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PNS GUIDED PEC L AND SAP BLOCK FOR POST OPERATIVE ANALGESIC EFFECTS IN PATIENTS UNDERGOING MODIFIED RADICAL MASTECTOMY

Dr Ritesh Roy MD Anaesthesia. Consultant Anaesthesiologist CARE Hospital, Bhubaneswar, Odisha, India.

Dr Nihar Ranjan Tripathy* Post Graduate Trainee Student, Dept of Anaesthesia, Hi-tech Medical College & Hospital , Bhubaneswar.*Corresponding Author

ABSTRACT

Introduction: In the recent years, chest wall blocks have taken the postoperative analgesia to newer levels in the field of anesthesia. Blanco et al. initially described the ultrasound (US) guided chest wall blocks that used local anesthetic (LA) deposition under pectoralis major (PEC I), then under the pectoralis minor (PEC II) and later modified these pectoralis blocks to cover larger areas of the thoracic wall by depositing LA under and/or above the serratus anterior (SA) muscle (SA plane block).
Paravertebral blocks and thoracic epidural blocks, the gold standard for post-operative analgesia for chest wall surgeries often have a high incidence of complications. The pectoralis (PEC) blocks, first described by Blanco et al., have been proven to provide adequate analgesia postoperatively for breast surgeries, wide pectoral dissections, upper chest injuries, pacemaker insertions, and intercostal chest drains. To make this simple and useful analgesia technique easy to use in routine procedures, which is limited by the availability of ultrasound machine and expert knowledge of the sonoanatomy of the area, we are describing the innovative technique of PEC-I block and SAP block using peripheral nerve stimulator, which is easily available in most of the health care institutions and hence accessible to most of the anesthetists.
Technique of block: Please refer the Article
Discussion: Almost always all kind of breast surgeries require adequate post-operative analgesia techniques, for better patient satisfaction. Thoracic epidural analgesia, thoracic paravertebral blocks (TPVB), interpleural blocks and intercostal nerve blocks have all been very effective for such surgeries but, are associated with several complications such as epidural hematomas , nerve injuries, pneumothorax, and hypotension. Analgesia technique like TPVB is often unreliable with a single injection, and pectoral nerves are still spared producing inadequate analgesia of the thoracic wall and needed other modes of analgesia as well in addition to the block. The pectoralis block (PEC block) and serratus anterior plane (SAP) block, technique were described by Blanco et al. in 2011 and 2013 using ultrasound and were easy, reliable, and associated with fewer complications. Peripheral nerve stimulators for such easy and superficial blocks increase the routine utilization of these blocks in various chest wall procedures and benefits wider range of population. We have described the use of PNS for PEC-I block associated with serratus anterior plane block to achieve excellent analgesia of the chest wall.

INTRODUCTION

In the recent years, chest wall blocks have become highly popular amongst the anesthesiologists around the whole World. These blocks are superficial and provide an easier approach to the thoracic wall for perioperative analgesia needed for thoracic surgeries. In 2011, Blanco et al.first described the "PECS" block as a novel analgesia technique for breast surgery [1,2]. In 2012, he published the ultrasound (US) techniques for PEC I and PEC II blocks [3]. Later in 2013, he described a further modification to his PEC blocks, the serratus anterior plane (SAP) block, which covered a wider area and provided superior analgesia. He described blocking the anterior chest wall by depositing local anesthetic (LA) above and/or below the SA muscle under US guidance and named this technique as SAP block [4]. Various publications have described the analgesic efficacy of the SAP block for post-thoracotomy, breast surgery, multiple rib fracture, and other chest wall procedures [5,6]. This novel, superficial and easy to approach analgesia technique is limited by the availability of US machines, especially in the developing world where US is not available in most of the health care centres. In this case series, we describe a novel approach using a peripheral nerve stimulator (PNS), which will expand the usage of these blocks.

