

5-14-2019

Comparison of Post-Operative Pain Control Modalities for Pectus Excavatum Repair

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Recommended Citation

Dekonenko, Charlene, "Comparison of Post-Operative Pain Control Modalities for Pectus Excavatum Repair" (2019). *Presentations*. 20.

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Comparison of Post-Operative Pain Control Modalities for Pectus Excavatum Repair

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GME Research Days

May 14, 2019



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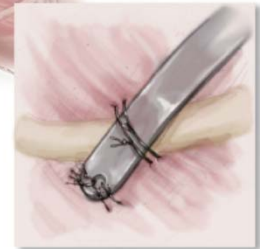
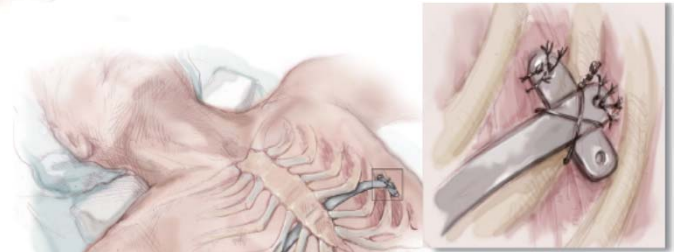
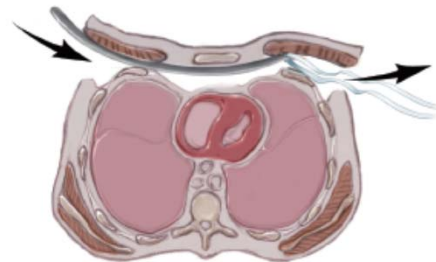
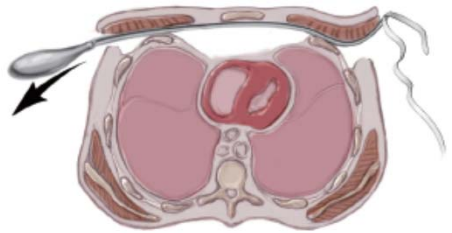
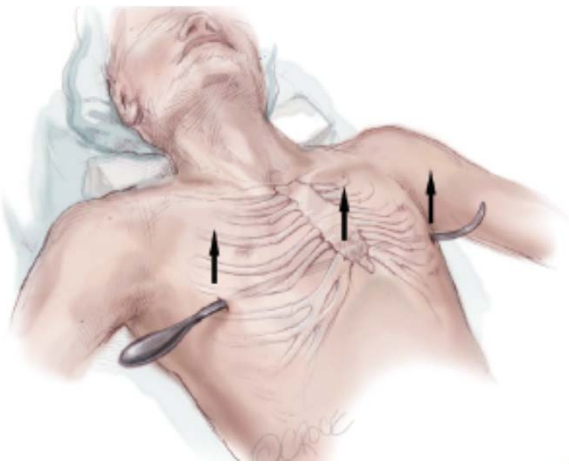
Disclosures

