


**COMMENTARY**

Pectoral nerves blocks (PECS) and sedation: A way to avoid general anesthesia in breast surgery – A single institution early experience

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Regional Anesthesia (RA) techniques, such as thoracic epidural block, thoracic paravertebral block, and intercostal nerve block, are regarded as the best choice for perioperative pain management in breast surgery.¹ However, such invasive techniques may be associated with some severe complications like pneumothorax, epidural/intrathecal spread, and sympathectomy, and therefore, many anesthesiologists are reluctant to their use in breast surgery.² Pectoral nerves blocks (PECS) represent a novel and less invasive approach to RA in breast surgery, which provides good analgesia with less complication than the traditional techniques.³

The use of PECS blocks in breast cancer surgery has been traditionally limited to postoperative pain management and not as the primary anesthesia.³ We describe our experience with PECS block and sedation as an alternative to General Anesthesia (GA) in this setting. The results are compared with a control group receiving GA.

All the women affected by unilateral breast cancer undergoing simple Wide Local Excision (WLE) or Mastectomy (Mx) ± axillary surgery were included in this study. RA was performed by three proficient and experienced anesthesiologists under ultrasound guidance as follows:

- **PECS I:** injection of 15 mL of local anesthetic (mepivacaine 2% + levobupivacaine 0.5% in equal parts) between the pectoralis major and pectoralis minor muscles, in proximity to the thoracoacromial artery.

- **Modified PECS II:** injection of a total of 20 mL of mepivacaine 2% + levobupivacaine 0.5% over the 3rd and 4th rib at the level of serratus anterior muscle.
- All patients undergoing Mx, and those treated with WLE for a cancer located in the medial aspect of the breast, also had parasternal infiltration.
- Sufficient analgesia was obtained in 30 minutes. Remifentanyl (0.1 mcg/kg/min) + propofol at a variable dosage (1-3 mg/kg/h) were infused during surgery. Patients treated with GA had surgery when an anesthesiologist trained in RA was not available.

Postoperatively, RA patients received only 1 g of paracetamol every 8 hours as analgesia, whereas the patients in the GA group had an intravenous morphine bolus (0.1 mg/kg) at the end of surgery + a continuous 2 mL/h infusion of tramadol + ketorolac + ondansetron through an elastomeric infuser.

Postoperative pain intensity was assessed using a single 10-point Numeric Rating Score (NRS) (in which 1 = no pain and 10 = worst pain imaginable), and a rescue dose of analgesia (ketorolac 10 mg) was administered whenever NRS was >4. Pain level, analgesic consumption, postoperative nausea and vomiting (PONV), and postoperative agitation/confusion were recorded in recovery room and the morning after surgery. Data were compared by statistical analyses (*t* test for age and pain levels and *chi-square* test for the other variables).

From January 2018 to December 2018, 102 women aged between 33 and 90 received unilateral breast cancer surgery; of those, 41 and 61 were treated with RA and GA, respectively. WLE with sentinel node biopsy (SNB) was the commonest surgery in

TABLE 1 Patients' characteristics by type of surgery

	RA				GA			
	N	Age	rNRS	mNRS	N	Age	rNRS	mNRS
WLE	4	51.8 (42-63)	3 (2-6)	2.8 (1-6)	5	56 (44-67)	2.8 (1-4)	2.4 (1-4)
WLE + SNB	16	62.6 (36-80)	2.9 (1-5)	2.6 (1-6)	25	58 (37-85)	3 (1-7)	2.4 (1-8)
WLE + ANC	8	65.3 (39-85)	3.3 (2-6)	2.6 (1-4)	10	61.1 (43-85)	3.7 (2-6)	2.8 (2-3)
MX	0	-	-	-	1	84	4	3
MX + SNB	8	70 (45-87)	3.3 (1-6)	2.6 (1-5)	11	73.9 (60-89)	4 (2-8)	3.3 (2-7)
MX + ANC	5	74.4 (53-90)	3.4 (2-6)	3.4 (2-4)	9	67.7 (33-84)	4 (2-8)	3.3 (2-7)

Abbreviations: mNRS, pain level the morning after surgery; rNRS, pain level in recovery.

both groups, followed by Mx + SNB and WLE with axillary node clearance (ANC) (Table 1). The majority of patients treated with RA were aged 70 or more ($n = 22$, 53.6%), whereas the same age group only accounted for 36.8% of patients treated with GA ($n = 20$) (Table 2).

Mean patient-reported pain levels in RA and GA groups were, respectively, 3.2 and 3.6 in recovery room and 2.8 and 2.9 the morning after surgery. There was no significant difference in pain NRS between the two groups. Mx, either with SNB or ANC, was the most painful procedure with a mean pain NRS of 3.4 for RA and 4 for GA in recovery room, followed by WLE + ANC (Table 1).

The use of at least one rescue dose of ketorolac was necessary for eight patients in the RA group, with five patients requiring two doses, and for 13 patients in the GA group (five patients had two doses) with no significant difference between the two cohorts. One patient treated with RA had mild nausea without vomit, compared to seven patients with PONV in the GA group. There were a total of four episodes of confusion/agitation in patients who remained admitted overnight: three of them were aged over 70 and all had GA (Table 2).

