

## Retraction Notice

Title of retracted article: **Pectoral Nerves (PECS) Block Is Effective for Motor Function Recovery in the Early Postoperative Period after Breast Cancer Surgery**

Authors: Eiko Hara, Hironobu Ueshima, Noriko Tanaka, Hiroshi Otake  
 \* Corresponding author. Email: ueshimhi@yahoo.co.jp

Journal: Open Journal of Anesthesiology (OJAnes)  
 Year: 2017  
 Volume: 7  
 Number: 10  
 Pages (from - to): 351-355  
 DOI (to PDF): <https://doi.org/10.4236/ojanes.2017.710035>.  
 Paper ID at SCIRP: 1920487  
 Article page: <https://www.scirp.org/journal/PaperInformation.aspx?PaperID=80026>

Retraction date: 2021-7-13

### Retraction initiative (multiple responses allowed; mark with X):

- All authors  
 Some of the authors:  
 Editor with hints from  Journal owner (publisher)  
 Institution:  
 Reader:  
 Other:

Date initiative is launched: 2021-7-13

### Retraction type (multiple responses allowed):

- Unreliable findings  
 Lab error  Inconsistent data  Analytical error  Biased interpretation  
 Other:  
 Irreproducible results  
 Failure to disclose a major competing interest likely to influence interpretations or recommendations  
 Unethical research
- Fraud  
 Data fabrication  Fake publication  Other:  
 Plagiarism  Self plagiarism  Overlap  Redundant publication \*  
 Copyright infringement  Other legal concern:
- Editorial reasons  
 Handling error  Unreliable review(s)  Decision error  Other:  
 Other:

### Results of publication (only one response allowed):

- are still valid.  
 invalid.

### Author's conduct (only one response allowed):

- honest error  
 academic misconduct  
 none (not applicable in this case)

**History**

Expression of Concern:  
yes, date: none

Correction:  
yes, date: none

**Comments:**

The paper does not meet the standards of "Open Journal of Anesthesiology".

This article has been retracted to straighten the academic record. In making this decision the Editorial Board follows [COPE's Retraction Guidelines](#). Aim is to promote the circulation of scientific research by offering an ideal research publication platform with due consideration of internationally accepted standards on publication ethics. The Editorial Board would like to extend its sincere apologies for any inconvenience this retraction may have caused.

Editor guiding this retraction: Professor Dr. Praveen Kumar Neema (EiC of OJAnes)

# Pectoral Nerves (PECS) Block Is Effective for Motor Function Recovery in the Early Postoperative Period after Breast Cancer Surgery

Eiko Hara, Hironobu Ueshima\*, Noriko Tanaka, Hiroshi Otake

Department of Anesthesiology, Showa University Hospital, Tokyo, Japan

Email: \*ueshimhi@yahoo.co.jp

**How to cite this paper:** Hara, E., Ueshima, H., Tanaka, N. and Otake, H. (2017) Pectoral Nerves (PECS) Block Is Effective for Motor Function Recovery in the Early Postoperative Period after Breast Cancer Surgery. *Open Journal of Anesthesiology*, 7, 351-355.

<https://doi.org/10.4236/ojanes.2017.710035>

**Received:** September 29, 2017

**Accepted:** October 28, 2017

**Published:** October 31, 2017

Copyright © 2017 by authors and Scientific Research Publishing Inc.

This work is licensed under the Creative Commons Attribution International License (CC BY 4.0).