TECHNIQUE OF BLOCKS

SAP BLOCK

Patient in the lateral position with block side up and with the arm in front of the chest wall the midaxillary line is identified and marked with a longitudinal straight line. The lower border of the 5th rib is marked up to the previous line drawn and the intersection point marked. This intersection point is the point of needle insertion(Fig.1).A 50 mm insulated nerve stimulator needle with a local anesthetic pre-filled syringe attached to the extension tubing is used for performing the block. Block area prepared with antiseptic solution, sterile drapes applied, and the area around the landmark is infiltrated with LA solution which is 2ml of 1% lignocaine. The peripheral nerve stimulator is set to an initial current of 1mA of 0.1ms duration and 1Hz frequency. After gentle massage over the area of LA infiltration the block needle is inserted at the predetermined marked point perpendicular to skin and slowly advanced till the SA muscle contraction is noted by the stimulation of long thoracic nerve. The needle is fixed at that point and current is reduced to 0.3mA. Persistence of contraction of SA muscle at this level confirms the needle placement at target site, i.e. above the SA muscle where the long thoracic nerve, the lateral and posterior cutaneous branches of intercostal nerves lie in the same plane. The LA drug (20mls of 0.2% ropivacaine) is slowly injected in increments with frequent negative aspirations at 5.0mls aliquots.

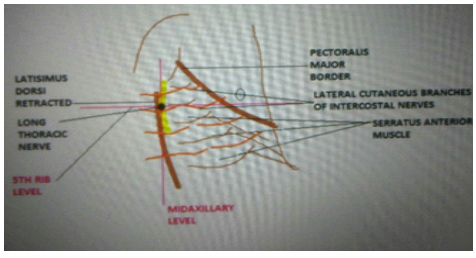

Fig 1. Needle insertion point for SAP block.

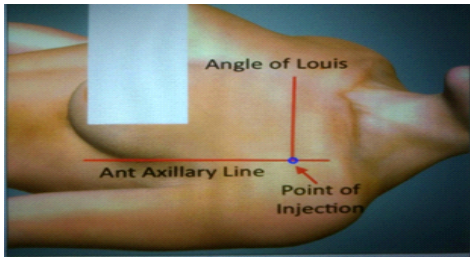

Fig 2. Needle insertion point for PEC I block.

PEC I BLOCK

The patient in supine position with ipsilateral arm slightly abducted PEC 1 block can be easily conducted with a PNS. The anterior

axillary line is marked and a longitudinal straight line is drawn along the line.Another line is drawn from the angle of Louis (2nd rib) horizontally straight that intersects the anterior axillary line at the delto-pectoral groove. This point of intersection is the needle insertion point (Fig. 2). The block is done with a 50 mm insulated peripheral nerve stimulator needle with syringe filled with local anesthetic (LA) attached to the extension tubing. After local infiltration of the skin with 2mls of 1% Lignocaine around the predetermined point of needle insertion, the needle is inserted perpendicular to the skin. The PNS is initially set at 1.0mA current, 0.1ms duration, and frequency of 1Hz. The needle is slowly advanced till the pectoralis muscle contractions is observed and is fixed at this depth with current gradually reduced to 0.3 mA. Persistence of contraction of pectoralis muscle at this level confirms the needle placement at the target site that is the plane between pectoralis major and minor where both lateral pectoral nerve and medial pectoral nerve lie in the same plane. Then 20 mls ropivacaine 0.2% is slowly injected in increments with frequent negative aspirations at 5mls aliquots.

METHODS

After taking ethical committee clearance and consent of each patient about the procedure we took 50 cases of modified radical mastectomy within age group of 18 to 60 years, ASA grade I & II, without any other significant comorbidity ,bleeding disorders or peripheral neuropathy and with body mass index less than 35.