Since the introduction of PECS II block, several randomized trials have shown its efficacy in reducing postoperative pain and opioid consumption in patients undergoing mastectomy.⁴⁻⁶ However, in all these studies RA techniques were always used in association with GA, and there are only a few anecdotal cases reporting the use of PECS blocks as the primary anesthesia in the literature.⁷⁻⁹

Murata et al⁷ firstly reported two cases of breast surgery (a simple mastectomy and a lumpectomy) without axillary surgery in two women aged 91 and 94, respectively. Subsequently, in 2017, Moon

et al⁸ reported a 49-year-old woman undergoing WLE + ANC treated successfully with PECS blocks and sedation. Finally, Galán Gutiérrez et al⁹ have recently reported two patients with multiple comorbidities, including severe respiratory disease, who received Mx + axillary surgery with a similar anesthetic technique.

Breast innervation is complex (Figure 1). PECS I and II blocks target the medial and lateral pectoral nerves and the lateral cutaneous branches of the second to sixth thoracic intercostal nerves (TICNs), but not their anterior branches. To perform an Mx or a WLE for a medially located cancer is thus necessary to block the anterior cutaneous branches of the TICNs with parasternal infiltration. Even at this point, some pain during the skin incision is possible due to the supraclavicular nerves; however, this condition can be easily managed with additional local anesthetic infiltration along the incision line, if necessary. We recommend that a deeper sedation level be maintained when the skin incision is performed and progressively be reduced during surgery, as there will be better analgesia over the muscular plane.

The use of RA with PECS blocks as single anesthetic technique, in our opinion, has the potential to become the first choice in breast cancer surgery, especially in patients at high risk of anesthetic complications (older age, multiple comorbidities). However, its use is limited to unilateral operations due to the high amount of local anesthetic that would be required for a bilateral block (risk of toxicity). Another possible disadvantage of the technique is that it is time-consuming: It takes the anesthetist about 15 minutes to perform the blocks, and then, it is necessary to wait 30 minutes to achieve good analgesia, giving a potential wait of 45 minutes between surgical cases in theater. However, with careful time

	RA				GA			
	N	R. doses	PONV	Conf.	N	R. doses	PONV	Conf.
<40	2	-	-	-	5	2	1	-
40-69	17	6	1	-	36	10	3	1
70+	22	7	-	-	20	6	3	3
Total	41	13	1	-	61	18	7	4

Abbreviations: Conf, Confusion/Agitation; R. doses, Rescue doses.

TABLE 2 Patients' characteristics by age group

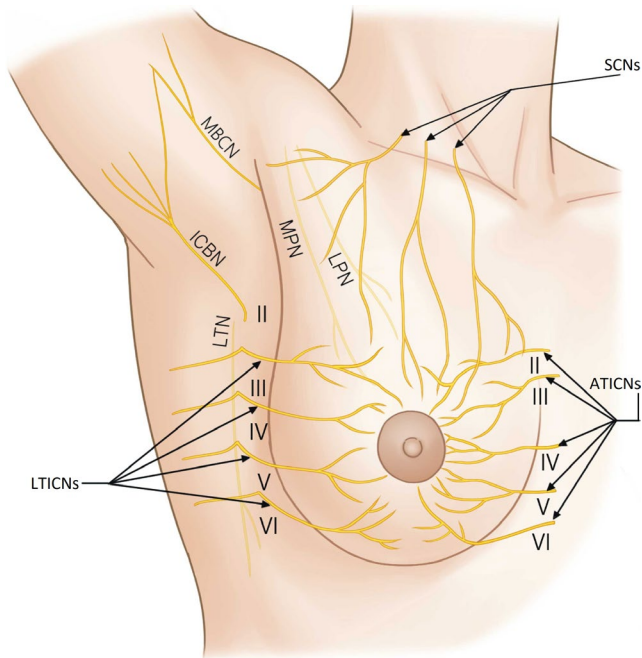


FIGURE 1 Innervation of female breast and axilla. ATICNs anterior branches of the thoracic intercostal nerves; ICBN, intercostobrachial nerve; LPN, lateral pectoral nerve; LTICNs, lateral branches of the thoracic intercostal nerves; LTN, long thoracic nerve; MBCN, medial brachial cutaneous nerve; MPN, medial pectoral nerve; SCNs, supraclavicular nerves

planning it is possible to optimize theater use: When the surgeon is about 30 minutes to go, the anesthetist can start performing the block on the next patient, thus minimizing the waiting time between cases.

RA with sedation is a safe and effective alternative to GA in breast surgery with no significant difference regarding pain control and less side effects. This study represents, to our knowledge, the largest case series of breast cancer surgical patients treated with RA and sedation published so far, and it is the only one to compare this anesthetic technique with standard GA. Further studies, preferably randomized, comparing PECS blocks only to PECS blocks + GA are required to fully understand the clinical relevance of this novel anesthetic approach to breast surgery.

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CONFLICT OF INTEREST

We declare that there is no actual or potential conflict of interest in relation to this article. All the authors have no financial or personal relationship with other people or organizations that could inappropriately influence (bias) this work.

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