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A PRELIMINARY STUDY ON THE PECTORALIS BLOCK II AS A PART OF MULTIMODAL ANALGESIA FOR INTRA AND POSTOPERATIVE PAIN MANAGEMENT IN MODIFIED RADICAL MASTECTOMY

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ABSTRACT

Background: Inadequate acute postoperative pain management is the main risk factor for chronic pain after breast surgery. Pectoralis blocks I and II (pecs block I and II) are novels peripheral nerves block techniques introduced since 2011 by Blanco *et al*.

Methods: Ten patients diagnosed with breast cancer planned for modified radical mastectomy (MRM), from preoperative evaluation patients with a physical status of American Society of Anesthesiologist (ASA) I and II. Anesthesia management under general anesthesia with an endotracheal tube and we performed PECS block II after general anesthesia. We recorded the systolic blood pressure, mean arterial pressure (MAP), and heart rate intraoperatively, and the pain scale at 4th, 6th, 12th, and 24th hours postoperatively.

Results: The pain scale at 4th and 6th hours postoperatively were 0.3±0.5 and 0.6±0.5 respectively. The pain scale at resting starts to increase at the 12th and 24th hours (1.2±0.4 and 1.1±0.6). The mean total use of morphine recorded on PCA was 3.3 ± 0.9 (mg). No pecs block II complications were recorded in this study.

Conclusion: Pecs block II is a relatively easy, safe, and effective for MRM surgeries. Further larger and double-blinded studies are needed to know its effectiveness compared to other techniques available.

Keywords: *pectoralis block, pain, score*

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INTRODUCTION

Postoperative pain due to inadequate post-surgery pain management is a major factor leading to chronic pain. Anesthesia techniques commonly used for breast surgery are general anesthesia, which can be combined with regional anesthesia.

Multimodal analgesia is a strategy that can be used to reduce perioperative pain and morbidity.[1] Multimodal analgesia can reduce the need for postoperative opioids so that opioid side effects such as nausea, vomiting, pruritus, decreased intestinal motility, respiratory depression can be avoided. Multimodal analgesia combines several different drug classes with different targets to provide adequate analgesia effects, such as combining opioids with NSAIDs and local anesthesia.[2]

Pectoralis block I and II (pecs block I and II) are peripheral nerve blocks technique introduced in 2011 by Blanco *et al*.[3] Pecs block I is performed by injecting local anesthetic agents between the major and minor pectoral muscles. The technique is then modified by injection of local anesthesia between the pectoralis minor and anterior serratus muscle, which is then called the modified pecs block I or pecs block II.[3-5]

PATIENTS AND METHODS

Ten women diagnosed with breast cancer were planned for modified radical mastectomy (MRM) surgery were enrolled in this study. The study was approved by the Committee of Ethical Research of Udayana University/Sanglah General Hospital. All subjects provided a written consent to be included in this preliminary study.

The sampling method was consecutive sampling. Inclusion criteria include the physical status of ASA I and II, aged 18-55 years, who were planned for elective modified radical mastectomy (MRM). Exclusion criteria include a known history of allergy to non-steroid anti-inflammatory drugs (NSAID) and/or to anesthesia drugs. A physical examination of the breast area was conducted during the preoperative visit to ensure no signs of inflammation or infection.

Upon arrival at the operating theater, the subjects were given premedication with midazolam 0.5 mg/kg. General anesthesia was carried by induction with propofol 2 mg/kg, fentanyl 1 mcg/kg, and atracurium 0.5 mg/kg to facilitate intubation. Ketorolac 30 mg was given as preemptive pain management. Oxygen, nitrous oxide, and sevoflurane were used to maintain anesthesia.

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After the patient was induced the pecs block II was performed in a sterile environment. We identified the major and minor pectoral muscles and the pectoral branches of the thoracoacromial artery. Then by using the Stimuplex® needle, a needle was inserted until it reaches the fascia between the major and minor pectorals. After a blood-free aspiration, the first injection with 10 mL of bupivacaine 0.25% was administrated.

