

PEC Block for Breast Surgery - Is it a Useful Technique?

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Pectoral nerves. Anatomy and function.

The pectoral nerves are the main branches of the brachial plexus that provide motor innervation to pectoral muscles, 2 principal nerves are described, Lateral Pectoral Nerve (LPN) and the Medial Pectoral nerve (MPN) The LPN arises from the lateral cord of the brachial plexus, and through it from the fifth, sixth, and seventh cervical nerves. The MPN originates from the medial cord of the brachial plexus. It arises from roots C8 and T1. It passes behind the first part of the axillary artery, bends forward between the axillary artery and vein, and connects in front of the artery with a small branch of the lateral nerve, forming the "ansa pectoralis", just lateral to the thoracoacromial artery.

Lateral pectoralis nerve pierces the coracoclavicular fascia, and is distributed to the deep surface of the Pectoralis major and innervates its clavicular head. The LPN has sensitive fibers too and innervates the acromioclavicular joint, subacromial bursa, periosteum of the clavicle and anterior articular capsule of the shoulder joint and costoclavicular ligaments.

Median pectoralis nerve enters the deep surface of the Pectoralis minor, where it divides into a number of branches, which supply the muscle. Two or three branches pierce the muscle and end in the Pectoralis major that innervates in its costal head. MPN gives sensory innervation to the inferolateral part of the pectoralis major, the ventral aspect of the arm and the chest wall near the armpit, mostly in conjunction with the intercostobrachial nerve

Sensory innervation of the breast

Sensory innervation of the breast is picked up by means of medial, lateral and superior mammary nerves.

The medial branches correspond to the anterior cutaneous branch of the intercostal nerves of the second to sixth spaces.

The lateral branches correspond to the anterior division of the lateral cutaneous branch from the third to the sixth intercostal nerves. The only exception is the lateral cutaneous branch of the second intercostal nerve (intercostobrachial nerve) that runs to the base of the axilla and the superior medial face of the arm.

The superior branches run to the most cranial region of the breasts and correspond to the supraclavicular nerves (branches of the plexus cervicalis).

PEC block

PEC Block is a simple fascial block at different level of the pectoralis muscles. PEC I Block is a block between the two pectoralis muscles, close to the thoracoacromial artery. The interfascial administration of 5-10 mL of long acting local anesthetic volume is enough to block lateral pectoral nerve and most of the *rami* of the medial pectoralis nerve. The block is performed with a linear transducer located 3-4 cm distal to coracoid process with a transversal view of minor pectoralis muscle. The needle is advanced "in plane" from medial to lateral approach.

PEC II Block is the disposition of the local anesthetic deep and in the lateral edge of the minor pectoralis muscle and over the serratus muscle. A volume of 20 ml is distributed from the second to the fifth ribs and blocks the lateral *ramii* of intercostal nerves as well as the long thoracic nerve. The needle is advanced “in plane” approach from medial to lateral and from cranial to caudal approaches.

The Serratus plane block is a new regional block easy to carry and safe, designed to block basically thoracic intercostal nerves and provide analgesia to the anterior, lateral and part of the posterior side of the chest wall, which the authors suggest that it may be an alternative to epidural and paravertebral block with fewer undesired side effects. This block was described in healthy volunteers without clinical validation. The sensory paresthesia mapping described in dermatomes D2 to D9. In the motor part weakness across the arms adducted is described. The difference in making this block above or below the serratus anterior muscle is only half of the time duration, without differences in superficial or deep pinprick. Serratus plane block is a variation of PEC II. With the same volume, in a most caudal and posterior plane to PEC II block. The needle was advanced “in plane” from caudal to cranial approach at the level of midaxillary line. The volume has been administered deep or superficial to serratus muscle.

PEC block indications

PEC I block produces good intra and postoperative analgesia during breast implants, special indication in subpectoral position ones.

PEC II and Serratus Plane block are indicated as analgesic method in most surgical procedures over breast as well as in axillary lymphadenectomy.

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