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LETTER TO THE EDITOR

Postoperative analgesia efficacy of erector spinae plane block in patients submitted to cardiac surgery: randomized clinical trial

Dear Editor,

In view of the importance of postoperative analgesia for patients undergoing cardiac surgery and the need to achieve a consensus regarding the indication of nerve block techniques for postoperative pain control for those patients, we performed a randomized, controlled, and blinded study comparing postoperative analgesia efficacy of using Erector Spinae muscle Plane Block (ESPB) associated with multimodal general anesthesia versus only using multimodal general anesthesia. The study was approved by our institution's Research Ethics Committee (CAAE 25758919.8.0000.5138) and included in the Brazilian Clinical Trials Registry (RBR-9djgfv). We recruited patients from both sexes, ages 18 to 75 years, scheduled for cardiac surgery via sternotomy, included after obtaining informed consent. We excluded patients with hemodynamic instability, coagulation disorders, cognitive disorders, and undergoing urgent or emergency surgery. By using a table of random numbers, participants were randomly allocated into block or control group. Upon operating room arrival, routine monitoring was installed, in addition to invasive arterial blood pressure, collection of blood samples for laboratory tests, and Foley catheter for urine output monitoring. In the block group, before anesthetic induction, ESPB was performed bilaterally, with the patient in lateral decubitus and sedated with dexmedetomidine. An ultrasound-guided technique was performed using an A50 needle, at the T4–T6 level. After injecting 20 mL of 0.5% ropivacaine bilaterally, we observed the spread of the local anesthetic solution in the erector spinae muscle plane. No block techniques were performed in the control group. General anesthesia was performed in all patients using remifentanyl (0.1 to $0.5 \mu\text{g}\cdot\text{kg}^{-1}\cdot\text{min}^{-1}$), dexmedetomidine (0.1 to $0.3 \mu\text{g}\cdot\text{kg}^{-1}\cdot\text{h}^{-1}$), etomidate (0.1 to $0.2 \mu\text{g}\cdot\text{kg}^{-1}$), cisatracurium ($0.15 \mu\text{g}\cdot\text{kg}^{-1}$), isoflurane (up to 2%), ketamine (0.1 to $0.3 \text{mg}\cdot\text{kg}^{-1}$), magnesium sulfate (20 to $30 \text{mg}\cdot\text{kg}^{-1}$), and sevoflurane. Pain scores were assessed by a blind examiner as to which group the patient

was allocated, using a Visual Analogue Scale (VAS) postoperatively. Morphine was administered as rescue analgesia, as follows: $10 \text{mcg}\cdot\text{kg}^{-1}$ if VAS = 2 to 3; $30 \text{mcg}\cdot\text{kg}^{-1}$ if VAS = 4 to 6; and $50 \text{mcg}\cdot\text{kg}^{-1}$ if VAS = 7 to 10.

The sample size calculation was based on a pilot study that revealed mean \pm standard deviation of morphine consumption in the first 24 hours equal to 5.90 ± 5.25 (mg) in the block group, and 5.50 ± 6.00 (mg) in the control group. In order to detect a difference of 5 mg between the groups, attain 90% power and a type I error of 5%, 25 patients were estimated for each group ($n = 50$). A $p < 0.05$ value was considered statistically significant for data analysis. Data were recorded and analyzed using SPSS 23 software.

From October 14 to December 16, 2020, a total of 74 patients were eligible to participate in the study. Nine patients from the block group and six from the control group were excluded due to loss during follow-up. Data from 54 patients were analyzed, 25 and 29 patients in the block and control group, respectively. Groups were similar regarding age, weight, and sex ($p < 0.05$). When the intensity of postoperative pain was analyzed, VAS scores were significantly lower in the block group at the 6th postoperative hour, but no difference between groups was revealed at the 12th postoperative hour and 24th postoperative hour. The block group had lower morphine consumption in the period from the end of surgery and 6th postoperative hour, while there was no difference from the 6th postoperative hour to the 12th postoperative hour, and from the 12th postoperative hour to the 24th postoperative hour (Fig. 1). Both groups showed similar total consumption of morphine, ranging from 0 to 18 mg in 24 hours, with a median of 3 mg and 5 mg in the block and control groups, respectively ($p = 0.779$ by the Mann-Whitney Test). No block-related complications were reported.

