Medial and Lateral Pectoral Nerve Block with Liposomal Bupivacaine for the Management of Postsurgical Pain after Submuscular Breast Augmentation

**Summary:** This report describes an ultrasound-guided medial and lateral pectoral nerve block using liposome bupivacaine, performed before the surgical incision, in a patient undergoing submuscular breast augmentation. The anatomic basis and technique are described. This procedure may be offered to patients undergoing submuscular insertion of a breast implant or tissue expander. Advancements in ultrasound guidance allow for more precise anatomic placement of local anesthetic agents. The injection technique used for this procedure resulted in complete relaxation of the pectoralis major, facilitating the surgical dissection and markedly diminishing postsurgical pain and muscle spasms. (Plast Reconstr Surg Glob Open 2014;2:e282; doi: 10.1097/GOX.0000000000000253; Published online 23 December 2014)

Breast augmentation is among the most popular surgical procedures performed in the world, with approximately 1,773,584 performed in 2013. The vast majority of these implants are placed submuscularly.

Tissue expansion remains a common technique for reconstruction of a breast that has undergone surgical treatment for carcinoma. Submuscular device placement is often preferred, as this enhances soft-tissue coverage of the implant and reduces the risk of fibrous capsular contracture. Although submuscular implant placement has distinct advantages in many patients, postsurgical recovery is marked by pain related to the stretching of the pectoralis major muscle fibers and muscle spasm from the surgical trauma and stretching forces caused by the device. Surgical creation of a submuscular pocket is greatly facilitated by pectoralis major muscle relaxation. Direct paralysis by nerve block with a local anesthetic provides profound muscle flaccidity.

**ANATOMIC BASIS**

The pectoralis major inserts superolaterally into the proximal humerus, superiorly into the inferior clavicle, and medially into the sternum, extending down to the seventh rib. The pectoralis minor inserts superolaterally into the coracid process of the anterior scapula and inferomedially into the third, fourth, and fifth ribs. The motor and sensory innervation for the pectoralis major derives from C5 to T1. The lateral and medial pectoral nerves, which branch off the brachial plexus, are the 2 nerves that innervate the pectoralis major. They course between...
the pectoralis major and minor after branching from the brachial plexus. They then innervate the pectoralis major as they travel below the muscle.

LIPOSOme BUPIVACaine

Liposome bupivacaine (Exparel; bupivacaine liposome injectable suspension; Pacira Pharmaceuticals Inc., Parsippany, N.J.) is a depot formulation of bupivacaine that allows for an extended release of bupivacaine over a few days. The liposomes are spherical structures composed of lipids that are designed to slowly release bupivacaine.

TECHNIQUE

The pectoral plane infiltration may be performed before or after induction of general anesthesia. With the patient in the supine position, the patient’s arm is abducted at the shoulder and flexed at the elbow, with the hand positioned above the shoulder as with the performance of an axillary nerve block. The ultrasound probe is then placed over the pectoralis major with its orientation perpendicular to the muscle fibers. The ultrasound image reveals a hyperechoic fascial plane between the pectoralis major and pectoralis minor muscles. The lateral and medial pectoral nerves lie within this plane. With an in-plane approach, a blunt needle is advanced under ultrasound guidance, visualizing the needle tip insertion into the fascial plane. Within the plane, 10–15 mL of local anesthetic is injected, bathing the lateral and medial pectoral nerves. Care is taken to avoid the vessels in close proximity to the nerves.

CASE REPORT

This patient was a 28-year-old woman undergoing an elective breast augmentation. The patient (weight, 129 lb; height, 5 ft 4 in) had a medical history of hypothyroidism, controlled with levothyroxine 75 μg daily, and no prior breast surgery. Induction of anesthesia was accomplished with lidocaine 30 mg and propofol 160 mg, followed by sevoflurane at 1 minimum alveolar concentration for maintenance of anesthesia. A laryngeal mask airway was inserted for airway maintenance, and the patient was placed on pressure-controlled ventilation. Once stable, the left and right pectoral plane infiltrations were performed using a mixture of 10 mL liposome bupivacaine and 5 mL 0.5% bupivacaine HCl per side. A submuscular breast augmentation with a pair of 550 cm³ silicone implants was then performed uneventfully via an inframammary approach. Of note, the surgeon reported that there was no visible evidence of the injectate during the procedure. The patient was taken to the postanesthesia care unit for recovery, where she received a total of 100 μg of fentanyl as treatment for agitation, rather than pain. Her recovery was uneventful and she was discharged home. From discharge to postsurgical day 10, the patient reported no need for narcotics or muscle relaxation therapy. Her pain score did not go above 3, and she reported having no pectoral muscle spasms throughout her recovery.

DISCUSSION

Postoperative pain from muscular stretch and spasm after submuscular insertion of tissue expanders or breast augmentation are common. Surgeons often prescribe muscle relaxant therapy and narcotics to mitigate muscle spasms and associated pain. This relatively simple and effective presurgical procedure, performed with long-acting liposome bupivacaine, seems to be an excellent adjunct to the typical postsurgical pain control measures often prescribed after breast augmentation and tissue expander insertion.

CONCLUSIONS

Preincision medial and lateral pectoral nerve blockade via a pectoral plane infiltration seems to facilitate surgical creation of a submuscular implant or expander pocket and helps reduce postsurgical muscle spasms and associated pain.

David Leiman, MD
Private Practice, 4522 Live Oak Street, Bellaire, TX 77401
E-mail: david.leiman@gmail.com

ACKNOWLEDGMENTS

Editorial assistance was provided by Peloton Advantage, LLC, supported by Pacira Pharmaceuticals, Inc. The authors were fully responsible for the content, editorial decisions, and opinions expressed in the current article.

REFERENCES

1. ISAPS International Survey on Aesthetic/Cosmetic Procedures Performed in 2013. Available at: http://www.isaps.org/Media/Default/global-statistics/2014%20ISAPS%20Global%20Stat%20Results.pdf. Accessed September 30, 2014.
2. Wallace MS, Wallace AM, Lee J, et al. Pain after breast surgery: a survey of 282 women. Pain 1996;66:195–205.