



# What Can Breast and Plastic Surgeons Do to Help Fight the Opioid Crisis: The Interpectoral Block for Pain Control Following Aesthetic and Reconstructive Breast Surgery

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## Abstract

With the heightened awareness of the dangers of opioid administration, the importance of providing effective non-opioid postoperative pain management is evident. Regional analgesia for breast surgery has been described, but it is unclear how widely it is utilized. The authors describe a simple block performed during ablative, aesthetic, and reconstructive breast surgery to improve postoperative pain control and significantly decrease the need for postoperative pain medications. The interpectoral (PECS I) block covers the lateral and medial pectoral nerves and can be administered by the anesthesiologist under ultrasound guidance after induction of general anesthesia, or by the surgeon under direct vision, using a blunt cannula, at the time of surgery. The authors have been practicing this technique in every patient undergoing aesthetic, ablative, and reconstructive breast surgery in the last 4 years. In approximately 350 patients, none received opioids after discharge, which was either same day or the following day. The authors provide a brief review of the literature and a detailed description of the technique along with a video demonstrating the procedures. Intraoperative pectoral block is a simple and effective technique for decreasing postoperative pain and analgesic requirements and could be widely adopted as a standard of care in breast surgery.

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With the heightened awareness of the dangers of opioid administration, as was recently discussed in an editorial published in the *Aesthetic Surgery Journal*,<sup>1</sup> the importance of providing effective non-opioid postoperative pain management is evident.

Indeed, several publications over the last years have reported on non-opioid pain control after aesthetic surgical procedures in general, and aesthetic breast surgery in particular. Parsa et al<sup>2</sup> recently reported on a shorter time to discharge, fewer readmissions and a significant decrease in postoperative opioid use after bilateral breast reduction with the administration of preoperative gabapentin and celecoxib along with local anesthetics. Similarly, a study of 462 patients undergoing aesthetic surgery (breast and other)<sup>3</sup> found a significant reduction in the use of rescue

analgesia and antiemetics as well as a shorter stay in the recovery room. The concept of enhanced recovery after surgery has also been adopted by plastic surgeons, as reported by Bartlett et al,<sup>4</sup> with a detailed protocol which includes administration of systemic and local analgesics, antiemetics, and steroids, which resulted in improvements

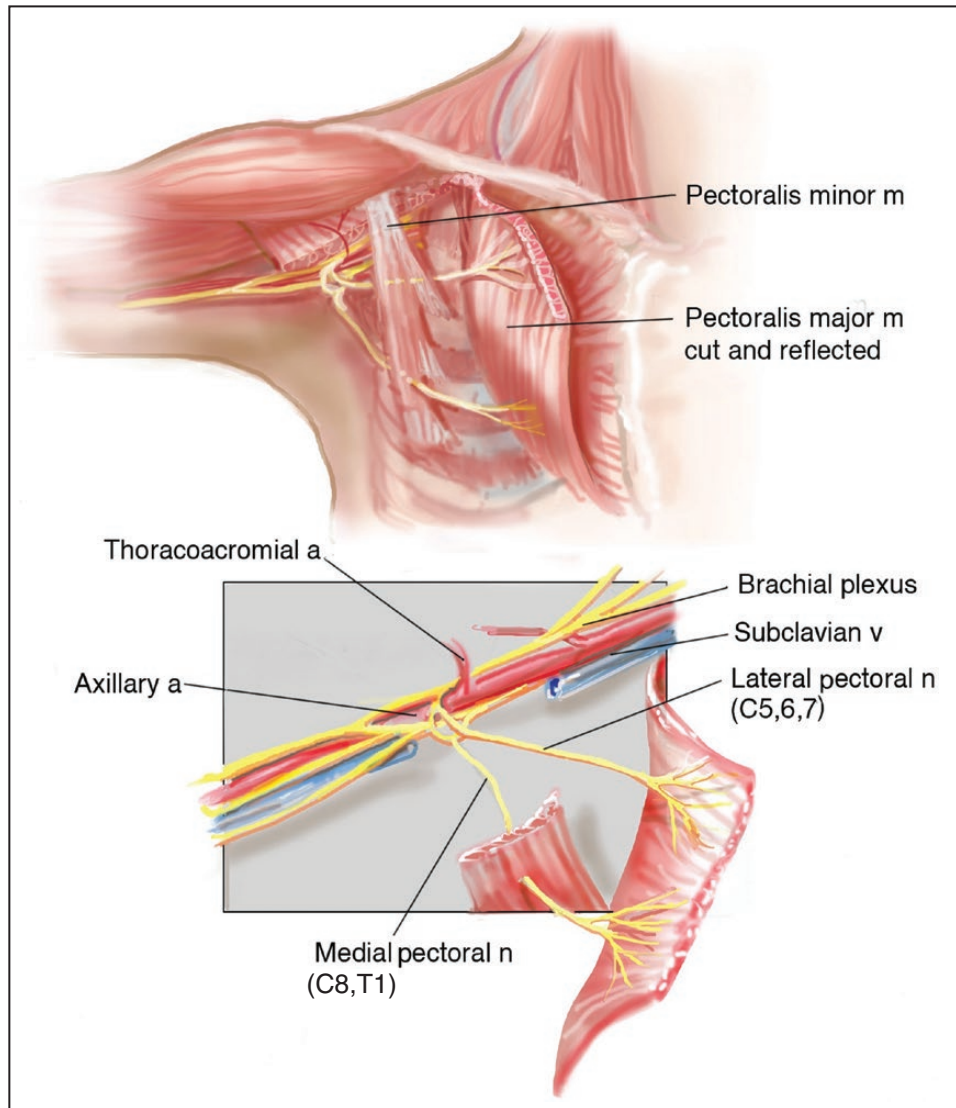
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**Figure 1.** Anatomical illustration of relation of lateral and medial pectoral nerves to major and minor pectoral muscles.

