

## Pectoralis Minor Nerve Block versus Thoracic Epidural and Paravertebral Block in Perioperative Pain Control of Breast Surgery - Mini Review

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### Abstract

Pectoralis minor blocks are still relatively new and require further evaluation, but may have a place in peri-operative pain management for the appropriate cases. Still considered as less invasive procedure in comparison to thoracic epidurals and para-vertebral blocks. Complications of thoracic epidural and para-vertebral blocks like spinal cord injury and pneumothorax makes many anaesthetists interested in practising pectoralis minor block guided by ultrasound. Blanco first introduced the pectoralis minor block in 2011, he did study on 50 patients within 2 years. Results were very promising, all patients did not need any opiates but only paracetamol and non-steroidal anti-inflammatory (NSAID) drugs got used.

Keywords: Pectoralis minor block; Nerve blocks; Breast surgeries; Postoperative analgesia

### Background

Pectoralis minor blocks are still relatively new and require further evaluation, but they may have a place in perioperative pain management for the appropriate cases [1]. To understand the pectoralis minor block, we need to discuss the anatomy of pectoral nerves. The lateral pectoral nerve originates from single root of lateral cord or upper and middle trunks (brachial plexus roots C5, C6, C7). Medial pectoral nerve (brachial plexus roots C8-T1) arises from anterior division of lower trunk or medial cord. Also, medial pectoral nerve may communicate with intercostobrachial nerve. The lateral pectoral nerve supplies the upper portion of pectoralis major muscle, tensor semivaginae articulation is humero-scapularis, pectoralis minim, sternoclavicularis, axillary arch, sternalis and infraclavicular muscles. Both lateral and medial pectoral nerves are closely related to thoracoacromial artery. The medial pectoral nerve supplies pectoralis quartus, sternalis muscles, chondrofascialis [2]. R.Blanco first introduced the pectoralis minor block in 2011, he did study on 50 patients who had breast expanders placed as part of breast reconstructive surgery, they needed only regular paracetamol and ketoprofen for postoperative analgesia. The procedure was done using Ultrasound probe, identifying pectoralis major and minor muscles. Pectoral branch of thoracoacromial artery usually found between pectoralis muscles, identified with colour Doppler, which is closely related to lateral pectoral nerve. 0.4 ml/kg of 0.25% Levobupivacaine was injected at the interfascial plane [3]. Then R.Blanco introduced modified technique of pectoralis block called pectoralis nerve block II (Figure 1). This new technique blocks

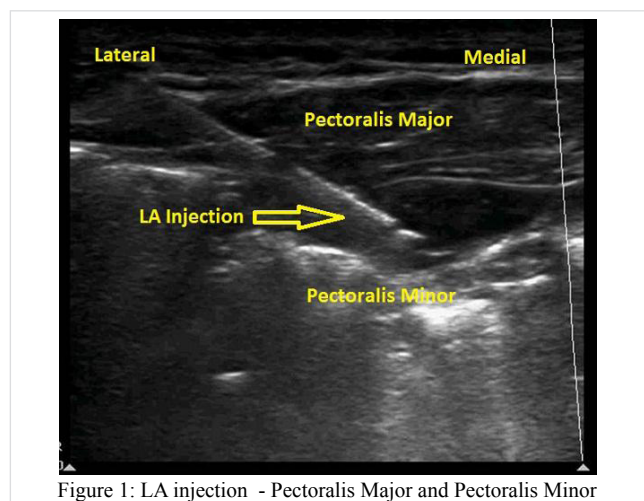


Figure 1: LA injection - Pectoralis Major and Pectoralis Minor

intercostobrachial nerve, intercostals (from 3<sup>rd</sup> to 6<sup>th</sup>), long thoracic and pectoral nerves as well [3]. This new block introduced in 2012, using ultrasound probe below lateral third of clavicle, identifying subclavian muscle and subclavian vessels then moves laterally till lateral border of pectoralis minor at level of 2<sup>nd</sup>, 3<sup>rd</sup>, 4<sup>th</sup> ribs. Serratus anterior muscle covered the 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> ribs, then injecting local anaesthetic between

pectoralis minor muscle and serratus anterior muscle. The privilege of this block, it can cover the axillary clearance in breast surgeries, maintaining good postoperative analgesia. This technique is preferred now than paravertebral and thoracic epidural analgesia by many anaesthetists as it is considered a quite safe and efficient procedure [3].

