

## Abstract

**Introduction:** Cryo Nerve Block Therapy (cryoNB) uses cryotherapy to relieve pain for patients undergoing surgical procedures within the chest wall<sup>7</sup>. The cryoNB involves freezing or ablating nerves underneath each rib at a temperature of at least  $-20^{\circ}\text{C}$  to disable the nerve without damaging the outer protective layer<sup>7</sup>. After blocking these nerves, patients are expected to experience numbness postoperatively for up to two months<sup>7</sup>. These nerves are a main source of pain after surgery, and by numbing them, the pain should be expected to be substantially reduced<sup>7</sup>. As a result of pain reduction, cryoNB has been shown to reduce opioid consumption.

**Methods:** This was a single-center retrospective chart review study of patients undergoing thoracic surgeries such as lobectomies, segmentectomies, and wedge resections. Two groups comprised this study: the experimental, defined as patients who underwent a thoracic surgery that received cryo nerve block, and the control group, defined as patients who underwent a thoracic surgery and did not receive cryo nerve block therapy. The study included patients between the ages of 18 years to 89 years who underwent thoracic surgeries at Christian Hospital. The surgeries were performed from December 2021 through November 2022 for the control group and December 2022 through November 2023 for the experimental. Exclusion criteria included patients less than 18 years of age, pregnant/breastfeeding, history of opioid or alcohol use disorder, severe allergy to opioid analgesics, on scheduled or long-acting opioid before admission, and those who are contraindicated to cryo-analgesia (i.e. diabetes mellitus, cold urticaria, cryoglobulinemia, Raynaud's disease). Blinding and randomization did not occur due to the retrospective nature. The primary outcome was the average total morphine milligram equivalents (MME) within 4 days post-operation. In addition, the average MME per day during the 4 days post-procedure was evaluated. The secondary outcomes include time to first dose of opioid, average pain scores on day 1 and 3, and hospital length of stay.

**Results:** A total of 82 patients were included; 50 were assigned to the cryoNB group and 32 without the cryoNB group. There was a significant difference in the primary outcome of total opioids during the 4 days post-operation between the cryo group ( $M = 118$ ,  $SD = 86.5$ ) and non-cryo group ( $M = 247.6$ ,  $SD = 140.5$ );  $t(80) = 5.2$ ,  $p = <0.001$ , 95% CI [79.8, 179.4]. The secondary outcomes were all not statistically significant. Average pain scores on days 1 and 3 were similar between groups.

**Conclusion:** The results of this study demonstrated that cryoNB reduced opioid consumption in patients who underwent thoracic surgeries while also maintaining pain scores. CryoNB is a promising adjuvant for patients undergoing lobectomies, segmentectomies, or wedge resections in reducing opioid usage in the inpatient setting.