The needle was then inserted again until it reached the fascia between the minor pectoralis and the anterior serratus muscles. We used the fourth rib as the needle guidance to avoid pleural puncture. Then, 20 mL bupivacaine 0.25% was administrated as a second injection. The surgeon was asked to wait for 15 minutes to ensure an optimal block before proceeding with the incision.

Hemodynamic recording (blood pressure, MAP, and pulse rate) was recorded every 5 minutes until surgery is complete. Postoperatively the subjects were given analgesia morphine via Patient Controlled Analgesia (PCA) and 30 mg ketorolac every 8 hours. Patients were discharged to the ward, and pain score was evaluated with at 4th, 6th, 12th, and 24th hours postoperatively.

Table 1 Characteristics of patients

Variable	N = 10 patients
Age, years (mean±SD)	47.5 ± 5.9
Weight, kg (mean±SD)	60.0 ± 7.8
Body mass index, kg/m^2 (mean±SD)	23.5 ± 1.8
Duration of surgery, minutes (mean±SD)	105.5 ± 8.9

SD: standard deviation

Table 2 Visual analogue scale (VAS) in resting position

Variable	Mean±SD
4th-hour postop	0.3 ± 0.5
6th-hour postop	0.6 ± 0.5
12th-hour postop	1.2 ± 0.4
24th-hour postop	1.1 ± 0.6

SD: standard deviation

Table 3 Visual analogue scale (VAS) upon movement

Variable	Mean±SD
4th-hour postop	1.5 ± 0.5
6th-hour postop	1.5 ± 0.5
12th-hour postop	2.5 ± 0.7
24th-hour postop	2.6 ± 0.8

SD: standard deviation

Table 4 Opioid requirements

Variable	Mean±SD
Intraoperative (fentanyl, µg)	120.5 ± 16.1
Postoperative (morphine, mg)	3.3 ± 0.9

SD: standard deviation

RESULTS

Characteristics of the subjects can be seen in Table 1. The mean age of the subjects was 47.5±5.9. The mean duration of the surgery was 105.5±8.9 minutes, with the shortest duration of the surgery was 90 minutes and the longest duration was 120 minutes.

The pain scores upon resting position, upon movement, and overall opioid requirements in intraoperative and postoperative periods were presented in tables 2, 3, and 4, respectively. While figures 1-3 presented the data of systolic blood pressure, MAP, and heart rate, respectively, at each measurement time during the intraoperative period.

DISCUSSION

Pectoral block (pecs block I and II) was founded by Blanco *et al*, as one of the modalities of analgesia in breast and thoracic surgery.[6] Pecs block II is expected to provide adequate analgesia effect intraoperatively. Pecs block II is an interfacial block that blocks the medial and lateral pectoral nerves also intercostal nerves for the axillary and chest regions.[7]

Pecs block II provides analgesia in the dermatome region of C4 to T5. In mastectomy surgery, the dermatome region starts from T2-T5, so by performing pecs block II we expected that we can provide analgesia in the surgery field.[8]

This study used 0.25% bupivacaine as a local anesthetic agent with a total volume of 30 mL. Bupivacaine is a long-acting local anesthetic of the amide group. The duration of action of local anesthesia on the peripheral nerve block depends on the type of nerve blocked. The peripheral nerve block can be divided into two, the major and minor nerve blocks. Pecs block II blocked the pectoral and intercostal nerves for the thoracic region and the axilla thus included in minor nerve block. The duration of action of bupivacaine on the minor nerve block is 180-360 minutes. When combined with epinephrine, the effect may extend to 240-420 minutes.

No intraoperative addition of fentanyl was needed in all subjects. By performing pecs block, we achieved stable intraoperative hemodynamics