After comparing multimodal general anesthesia alone with multimodal general anesthesia associated with ESPB, we can suggest that ESPB promotes a beneficial outcome up to the 6th postoperative hour after cardiac surgery, confirmed by the lower pain score and lower morphine consumption. However, no statistically significant difference was seen at the 12th and 24th postoperative hours, indicating that such benefit is restricted to the early postoperative hours. This agrees with previous studies which also evaluated the single-shot ESPB technique.

Early analgesia in cardiac surgery was studied by other authors comparing ESPB versus paracetamol and tramadol intravenous analgesia. Pain in the group of patients receiving

Study conducted at the Santa Casa de Misericórdia de Belo Horizonte, Belo Horizonte, MG, Brazil.

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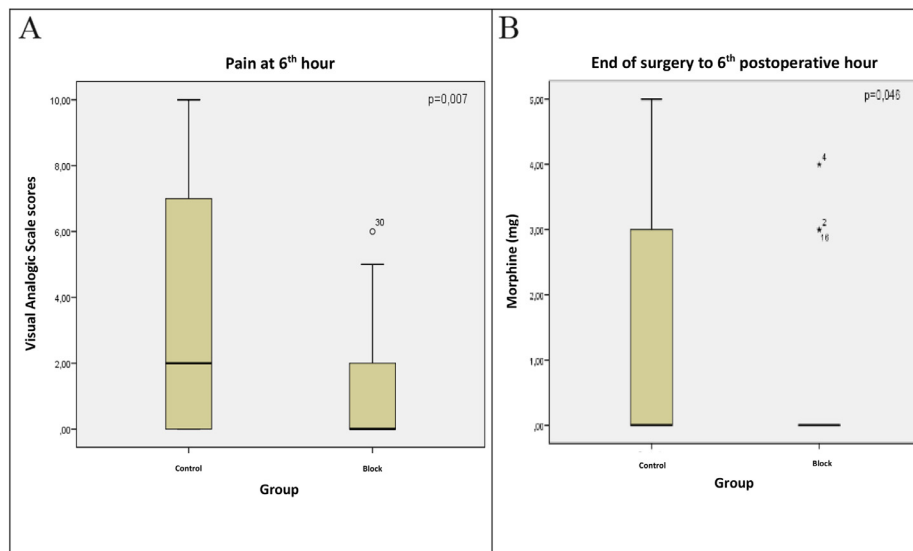


Figure 1 Comparison between control group and erector spinae muscle plane block group regarding, (A) pain score at 6th postoperative hour, and (B) morphine consumption up to the 6th postoperative hour, for patients submitted to cardiac surgery.







ESPB was lower at the 6th hour, a beneficial effect lasting up to the 12th postoperative hour.¹ However, a meta-analysis published later revealed a difference restricted to the 6th postoperative hour, given a difference in pain control in favor of ESPB was observed at the 6th postoperative hour ($p < 0.02$), and there were no differences in the subsequent assessments, up to the 24th postoperative hour.² Corroborating that finding and our results, a recent clinical study published, assessing patients undergoing cardiac surgery, revealed pain scores significantly lower in the ESPB group compared to the sham block group up to the 6th postoperative hour and no difference in the subsequent pain assessments.³ The present study showed no difference between groups in total rescue morphine consumption in 24 hours, a finding in disagreement with other investigations that revealed a reduction in the total consumption of rescue opioids in the ESPB group.²⁻⁴ The difference can be explained by the use of multimodal general anesthesia in both groups in the present study, resulting in low morphine consumption in both groups, so that the difference in total consumption was not detected or was irrelevant. Nevertheless, current evidence suggests that a multimodal strategy, combining drugs such as dexmedetomidine, ketamine, and magnesium sulfate, is the best indication for postoperative pain management of patients submitted to cardiac surgery. The multimodal strategy promotes a synergistic effect and pain reduction with fewer adverse effects,⁵ justifying its choice. The present study has limitations, such as the probable interference of multimodal general anesthesia on morphine consumption and not having measured robust outcomes such as mortality. Notwithstanding, the study indicates that ESPB improved pain management and reduced morphine consumption up to the 6th postoperative hour in patients undergoing cardiac surgery, and this may be the rationale for using ESPB for these patients.

Conflicts of interest

The authors declare no conflicts of interest.

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