ABSTRACT

Pilot Study of Pecs I and II Block for Intracardiac Device Placement

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INTRODUCTION: Pectoralis (Pecs) plane blocks have been demonstrated to be an effective analgesic technique for chest procedures. Pecs I blocks the lateral and medial pectoral nerves, appropriate for surgery limited to the pectoral muscles. Pecs II blocks the lateral branch of the T2-4 spinal nerves, intercostobrachial, and the long thoracic nerve and is appropriate for more extensive pectoralis major dissection and axilla blockades. Evaluations have been done in the adult patients and the only randomized controlled trial is in breast surgeries. Because pacemaker placement and generator exchanges are common in both the adult and pediatric population, we sought to evaluate the utility of Pecs I and II blocks in our pediatric heart center. Our hypothesis was that utilizing the Pecs I and II regional technique would decrease narcotic requirements and reduce hospital stay of need for intracardiac device placements / exchanges.

METHODS: Retrospective study of all subjects receiving elective intracardiac device placement from February 2015 to September 2016 at Texas Children’s Hospital. Primary outcomes: postoperative opioid requirements. Secondary outcomes: VAS pain scores, hospital length of stay, nausea / vomiting.

MAIN RESULTS: During the study period, there were a total of 32 subjects: 24 who received no regional technique (control) and 8 who received Pecs I and II blocks (study). Median intravenous equivalent for control vs. study patients during hospitalization was 0.26 [0.21 – 0.32] and 0.20 [0.13 – 0.26] mg/kg, respectively (p = 0.04). Median total morphine equivalent for control vs. study patients during hospitalization was 0.80 [0.73 – 1.2] and 0.75 [0.38 – 0.77] mg/kg, respectively (p = 0.03). Median hospital length of stay for control vs. study patients across the entire study period was 24 [18 – 27] and 9.3 [6.9 – 16] hours, respectively (p = 0.05). The incidence of nausea was 12.5% in the control group and 0% in the study group. Average of available pain scores in the post-operative period were 4.3 [4 – 4.5] in the control group and 0 [0 – 3] in the study group. There was no change in blood pressure and at block placement, 5 minutes, 10 minutes, and 15 minutes (p = 0.95).

DISCUSSION: Pecs I and II blocks are an alternative to paravertebral nerve blocks and thoracic epidurals. In this small population, Pecs I and II appears to be a safe and viable option for intracardiac device placement and associated with reduction in opioid utilization. Pain assessment was too sparse to assess pericardial pain in our institution. Further adequately powered, randomized controlled trials should be conducted to definitively evaluate the benefits and risks of Pecs I and II blocks for intracardiac device placement in patients with congenital heart disease.

BACKGROUND

Pectoralis (Pecs) type I block first described in 2011:1
• Superficial block targeting lateral and medial pectoral nerves at intercostal plane between pectoral major and serratus muscle (SM), axillary artery (AA), axillary vein (AV).
• Alternative to paravertebral blocks and thoracic epidurals for procedures of the chest wall and axilla
• Have been described for use in breast surgery, tumorectomies, wide local excisions, and axillary dissections
• Local anesthetic deposited between pectoralis minor and serratus muscle. Pectoralis minor (Pm), lateral pectoral nerve (lpn) is adjacent to pectoral branch of thoracoacromial artery (TAA), serratus anterior branch of subscapular artery (SAA). Pectoral branch of TAA is the blood supply to the lateral thoracic muscle.

Pectoral (Pecs) type II block described in 2012:2
• Local anesthetic deposited between pectoral minor and serratus muscle to additionally block intercostobrachial, intercostals III-V, and long thoracic nerve (figure 2)
• Tumorectomies, wide excisions, and axillary dissection

With injection of 0.25% levobupivacaine 10 mL for Pecs I and 20 mL for Pecs II:3
• Onset time of analgesia: 3 minutes
• Implantable Cardioverter Defibrillators (ICDs) are inserted for life threatening dysrhythmias:
• Local anesthetic infiltration and skin incision in right or left subxiphoid area
• Creation of subcutaneous pocket
• Placement and evaluation of leads
• Insertion of generator
• Recovery:
• Post-anesthesia recovery unit (PACU) until discharged by anesthesiologist
• Overnight observation on hospital / inpatient floor

METHODS

Study Design: Patients receiving elective intracardiac device placement at TCH (2/2015 – 9/2016) (n = 32)

RESULTS

Blood Pressure Response:

In the regional group, there was no significant change in blood pressure as compared to control group (p = 0.005, figure 8).

Opioid Utilization and Pain Scores:

Pecs I and II blocks:
• Alternative to paravertebral blocks and thoracic epidurals for procedures of the chest wall and axilla
• Reduced hospital length of stay 61%
• Have been described for use in breast surgery, tumorectomies, wide local excisions, and axillary dissections
• Utilization of Pecs I and II blocks in patients undergoing intracardiac device placement procedures in the cardiac catherization lab was associated with:
  • Reduced opioid utilization by 16% for entire hospital stay
  • Reduced hospital length of stay 61%
  • Reduced average postoperative pain scores from 4.3 to 0.9 (limited data)

Pecs I and II blocks appear safe from initial retrospective review
• At 30 day follow-up, resulted in no adverse events in procedure in our cohort

Future studies examining the outcomes of Pecs I and II blocks in patients undergoing intracardiac device placements are needed. Results may suggest an analgesic technique which may lead to reduced pain, opioid utilization, and hospital savings.

REFERENCES

4. SSRAUSA: Ultrasound Guided PECS Block at https://www.youtube.com/watch?v=daPBt0AVmsY.