Ultrasound Guided Thoracic Paravertebral, Pectoralis II, and Serratus Anterior Plane Block in Breast Surgeries: Spread of Local Anesthetic and Postoperative Analgesia

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Introduction:
Thoracic paravertebral block (TPVB) has become the gold standard to provide good postoperative analgesia in breast surgery; however, it carries the risk of various complications. Recently ultrasound-guided (USG) less invasive Pectoralis (PECS) block and Serratus Anterior Plane (SAP) block have been described as an alternative to TPVB.

Objectives:
To evaluate TPVB, PECS and SAP block in terms of analgesic efficacy by comparing postoperative 24-hour fentanyl consumption and visualize the spread of local anesthetic by ultrasound imaging, correlating it with the sensory blockade produced.

Methods:
Prospective randomized interventional study conducted in 45 ASA grade I-II patients scheduled for the elective breast surgery. Patients were randomly allocated into 3 groups i.e. Gr.1 (USG-TPVB) (Ropivacaine 0.375% 20ml), Gr.2 (USG-PECS II) block (Ropivacaine 0.375% 30ml), and Gr.3 (USG-SAP) (Ropivacaine 0.375% 30ml). Spread of the local anaesthetics was seen with ultrasound imaging.

Onset of sensory blockade, total fentanyl consumption and Pain scores were measured at rest and ipsilateral abduction of arm at 1, 2, 3, 6, 12 and 24-hour.

Results:
Time to onset of the block to pain sensation (mean ± SD) in TPVB group was 18.26±3.03 minutes, PECS II group was 8.65±4.16 minutes and SAP group was 9.07±5.25 minutes. TPVB group again had a significantly longer time to onset compared to PECS II group (P=0.0002) and SAP group (P=0.0001). Postoperative fentanyl requirement (mean±SD) was 428.33 ± 243.1 μg, 644.67 ± 311 μg.
260.15 ± 182.44 μg in the TPVB group, PECS II group, and SAP group respectively. SAP group had significantly lesser requirement than PECS II group (P=0.028) but similar requirement as in TPVB group (P=1.0). Pain scores were not significantly different amongst the group in the postoperative period.

Conclusion:
TPVB and SAP group result in a greater spread of the drug and provide equivalent analgesia and are superior to the PECS II block in providing analgesia for breast surgeries. SAP block is easier to perform than TPVB with lesser chances of complications and results in faster onset. Thus we recommend SAP block for patients undergoing breast surgeries for effective analgesia.