<http://creativecommons.org/licenses/by/4.0/>



## Abstract

**Background:** Pectoral nerves (PECS) block has been reported to be effective for a perioperative analgesia for breast cancer surgery. In addition, we may consider that the PECS block is also effective for motor function in postoperative period. Therefore, we investigated the effect of PECS block for motor function in postoperative period. **Methods:** This study selected the patients performed the breast cancer surgery between April and September, 2015. The study surveyed the difficulty of movement of the upper limbs at postoperative day 5 (D5) and postoperative month 6 (M6) by performing telephone survey. We counted the number of patients who complained of the difficulty of movement of the upper limbs. All results were compared using the chi-squared test.  $P < 0.05$  was considered statistically significant. **Results:** 93 patients received only general anesthesia (G group). 85 patients received PECS block with general anesthesia (P group). The number of the P group at D5 was 2 patients. On the other hand, the number of the G group was 15 patients ( $P = 0.042$ ). In the same way, the number of the P group M6 was no patient. On the other hand, the number of the G group was 10 patients ( $P = 0.043$ ). **Conclusion:** A PECS block is effective for motor function recovery in the early postoperative period after breast cancer surgery.

## Keywords

Breast Cancer, Pectoral Nerves Block, Motor Function

## 1. Introduction

Pectoral nerves (PECS) block is a block that can be used for multiple lateral cu-

taneous anterior branches of intercostal nerves (Th2-6) present in the internal mammary region, and is reported to be effective for acute postoperative analgesia after breast cancer surgery [1] [2] [3]. In addition, a local anesthetic for primary cancer surgery must have some advantages, such as reduced incidence of recurrence and metastasis [4].

A PECS block is generally performed by administering the first injection between the pectoralis major and pectoralis minor at the third rib and second injection between the pectoralis minor and serratus muscles at the fourth rib [5] [6]. However, the first injection normally does not provide analgesic efficacy because the nerve that is blocked by the first injection is a motor nerve, such as the lateral pectoralis muscle nerve and internal pectoralis muscle nerve. However, as reported, motor nerve block can prevent muscle contraction, while the PECS block may be effective for motor recovery of the upper limb after breast cancer surgery [7] [8]. In this study, we retrospectively investigated the effect of the PECS block on motor function during the postoperative period.

## 2. Materials and Methods

### 2.1. Patients and Design

This retrospective study was approved by the Showa University Hospital Institutional Review Board (approval number 1952). In addition, the study was registered at the University Hospital Medical Information Network (UMIN ID number 000020016). From April to September 2015, we selected patients who had undergone modified radical mastectomy. The patients were divided into two groups: a general anesthesia group (G group) and general anesthesia and PECS block group (P group). The number of difficulties related to motor function of the upper limbs (flexion, extension, abduction, adduction, external rotation, and internal rotation) were counted at postoperative day 5 (D5) and postoperative month 6 (M6) by performing telephonic interviews. We also assessed the type of the difficulty related to motor function of the upper limbs at postoperative day 5 and postoperative month 6 in the G group. The exclusion criterion was the inability to communicate with some patients about bilateral breast cancer surgeries and secondary surgery.

### 2.2. Ultrasound-Guided PECS block

We used a 12 L-RS linear probe of the LOGIQ e Premium system (GE Healthcare Japan, Tokyo, Japan) for an ultrasound-guided PECS block. Before the block, the precordium was firmly cleaned with chlorhexidine. The blocks were then performed using a 20-gauge Tuohy needle. A PECS block was administered by injecting 10 mL of 0.15% levobupivacaine between the pectoralis major and pectoralis minor at the third rib (first injection) and 25 mL of 0.15% levobupivacaine above the serratus anterior muscle (second injection).

### 2.3. Statistical Analysis

The age of the patients, body mass index (BMI), operation time, anesthesia time,

and fentanyl amount used were analyzed using the nonparametric Mann-Whitney's *U*-test and were expressed as an average (standard deviation). The number of difficulties related to motor function of the upper limbs was determined by  $\chi^2$  test with JMP<sup>®</sup> 11 (SAS Institute Inc., Cary, NC, USA). The level of significance for both tests was set at  $P < 0.05$ .

### 3. Results

213 patients were included during the study period. Of these patients, 93 patients received only general anesthesia (G group). The other 85 patients received PECS block with general anesthesia (P group). 35 patients (G group: 30 patients, P group: 5 patients) were excluded from the study because of not connecting phone (Figure 1).