in postoperative pain, nausea/vomiting, fatigue/drowsiness, constipation, and ambulation.

Regional anesthesia for breast surgery is not a novel concept; however, in light of the recent “opioid crisis” in the United States, a brief reminder of the opportunities and benefits of intraoperative regional blocks to reduce postoperative pain seems timely.

We describe herein our experience with a simple and effective block performed at the time of ablative, aesthetic, and reconstructive breast surgery to improve postoperative pain control and significantly reduce the need for postoperative pain medications in general, and opioids in particular.

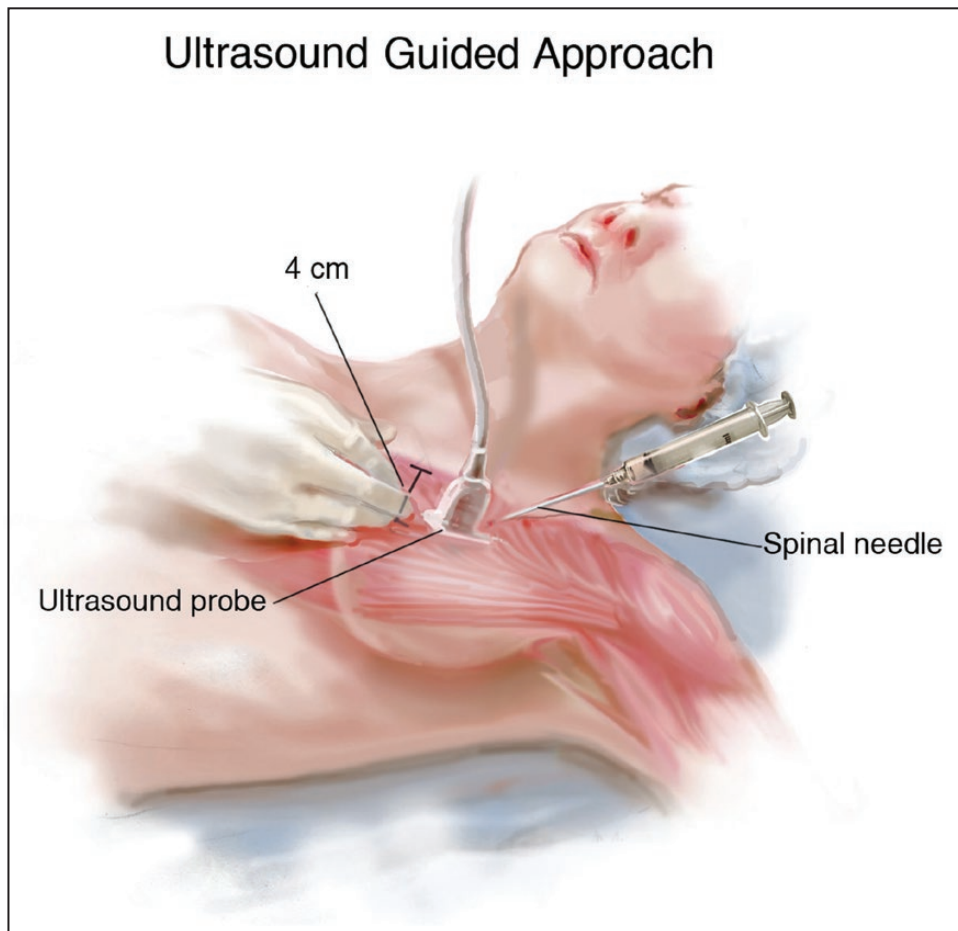
The interpectoral block was first reported by Blanco,<sup>5</sup> who described injecting local anesthetic into the interfascial plane between the pectoralis major and minor muscles, in the vicinity of the lateral and medial pectoral nerves, under ultrasound guidance.