### Thoracic Epidurals for Breast Surgeries

Thoracic epidural for breast surgery is still an option for postoperative analgesia. Usually inserted at level of T4-5 or T3-4 using low concentrations of l-bupivacaine 0.1% or 1 % ropivacaine with a dose of 0.75 to 1 ml/ desired segmental spread. Thoracic epidural still got some risks which can happened. Blocking of C3,4,5 may lead to bilateral phrenic nerve block compromising respiration. Post dural puncture headache (ratio of 1 in 200), blocking of sympathetic system will cause bradycardia and hypotension, temporary nerve injury (ration of 1 in 1000) and permanent nerve injury (ratio of 1 in 20,000) as well [4]. Hence thoracic epidural still having more complications in comparison to pectoralis minor block but still got advantage of covering bilateral breast surgeries in one injection.

### Thoracic Para-Vertebral Nerve Block

Thoracic paravertebral nerve blocks used for many years in unilateral breast surgeries. It got many advantages; less likely to cause paraplegia in comparison to epidural, no neuroaxial block particularly with anticoagulants concerns and easy to perform as well [5]. About risks of para-vertebral nerve blocks; can cause neuroaxial blocks less common than epidural, high risk of intravascular injection more than epidural and pectoralis minor block, bleeding, infection, nerve injury, short segment contralateral block and got failure rate as well. So, it might get less complications than thoracic epidural does but still more risky than pectoralis minor block [5,6]

### Recent Studies

Retrospective study of recent studies done in 2014, comparing morphine consumption in first 24 hours after breast surgery in patients received pectoralis minor nerve block versus those got thoracic epidural and thoracic paravertebral block [7]. Also the study which was done by Blanco in 2011 about pectoralis minor block and the need of postoperative analgesics in those patients [8].

### Discussion

There is an interest in the use of regional anesthesia for breast surgery as it gives good postoperative pain control with decreasing opiate dosage and side effects, when combined with general anaesthetics allows great reduction in general anaesthetics side effects. So, early recovery, low incidence of nausea and vomiting. some anaesthetists consider regional techniques a way of reduction in metastatic disease progression after mastectomies [9]. Recent study was done in 2014 on 60 patients, half of them received pectoralis minor block (first group) and other half got thoracic paravertebral block (second group) for postoperative analgesia. Intraoperative fentanyl consumption compared, average usage in patients got pectoralis minor block is 105 mcg, and other group consumed 127.5 mcg. Morphine consumption was always lower in first group which was 21

mg, whilst second group used 28 mg. Postoperative nausea and vomiting percentage was recorded as well, in the first group 53.3% of patients suffered from nausea and vomiting compared to 56.7% in second group [9]. R.Blanco in 2012, made a good study as well comparing modified pectoral nerve block with the pectoral nerve block I introduced in 2011. Advantage of new technique is emphasised in breast surgeries with axillary clearance whilst pectoralis minor block I is still good for breast expanders' surgeries. Furthermore, he compared this technique with paravertebral and thoracic epidural in breast surgeries, concluded that it is quite safer, less incidence of pneumothorax than paravertebral block and no sympathetic nerve block as thoracic epidural did. Moreover, Blanco mentioned that it decreased incidence of tumour recurrence and considered as simple and fast technique as well. The modified technique provided also blocking of anterior parts of intercostals nerves which you cannot grantee with pectoralis minor block I. On the other hand, intravascular injection complication in pectoral branch of the acromiothoracic artery was considered to be more likely with pectoralis minor block as one of it is main adverse effects [2]. Previously many studies supported the use of paravertebral block in breast surgeries. One of them mentioned that postoperative analgesia continued for 72hours and decreases the risk of postoperative nausea and vomiting [10]. Other researches mentioned the complications of thoracic paravertebral block, generally percentage of complications is between 2.6% and 5 %. Failure rate can reach 10% , dropping of blood pressure occurred in 4.6%, inadvertent intravascular injection happened in 3.8 % of cases, pneumothorax occurred in 0.5%, epidural block reported as well and leads to bilateral block (10%), Horner syndrome, total spinal block was very rare. But the most important problem is that the anaesthetist cannot perform paravertebral block on both sides [11]. Previously, thoracic epidural was used frequently; most of anaesthetists were more familiar with it. Afterwards, before pectoralis nerve block appeared, paravertebral blocks were considered more preferable than thoracic epidural as considered less invasive .Thoracic epidural anaesthesia complications recorded are sympathetic block which leads to hypotension and bradycardia, itching, urinary retention, nerve damage, patchy epidural block, postdural puncture headache [12].

### Conclusion

Modified Pectoralis minor nerve block becomes more familiar nowadays among anaesthetists compared to paravertebral and thoracic epidural nerve blocks with breast surgeries. Recent studies illustrates that it is quite safe procedure and effective as well for Intraoperative and postoperative pain control in breast surgeries.

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