Patient demographics are presented in Table 1. The amount of fentanyl administered to the P group during the surgery was lower than that administered to the G group ( $P = 0.0011$ ). The number of difficulties related to motor functioning of the upper limbs in the P group (2) was lower than that in the G group (15) at D5 ( $P = 0.042$ ). The number of difficulties related to motor function of the upper limb in the P group (0) was lower than that in the G group (10) at M6 ( $P = 0.043$ ; Table 2). The upper limb motor functions that were affected in the G group were mainly flexion and internal rotation (Table 3).

### 4. Discussion

The results of this study revealed that administration of a PECS block aided in the early recovery of motor function of the upper limbs during the postoperative stage of breast cancer. A PECS block can provide not only relief from acute pain during the perioperative period but also aids in the early recovery of motor function of the upper limbs. In addition, since the upper limb motor functions that were affected were mainly flexion and internal rotation in the G group, which involved the pectoralis major muscle, we speculate that the first injection, which can block the pectoral nerve-dominated pectoralis major muscle, was ef-

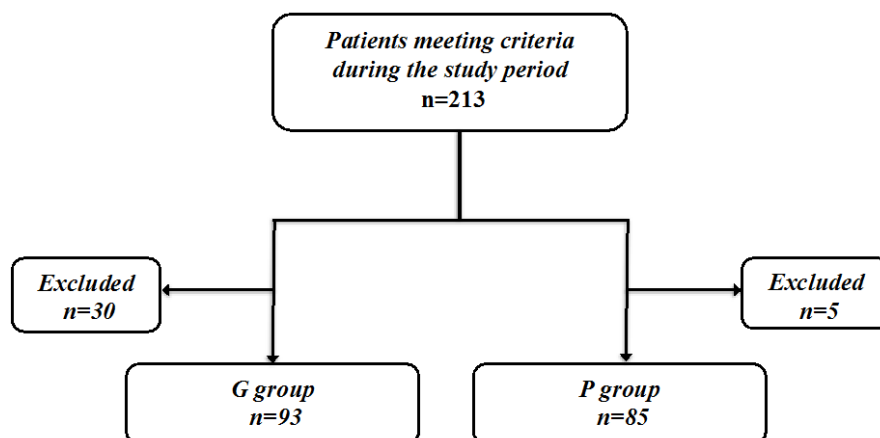


Figure 1. Flowchart of this study.

**Table 1.** Patients demographics data: age, body mass index, ASA classification, operation time, anesthesia time, intraoperative fentanyl consumption.

	G group (n = 93)	P group (n = 85)	P
<b>Age year</b>	57.4 (12.6)	57.1 (13.0)	0.98
<b>Body mass index kg/m<sup>2</sup></b>	23.6 (1.5)	24.8 (1.7)	0.69
<b>ASA class I, II, III, IV</b>	35, 56, 2, 0	25, 66, 4, 0	
<b>Duration of Surgery min</b>	92 (38)	94 (32)	0.32
<b>Duration of Anesthesia min</b>	130 (41)	132 (35)	0.49
<b>Intraoperative Fentanyl Consumption, µg</b>	304.9 (60.4)	280.4 (44.4)	0.0011

Average (Standard Deviation).

**Table 2.** The number of the difficulty of motor function of the upper limbs at postoperative day 5 and postoperative month 6 by performing telephone interviews. G group: only general anesthesia, P group: general anesthesia and PECS block.

	G group (n = 93)	P group (n = 85)	P
<b>D5</b>	15	2	0.042
<b>M6</b>	10	0	0.043

**Table 3.** The type of the difficulty of motor function of the upper limbs at postoperative day 5 and postoperative month 6 by performing telephone interviews on G group.