The lateral pectoral nerve (also known as the lateral anterior thoracic nerve) arises from the lateral cord of the brachial

plexus with fibers from the fifth, sixth, and seventh cervical nerves (Figure 1). It pierces the clavico-pectoral fascia and enters the deep surface of the pectoralis muscles. The lateral pectoral nerve connects with the medial pectoral nerve around the axillary artery. Although this nerve is described as mostly motor, it has also been considered to carry sensory proprioceptive and nociceptive fibers to the pectoralis major muscle.

A later modification, the PECS II block,<sup>6</sup> aims to cover also the intercostobrachial, intercostals III-VI, and the long thoracic nerve. In this modification, the local anesthetic is placed between the major and minor pectoral muscles as in the original interpectoral block, as well as between the pectoralis minor and the *serratus anterior* muscles.

Several studies have reported on the advantages of regional blocks for breast surgery, including a recent meta-analysis<sup>7</sup> of eight randomized controlled trials and two cohort studies with a total of 993 patients undergoing a modified radical mastectomy. This meta-analysis demonstrated that PECS block, especially PECS II block, is a safe



**Figure 2.** Illustration of the ultrasound-guided approach.

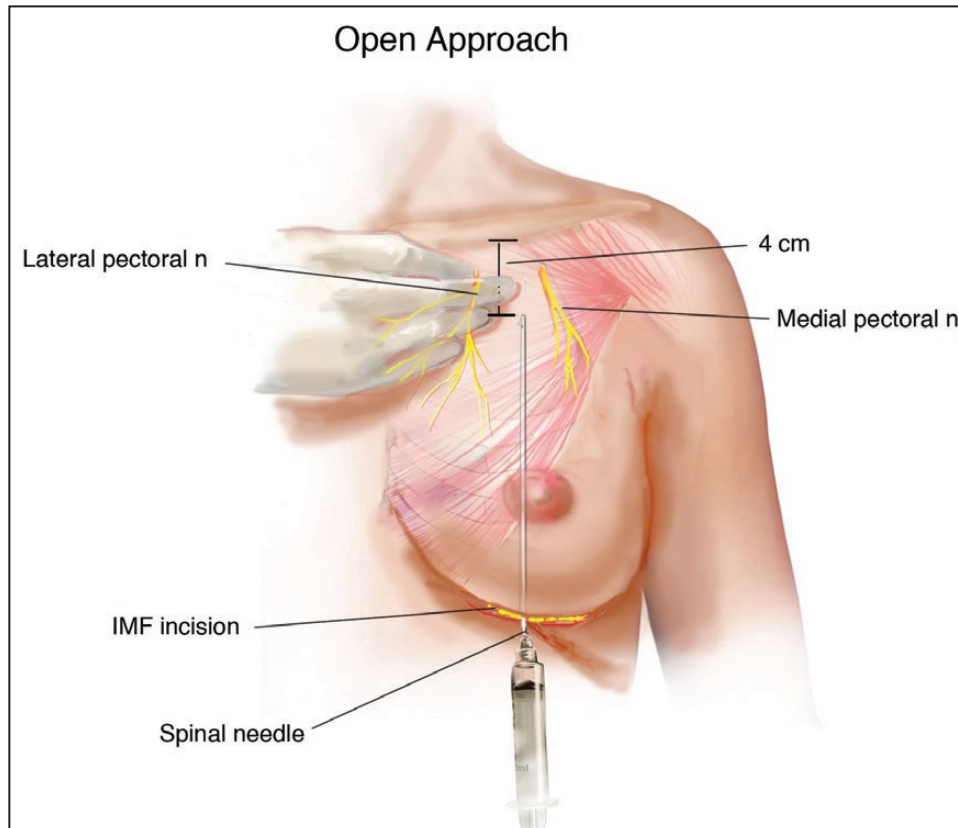


**Video 1.** Watch now at <http://academic.oup.com/asjof/article-lookup/doi/10.1093/asjof/ojaa009>

and effective option for analgesia after modified radical mastectomy, with reduced intraoperative and postoperative opioid consumption, as well as decreased early postoperative pain, postoperative nausea and vomiting, and the need for postoperative rescue analgesia.

