Effectiveness of Ultrasound-Guided PEC I/II Block In Early Discharge After Pacemaker Placement During the COVID-19 Pandemic: A Case Series

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Figures

Fig 1. Staged photograph showing transducer during PEC I/II block. Patient's head is located at left-hand side of image

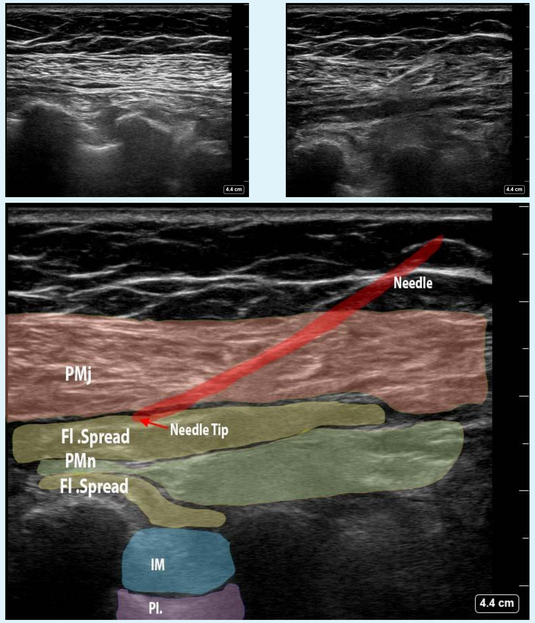

Fig 2a/b/c. Ultrasound imaging showing anatomy prior to PEC block/ Ultrasound imaging showing needle and anesthetic spread/ Ultrasound image showing needle and anesthetic spread with false-color overlay.
(Abbreviations: PMj - Pectoralis Major, PMn - Pectoralis Minor, ISM - Intercostal Muscle, PI. - Pleura)

Introduction

Transvenous pacemaker insertion (TV-PMI) is a common procedure performed to address various heart dysrhythmias. Despite the fact that these procedures are minimally invasive, they typically require in-hospital admission and are often associated with significant postoperative pain that may interfere with the patients' well-being, recovery and rehabilitation, and potentially increases hospital length of stay. As such, achieving pain control while minimizing opioid use is critical, since more than 60% of unplanned prolonged hospitalizations and hospital readmissions are thought to be related to inadequate pain control or to side effects of opioids. In an effort to minimize postoperative narcotic use, there has been a recent shift to exploring opioid-sparing multimodal pain management to treat pain. In recent studies, similar truncal plane blocks were found to be effective as part of a multimodal analgesic approach to decrease pain and opioid use after subcutaneous implantable cardioverter-defibrillator (S-ICD) placement. Further studies have shown that PEC blocks are effective at decreasing postoperative pain and reducing opioid use within a pediatric population, but there is sparse data for the utility of PECS for pacemaker placement in the adult population.

During the Spring of 2020, the COVID-19 pandemic necessitated the cessation of all non-emergent surgical procedures. When indicated, TV-PMI must be performed and is considered an emergent procedure. These patients thus had to endure both the risk associated with the indication for TV-PMI and in-hospital exposure to the COVID-19 virus. Utilizing regional anesthesia techniques during the COVID-19 pandemic would have the benefit of providing adequate anesthesia with minimal utilization of narcotics and potentially avoiding hospital admission.

This case series presents 3 patients that received Pectoralis 1 and 2 (PEC 1/2) blocks to facilitate enhanced recovery after emergent pacemaker insertion during the COVID-19 pandemic of 2020. The primary outcomes observed were postoperative opioid consumption, pain scores reported by the patients, and length of stay.

Methods & Results

All patients in this series received monitored anesthesia care with intraoperative PECS 1 and 2 blocks. All patients received midazolam 1-2 mg IV prior to initiation of the blocks. Monitoring anesthesia care was induced and maintained intraoperatively with propofol 25-75 mcg/kg/min.

PECS 1 and 2 blocks were performed after induction on the surgical side with the ultrasound probe positioned below the lateral third of the clavicle. The positions of the axillary artery and vein were confirmed, and the ultrasound probe was moved inferolaterally until the pectoralis major, pectoralis minor, and serratus anterior muscles were identified in one plane at the level between the third and fourth ribs. The block needle was advanced via the in-plane approach in a medial-to-lateral direction until it reached the interfascial plane between the pectoralis minor and serratus anterior muscles (PEC 2 block). After the position of the needle tip was confirmed, 25 ml of 0.25% bupivacaine admixed with 5 mg dexamethasone was injected. The needle was subsequently withdrawn until the tip was located in the interfascial plane between the pectoralis major and minor muscles (PEC 1 block), where 15 ml of 0.25% bupivacaine admixed with 5 mg dexamethasone was administered. All blocks were performed after chlorhexidine 4% prep with Ultrasound-guidance using a linear array ultrasonography 8-13 Hz probe (HFL38x, M-Turbo; SonoSite, Bothwell, WA) and 50-mm 22-gauge Stimulplex needle (B-Braun, Melsungen, Germany).

After completion of the surgery, all patients were taken to the postanesthesia care unit (PACU). Post-operative pain was treated with oral acetaminophen and with opioids as needed for breakthrough pain. The demographic, MME of opioid consumption, pain scores and length of stay are listed in the table below:

Subject	Age (y)	Sex	ASA	Opioid Consumption in MME During Hospitalization	Pain Scores During Hospitalization	Length of Hospitalization (Days)
1	74	F	3E	0	0	0.3
2	88	M	3E	0	0	0.3
3	74	M	3E	0	0	0.3

Discussion

The main findings of the current case series demonstrate that PEC 1/2 blocks in patients slated for TV-PMI are associated with the absence of postoperative opioid requirements and low pain scores, It is important to note that there were no complications such as pneumothorax, chest wall hematoma, or local anesthetic toxicity. Our findings on efficacy and safety of PEC 1/2 blocks for TV-PMI are consistent with other studies of fascial plane blocks. with the additional benefit of same day discharge from the hospital. These finding are uniquely important during the COVID-19 pandemic and make PEC1/2 blocks an important perioperative addition to an opioid-sparing regimen. Further research is warranted.

Acknowledgements & References

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