	D5	M6		D5	M6
<b>Flexion</b>	13	8	<b>Adduction</b>	8	4
<b>Extension</b>	3	2	<b>Internal rotation</b>	0	0
<b>Abduction</b>	1	1	<b>External rotation</b>	0	0

fective for the recovery of upper limb motor functions [9]. In other words, the muscle contraction prevention by first injection may promote the recovery of upper limb motor functions.

There were some limitations to this study. Firstly, this study was a retrospective study. Therefore, we performed the telephone survey. He should need not only the telephone survey but a medical examination. Also, the nerves that dominate the pectoralis major muscle involve not only the pectoral nerves but also the anterior branches of the spinal nerves. We need to investigate which anterior branches affect the pectoralis major muscle.

In the future, we need to conduct a prospective study with a longer study duration than a postoperative month 6.

## 5. Conclusion

The results of this study indicate that the PECS block (especially, first injection)

can prevent contraction of the pectoralis major and pectoralis minor muscles. Therefore, we recommend that clinicians should administer the first injection for breast cancer surgery.

## Acknowledgements

Assistance with the letter: none.

Financial support and sponsorship: none.

Conflict of interest: none.

## References

- [1] Bashandy, G.M. and Abbas, D.N. (2015) Pectoral Nerves I and II Blocks in Multimodal Analgesia for Cancer Surgery: A Randomized Clinical Trial. *Regional Anesthesia and Pain Medicine*, **40**, 68-74.  
<https://doi.org/10.1097/AAP.000000000000163>
- [2] Kulhari, S., Bharti, N., Bala, I., Arora, S. and Singh, G. (2016) Efficacy of Pectoral Nerve Block versus Thoracic Paravertebral Block for Postoperative Analgesia after Radical Mastectomy: A Randomized Controlled Trial. *British Journal of Anaesthesia*, **117**, 382-386. <https://doi.org/10.1093/bja/aew223>
- [3] Ichikawa, Y., Hironobu, U., Hiroshi, O. and Akira, K. (2017) PECS Block Provides Effective Postoperative Pain Management for Breast Cancer Surgery—A Retrospective Study. *International Journal of Clinical Medicine*, **8**, 198-203.
- [4] Exadaktylos, A.K., Buggy, D.J., Moriarty, D.C., Mascha, E. and Sessler, D.I. (2006) Can Anesthetic Technique for Primary Breast Cancer Surgery Affect Recurrence or Metastasis? *Anesthesiology*, **105**, 660-664.  
<https://doi.org/10.1097/00000542-200610000-00008>
- [5] Blanco, R. (2011) The “Pecs Block”: A Novel Technique for Providing Analgesia after Breast Surgery. *Anaesthesia*, **66**, 847-848.  
<https://doi.org/10.1111/j.1365-2044.2011.06838.x>
- [6] Blanco, R., Fajardo, M. and Parras Maldonado, T. (2012) Ultrasound Description of Pecs II (Modified Pecs I): A Novel Approach to Breast Surgery. *Revista Española de Anestesiología y Reanimación*, **59**, 470-475.  
<https://doi.org/10.1016/j.redar.2012.07.003>
- [7] Ueshima, H. and Otake, H. (2016) Pectoral Nerves Block for a Contraction of the Latissimus Dorsi Muscle. *Journal of Clinical Anesthesia*, **31**, 200.  
<https://doi.org/10.1016/j.jclinane.2016.02.005>
- [8] Ueshima, H., Iwamoto, W. and Otake, H. (2016) Serratus Plane Block for a Contraction of the Latissimus Dorsi Muscle. *Regional Anesthesia and Pain Medicine*, **105**, 660-664.
- [9] Moukarbel, R.V., Fung, K., Franklin, J.H., Leung, A., Rastogi, R., Anderson, C.M. and Yoo, J.H. (2010) Neck and Shoulder Disability Following Reconstruction with the Pectoralis Major Pedicled Flap. *Laryngoscope*, **120**, 1129-1134.