A recent study not included in the meta-analysis reported on 80 patients undergoing a lumpectomy and sentinel lymph node biopsy who were randomly assigned to undergo an ultrasound-guided PECS II block or to a placebo control group.<sup>8</sup> Patients in the study group had significantly lower opioid requirements after surgery, especially for operations on the outer area of the breast, but another randomized controlled study did not show any benefit of intervertebral and PECS block with bupivacaine, adrenalin, and dexamethasone compared with saline in 47 patients undergoing a tissue expander breast reconstruction.<sup>9</sup>

Most studies used 10 to 20 mL of 0.25% bupivacaine for PECS block, but some have reported on the addition of dexmedetomidine, (a novel specific and selective  $\alpha$ -2



**Figure 3.** Illustration of the open approach.

adrenergic agonist),<sup>10–12</sup> magnesium sulfate,<sup>13</sup> or Ketamine<sup>14</sup> to enhance and prolong the effect of regional analgesia of this technique. Exparel (liposomal bupivacaine) may also be useful and provide pain control for up to 3 days.<sup>15</sup>

As the half-life time of bupivacaine is approximately 12 hours and duration of action up to 24 hours, it is advisable to inject the block toward the end of the procedure.

## TECHNIQUE

For all patients undergoing mastectomy with or without reconstruction or lumpectomy with or without oncoplastic reconstruction, we inject in one spot, a single dose of 5 to 10 mL of 0.5% bupivacaine hydrochloride (AstraZeneca, Södertälje, Sweden) diluted 1:1 with saline (10–20 mL of 0.25%), using a blunt 2 mm cannula 20 cm long, between the pectoralis major and minor muscles, at the time of surgery. The tip of the cannula can be easily palpated under the pectoralis major muscle mass 2 finger breadths below the clavicle in the mid axis of the breast, approximately at the lateral border of the medial one-third of the clavicle. The entire amount is injected at this point (after aspirating to ensure the tip is not within a blood vessel).

The interpectoral plane can be easily and safely accessed using a blunt cannula, directly under vision after

a mastectomy, sliding parallel to the rib cage in the loose areolar plane between the mid pectoralis major muscle mass and the ribs and further up between the pectoral minor and major muscles in the mid axis of the breast.

