirmed using neuromuscular monitoring, with a train-of-four ratio greater than 0.9 prior to transfer. The patient was positioned with both arms adducted in a neutral position during surgery, minimizing the risk of traction or compression injury. No intraoperative events suggested nerve injury, and the preservation of distal motor function with selective proximal weakness made brachial plexus involvement less likely.

The long thoracic nerve courses along the superficial surface of the serratus anterior muscle, typically running along the mid-axillary line. This trajectory closely corresponds to the deeper injection plane of the PECS II block, between the pectoralis minor and serratus anterior muscles. This anatomical relationship supports the possibility of inadvertent involvement of the long thoracic nerve. The serratus anterior muscle, innervated by the long thoracic nerve, plays a key role in scapular stabilization and upward rotation during arm elevation [8]. Transient impairment of this muscle may explain the observed weakness.

In our routine practice, we commonly perform a combination of PECS I block and serratus anterior plane block (SAPB) at the mid-axillary line to achieve lateral chest wall coverage. With this approach, we have not encountered similar upper limb weakness. In contrast, in the present case, a PECS II block was performed within the infraclavicular area, after which the patient developed transient arm elevation weakness.

This difference may be explained by the level of long thoracic nerve involvement. SAPB may affect more distal branches, whereas PECS II block may involve the nerve more proximally, resulting in more pronounced functional impairment.

This case has limitations, including the absence of formal assessment for scapular winging and lack of confirmatory studies. Therefore, alternative explanations such as subtle brachial plexus involvement cannot be excluded.

In conclusion, PECS II block may result in transient upper limb elevation weakness without sensory deficits. Differences in block technique may influence the

likelihood of such motor effects. The combination of PECS I block and serratus anterior plane block may represent a potential alternative approach; however, this hypothesis requires further validation.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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