SOUTHERN ILLINOIS UNIVERSITY EDWARDSVILLE
SCHOOL OF PHARMACY

Post-operative Opioid Analgesic Use in Thoracic Surgery Patients who underwent Cryo Nerve Block vs Patients who received PCA or Epidural

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OBJECTIVES

- To investigate how cryo nerve block affects postoperative pain management after thoracic surgeries

METHODS

- **Study Design**
  - Single-centered, retrospective, observational study
- **Inclusion**
  - Patient undergoing thoracic surgery including robotic wedge resections and lobectomies between dates December 2021 to November 2023
  - Ages ≥ 18 years and < 89 years of age
- **Exclusion**
  - Pregnancy/breastfeeding
  - Patients on scheduled and/or long-acting opioids prior to admission
  - History of opioid or alcohol use disorder
  - Severe allergy to opioid analgesics
  - Patients who are contraindicated to cryoanalgesia
- **Primary Outcome**
  - Total MME given within 4 days post-operatively
- **Secondary Outcomes**
  - Time to first dose opioid
  - Hospital length of stay
  - Average pain scores on days 1 and 3

PREVIOUS TRIALS

- Prospective, randomized FROST trial conducted cryo nerve block in conjunction with standard of care (SOC) pain management to assess whether it provided superior FEV1 results, recovery, and analgesic efficacy in minimally invasive cardiac surgery. [4]
- Eighty-four patients were randomized to CryoNB (n = 65) and SOC (n=19).[4]
- Higher opioid consumption was noted in the SOC group (13%) compared to CryoNB group.[4]
- Future larger prospective randomized trials are warranted to determine whether intercostal CryoNB has an opioid-sparing effect in patients undergoing minimally invasive cardiac surgery.[4]

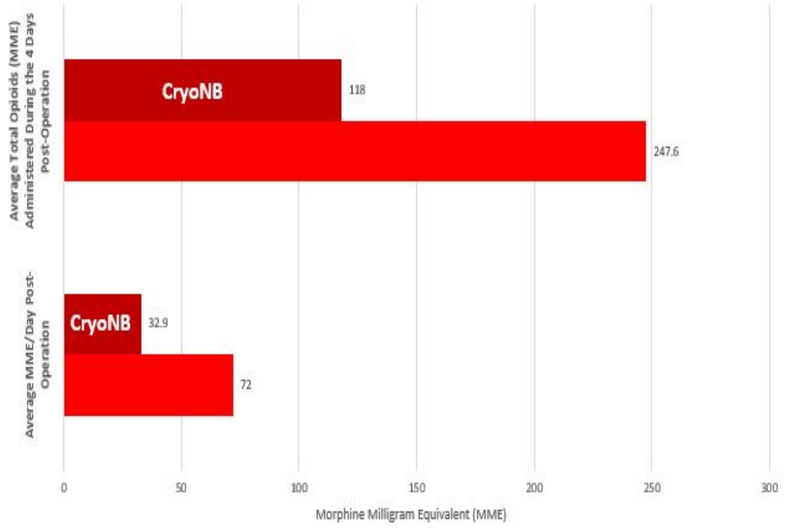
BACKGROUND

For many thoracic surgeries, postoperative pain is exacerbated in procedures involving the lungs and thoracic cavity due to the motion of breathing.[2] Inadequate pain control can result in serious consequences such as mucus retention, atelectasis, pneumonia, nosocomial infections, and respiratory failure.[2] Opioid analgesics have been a mainstay in therapy for postoperative pain relief; however, the side effects of respiratory depression, sedation, constipation, and altered mental status may outweigh the benefits.[3] Cryo Nerve Block Therapy (cryoNB) uses cryotherapy to provide pain relief for patients undergoing surgical procedures within the chest wall and potentially reduces opioid consumption.[7] The cryoNB involves freezing or ablating nerves in the chest underneath each rib at a temperature of at least -20°C to disable the nerve without damaging the outer protective layer.[7] These nerves are a main source of pain after surgery and by numbing them, pain should be expected to be substantially reduced.[7] Over a period of several months, the nerve will gradually regrow back.[7] As the nerve regrows, the numbness resides and the nerve resumes its normal function.[7]

RESULTS

	Total Number of Patients	Mean Patient Age	PCA	Epidural	Mean Total MME 4 days Post-Op	Mean Post-Op MME per day	Mean Pain Score Day 1	Mean Pain Score Day 3	Mean Length of Hospital Stay
CryoNB Group	50	68	4	0	118.0	32.9	5.8	4.0	3.6
Control Group	32	67	4	20	247.6	72	5.0	3.1	3.4

- There was a significant difference in the primary outcome of average total opioids (MME) administered during the 4 days post-operation between the cryo group (M = 118, SD = 86.5) and non-cryo group (M = 248, SD = 140.5); t(80) = 5.2, p = <0.001, 95% CI [79.8, 179.4].
- There was a significant difference in average MME per day during the four day postoperative period between the cryo group (M = 33, SD =22.6) and non-cryoNB group (M=72 SD=34.1); t(80) = 6.3, p = <0.001, 95% CI [26.7, 51.6].
- Of the secondary outcomes, none showed a statistically significant difference between the cryoNB and non-cryoNB groups.



EVALUATION/DISCUSSION

- We accepted our hypothesis that cryoNB patients would take fewer oral opioid analgesics.
- There was no statistically significant difference in pain scores between the two groups on day 1 and 3. It is still of benefit to use cryoNB because it can maintain pain scores at the same level post operation while also reducing opioid consumption.
- Randomization did not occur
- Nurse's incomplete charting of pain scores
- Choice of opioid analgesics postoperative was up to the physician's discretion.
- Fairly small sample size

CONCLUSION

- The results of our study can impact patient care by supporting the use of cryoNB in thoracic surgeries to reduce opioid consumption. Since cryoNB reduces opioid consumption, it would be the most opioid steward option to implement as standard practice. Consequently, this lessens the impact of the ever-growing opioid epidemic within our community. The following steps include educating thoracic surgeons in other hospitals about cryoNB and spreading the results that we have found. In addition, further studies need to be conducted with larger populations.

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