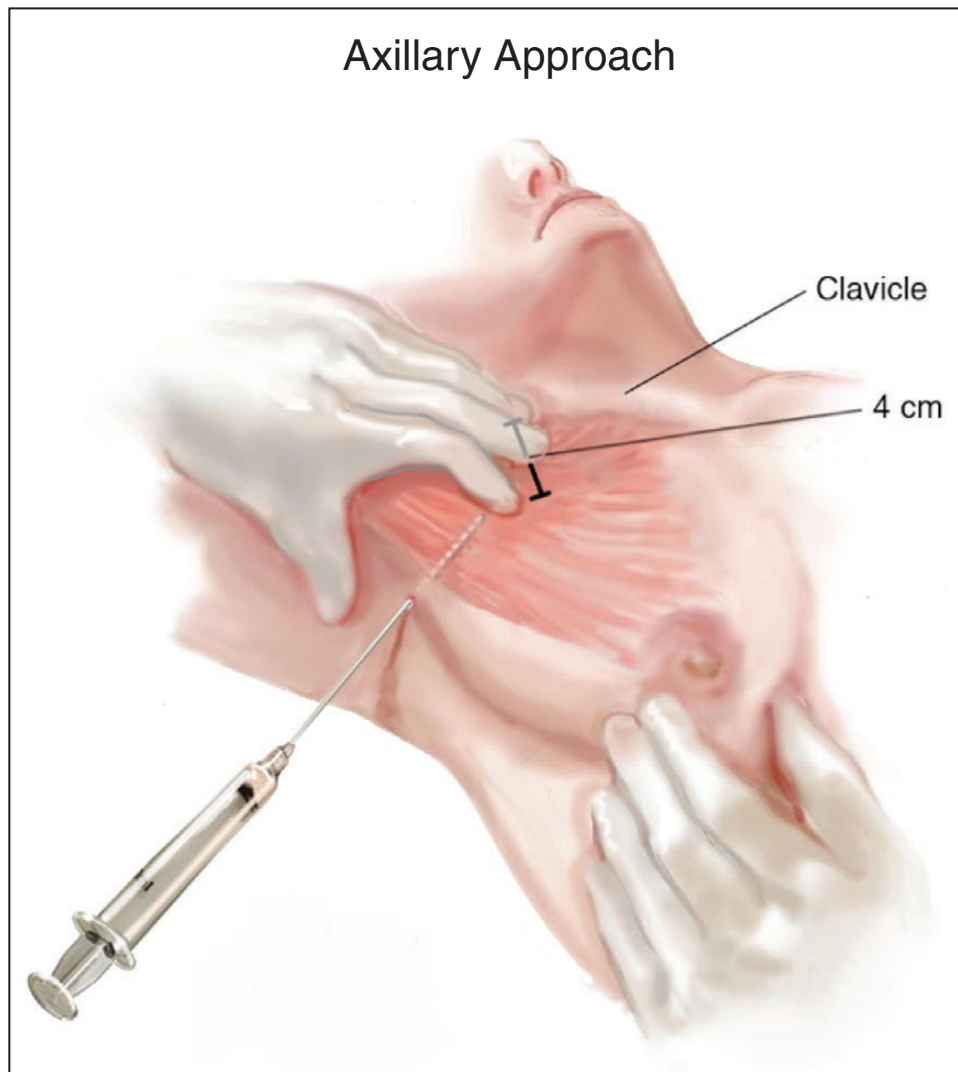
In patients where the pectoralis major muscle is not necessarily visualized during surgery (eg, mastopexy or breast reduction, fat injection), the interpectoral block may be undertaken at the end of the operation transcutaneously from the lateral pectoral fold near the tail of the breast through a 2-mm skin stab or through the incision used for the sentinel lymph node biopsy in breast conserving operations.

Alternatively, the block can be performed under ultrasound guidance by the anesthesiologist, using a spinal needle, after induction of general anesthesia or immediately after surgery. The [Video 1](#) accompanying this paper demonstrates the ultrasound guided ([Figure 2](#)), the “open” ([Figure 3](#)), and the axillary ([Figure 4](#)) approaches.

All surgeries are performed under general anesthesia, supplemented with the interpectoral block.

## OUR EXPERIENCE

Both the “open” and the axillary approaches were adopted by us for practical reasons and provided durable pain



**Figure 4.** Illustration of the axillary approach.

control in the majority of cases. We have been practicing this technique in every patient undergoing aesthetic, ablative, and reconstructive breast surgery in the last 4 years. In approximately 350 patients (all female; age range, 29–77 years; mean age, 45 years), no patient received opioids after discharge, which was either same day or following 1 day of hospital stay, compared with approximately one-third of our patients prior to utilization of the pectoral block. Written consent was provided by all patients for the surgery and the steps taken to reduce postoperative pain (interpectoral block) were explained. The guiding principles of the Declaration of Helsinki were adhered to in this study.

In our experience, placing a bolus of 10 cc in the mid axis of the breast 2 finger breadths below the clavicle using a blunt cannula in a relatively closed space allows diffusion

in the loose areolar tissue to cover to effect both medial and lateral branches of the pectoral nerve. It is our opinion that no additional blocks (medial, intercostal, or serratus) are necessary to achieve the desired effect.

Rare reported complications include hematoma, as a result of inadvertent puncture of the subclavian artery or vein, and failure of the block as a result of incomplete coverage of anatomical targets.<sup>16,17</sup> Pneumothorax is another potential complication, which can be avoided by using a blunt cannula and performing the block intraoperatively under direct vision. This technique should also reduce the risk of vessel puncture and hematoma. Injecting the analgesic too laterally may result in transient paresis of the ipsilateral arm, due to involvement of the brachial plexus best avoided by assuring the injection beneath the medial third of the clavicle.

## LIMITATIONS

Evidently, this is not a formal report of a clinical trial, but rather a description of our daily practice. Clinical trials have been published, several of which are quoted above. There is no parallel control group and, and it based on the first (M.S., plastic surgeon) and the second (T.M.A., breast surgeon) authors individual and collective experience.