Induction of anesthesia was done in all cases with glycopyrrolate 4 µg kg–1, 1 µg kg–1 IV fentanyl, 2 mg kg–1 propofol intravenously. The airway was secured with a properly placed i-gel size 3 or 4 according to the body weight of patients. PNS guided PEC I block followed by SAP block was performed. Anesthesia was maintained with sevoflurane (1 minimum alveolar concentration) in air oxygen mixture with a 40% Fio2. No muscle relaxant was used during the procedure. At the end of surgery, the i-gels were removed and sent to the post anesthesia care unit for observation for 1 hour and then transferred to the surgical ward. Postoperative pain intensity was assessed using the visual analog scale score on an hourly basis. All the patients were previously explained in detail about the visual analogue scale using simple and appropriate pictorial presentation. Time of rescue analgesic required by each patient was observed for next 48 hours.All the patients were put on intravenous Diclofenac 75 mg in 100 ml normal saline twice daily post operatively.Tramadol 2mg kg–1 intravenous was decided to be the rescue analgesic on observation of a VAS score of >3.

RESULTS

Table 1.Demographic profile of patients

Parameters	Values (mean +/- SD)
Age	50 (8) years
Weight	61 (10) kgs
Height	151 (7) cms
ASA class I/II	18/32
Type of surgery	Radical mastectomy
Duration of surgery	90 (15) mins

PNS guided PEC I block combined with SAP block provided excellent post operative analgesia in 45 cases for up to next 48 hours with a VAS score of <3 . Five cases needed rescue analgesic between 30th to 36th post operative hours which were well managed with rescue analgesics. All the patients did not require any supplemental opioid analgesic during the entire intraoperative period as assessed by hemodynamic status. No significant post operative complication was detected.

DISCUSSION

A large number of breast surgeries are performed now a days for removal of breast cancer, fibro adenomas as well as for cosmetic reasons and being highly pain sensitive structure, require better post-operative analgesia techniques that are associated with fewer complications with reduced length of hospital stay. Regional anesthesia techniques such as TEA, TPVB, and intercostal nerve blocks (ICNB) have all proven to be the very effective for such surgeries [7,8] but are associated with complications such as epidural hematomas, nerve injuries, pneumothorax, and hypotension [9,10,11,12]. These analgesia techniques need to be mostly done before administration of general anesthesia to recognize and reduce the incidence of the associated complications. Analgesia technique like TPVB, when used in day-care setting, was found to be unreliable with a single injection [13]. Multiple injections were found to be more effective [14] but pectoral nerves were still spared producing inadequate analgesia of the chest wall, and post-operative monitoring was required making it unsuitable for same day discharge from the hospital. To overcome this limitation a novel technique for chest wall blocks, the pectoralis block (PEC block) was described by Blanco in 2011 and then in 2012 in an article. He described an intermyofascial injection of LA between the pectoralis major and minor muscles to block the pectoral nerves. This approach using ultrasound was novel, superficial than TEA, TPVB, or ICNB and easy to use [15,16]. The PEC block done under US guidance has a lower risk of intravascular injection than TPVB. The possibility of injection into the pectoral branch of the acromiothoracic artery remains; however, these complications can be easily avoided with proper ultrasound training and determining the right pattern of spread of the LAs [15]. In the developing world accessibility to the US is limited, and hence, use of PNS for such an easy and superficial block increases the utilization and benefits wider population. In this case series we have described the use of PNS for PEC-I block combined with SAP block [17,18] to achieve excellent analgesia of the chest wall for surgeries such as breast surgeries, modified radical mastectomy, thoracotomies, Latissimus dorsi flaps, and other hemithorax surgeries.

By developing a PNS guided PEC I combined with SAP block we conclude that we can overcome the limitations of requirement of an USG device yet with the same efficiency we can successfully provide excellent post operative analgesia in breast surgeries as well as other described hemithorax procedures. As this is a unique and newer procedure in the field of anesthesia further research and trials are awaited for its validation and to establish this as an effective procedure for routine use in the hemithorax surgeries.

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