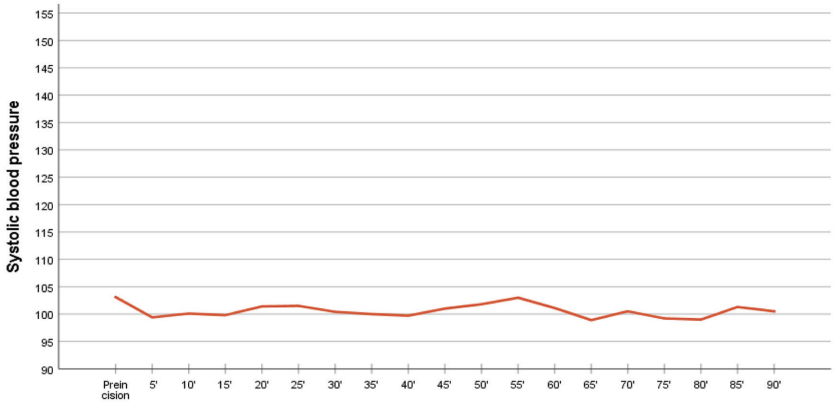

Figure 1 Systolic blood pressure means at each measurement time

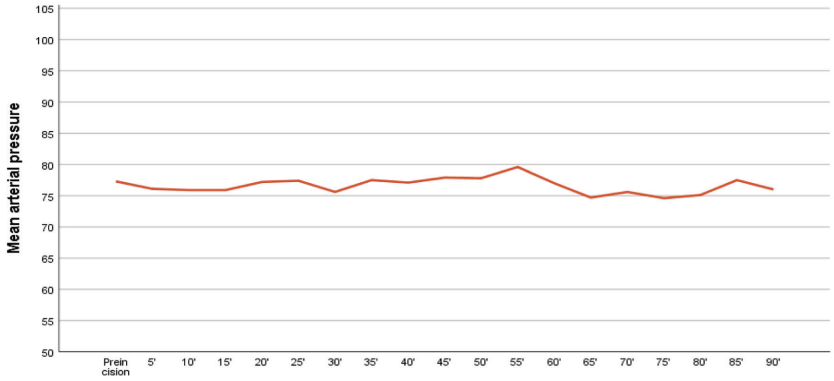

Figure 2 Mean arterial pressure means at each measurement time

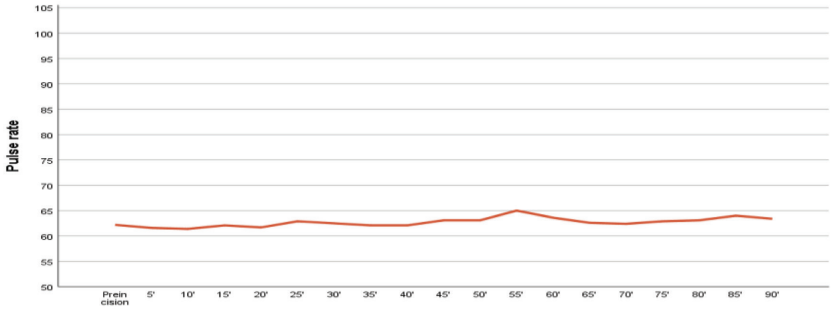

Figure 3 Pulse rate at each measurement time

by looking at graphs of fluctuations in systolic blood pressure, MAP, and pulse rate.

The 24 hours evaluation on the effects of pectoralis block II on postoperative pain were satisfying. This can be seen by the low VAS score as displayed in Tables 2 and 3. The prolonged effects of pecs block II in postoperative analgesia are affected by peripheral vascular effects of local anesthetic agents. Many local anesthetics have a biphasic effect on vascular smooth muscle, at low concentrations, these agents tend to cause vasoconstriction, whereas, at higher concentration, they cause vasodilation.

The postoperative analgesia effect of pecs block II was also obtained from a study by Bashandy *et al.*[9] In the study, the pain value within 24 hours postoperatively in the group performed with pecs block II was lower than the control group. The need for intraoperative and postoperative opioid in the pecs block II group was also lower than in the control group. In other studies, it was reported that pecs block II also had lower opioid requirements compared with a thoracic paravertebral block with fewer side effects.[10-13]

CONCLUSION

Combination of general anesthesia and pecs block II can reduce the need for intraoperative and postoperative opioids, maintain hemodynamic stability, and provide good postoperative analgesia effects. Pecs block II is a relatively easy, safe, and effective technique for breast and thoracic surgery. For further study, a larger, double-blind randomized controlled trial is needed to see the effectiveness of pecs block II in breast and thoracic surgeries.

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The authors declare no conflict of interests.

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