## CONCLUSIONS

Intraoperative pectoral block is a simple and effective technique for decreasing postoperative pain and analgesic requirements. It may be administered by the general surgeon, breast surgeon, or under ultrasound guidance by the anesthesiologist and, in our opinion, should be widely adopted as a standard of care in breast surgery.

## Disclosures

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## REFERENCES

- Nahai F. The opioid crisis: what must aesthetic surgeons do about it? *Aesthet Surg J*. 2019;39(8):924-926.
- Parsa FD, Cheng J, Stephan B, et al. Bilateral breast reduction without opioid analgesics: a comparative study. *Aesthet Surg J*. 2017;37(8):892-899.
- Nguyen TC, Lombana NF, Zavlin D, Moliver CL. Transition to nonopioid analgesia does not impair pain control after major aesthetic plastic surgery. *Aesthet Surg J*. 2018;38(10):1139-1144.
- Bartlett EL, Zavlin D, Friedman JD, Abdollahi A, Rappaport NH. Enhanced recovery after surgery: the plastic surgery paradigm shift. *Aesthet Surg J*. 2018;38(6):676-685.
- Blanco R. The 'pecs block': a novel technique for providing analgesia after breast surgery. *Anaesthesia* 2011;66(9):847-848.
- Blanco R, Fajardo M, Parras Maldonado T. Ultrasound description of Pecs II (modified Pecs I): a novel approach to breast surgery. *Rev Esp Anesthesiol Reanim*. 2012;59(9):470-475.
- Zhao J, Han F, Yang Y, Li H, Li Z. Pectoral nerve block in anesthesia for modified radical mastectomy: a meta-analysis based on randomized controlled trials. *Medicine (Baltimore)*. 2019;98(18):e15423.
- Kim DH, Kim S, Kim CS, et al. Efficacy of pectoral nerve block type II for breast-conserving surgery and sentinel lymph node biopsy: a prospective randomized controlled study. *Pain Res Manag*. 2018;2018:4315931.
- Lanier ST, Lewis KC, Kendall MC, et al. Intraoperative nerve blocks fail to improve quality of recovery after tissue expander breast reconstruction: a prospective, double-blinded, randomized, placebo-controlled clinical trial. *Plast Reconstr Surg*. 2018;141(3):590-597.
- Manzoor S, Taneja R, Sood N, Puri A, Kadayaprath G. Comparative study to assess the quality of analgesia of bupivacaine and bupivacaine with dexmedetomidine in ultrasound-guided pectoral nerve block type I and II in breast surgeries. *J Anaesthesiol Clin Pharmacol*. 2018;34(2):227-231.
- Bakr MA, Mohamed SA, Mohamad MF, et al. Effect of dexmedetomidine added to modified pectoral block on postoperative pain and stress response in patient undergoing modified radical mastectomy. *Pain Physician*. 2018;21(2):E87-E96.
- Kaur H, Arora P, Singh G, Singh A, Aggarwal S, Kumar M. Dexmedetomidine as an adjunctive analgesic to ropivacaine in pectoral nerve block in oncological breast surgery: A randomized double-blind prospective study. *J Anaesthesiol Clin Pharmacol*. 2017;33(4):457-461.
- Abdelaziz Ahmed AA. Efficacy of pectoral nerve block using bupivacaine with or without magnesium sulfate. *Anesth Essays Res*. 2018;12(2):440-445.
- Othman AH, El-Rahman AM, El Sherif F. Efficacy and safety of ketamine added to local anesthetic in modified pectoral block for management of postoperative pain in patients undergoing modified radical mastectomy. *Pain Physician* 2016;19(7):485-494.
- Malik O, Kaye AD, Kaye A, Belani K, Urman RD. Emerging roles of liposomal bupivacaine in anesthesia practice. *J Anaesthesiol Clin Pharmacol*. 2017;33(2):151-156.
- Ueshima H, Otake H. Ultrasound-guided pectoral nerves (PECS) block: complications observed in 498 consecutive cases. *J Clin Anesth*. 2017;42:46.
- Carstensen LF, Jenstrup M, Lund J, Tranum-Jensen J. Pectoral block failure may be due to incomplete coverage of anatomical targets: a dissection study. *Reg Anesth Pain Med*. 2018;43(8):844-848.