- No Disclosures
- Not previously presented
- No grant support

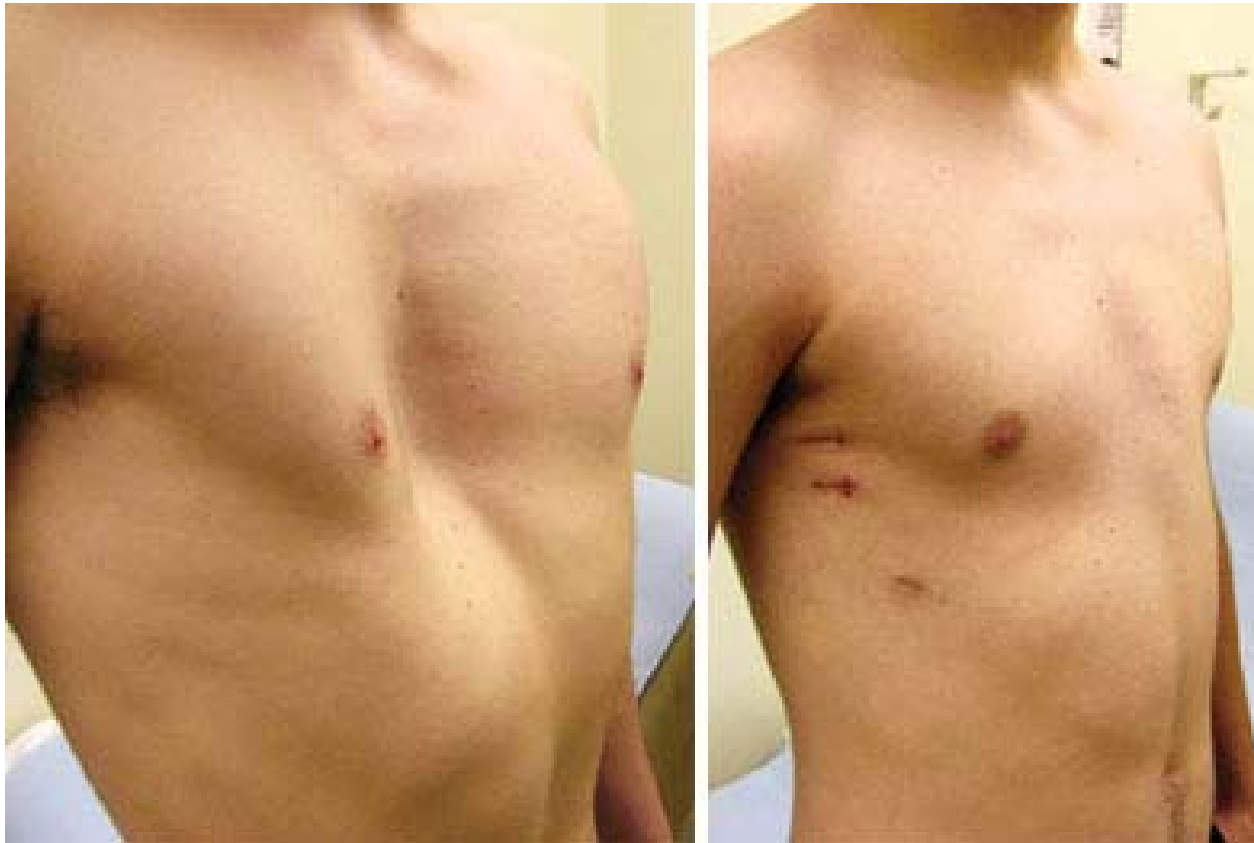
Background

- Pectus Excavatum- posterior displacement of the sternum
- Incidence: 1 in 1000 children
- Treatment: Operative correction with a substernal bar

Background



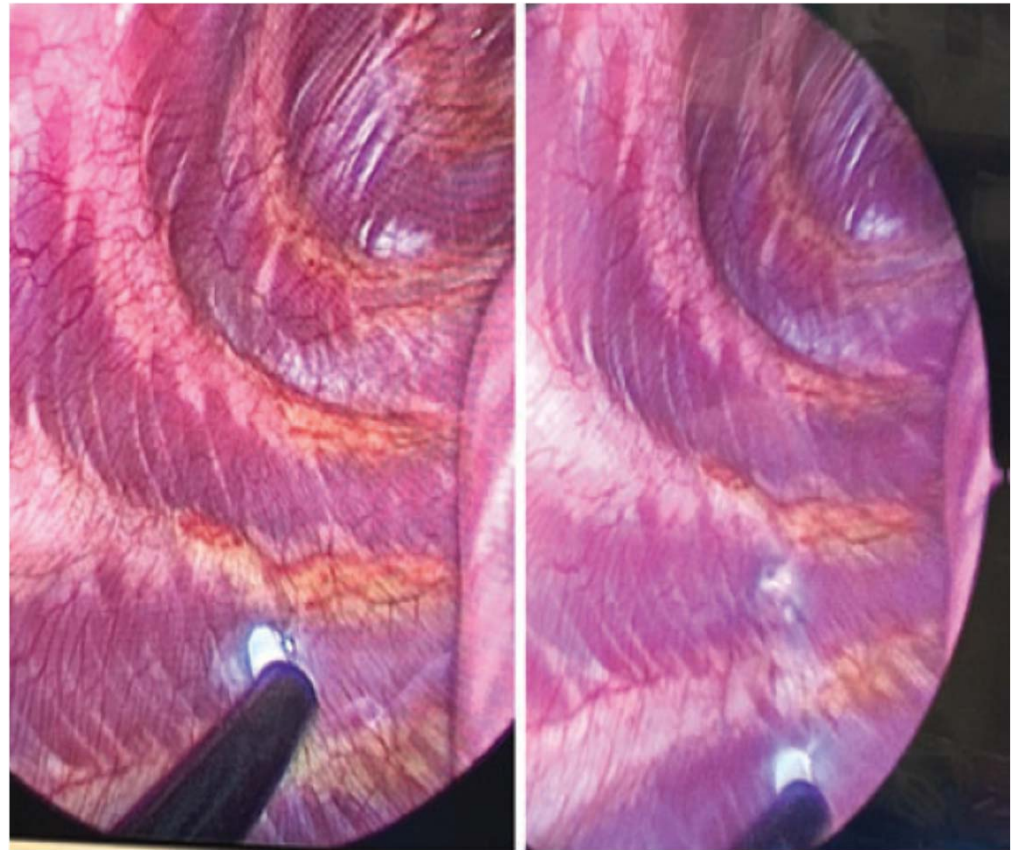
Background



Background

- Pain control is the most significant issue of post-operative care
- Methods: thoracic epidural, intercostal nerve block, continuous paravertebral nerve block, patient-controlled analgesia (PCA)
- Mainstay of pain control remains opioids

Background



Background

- Intra-operative Cryoablation: Localized freezing of intercostal nerves
- Wallerian degeneration of axons with fibrous neuronal components left intact allowing regeneration
- Preliminary small studies show decreased LOS and opioid use

Aim

- To compare patient outcomes following pectus excavatum repair using cryoablation, epidural, or PCA for post-operative pain control.
 - Primary outcomes: length of stay (LOS)
 - Secondary outcomes: operative time, pain scores, time to only oral analgesics

Hypothesis

Patients undergoing minimally invasive pectus excavatum repair using intra-operative cryoablation will have improved outcomes compared those using an epidural or PCA.

Methods

- Prospective observational study using cryoablation compared to results of a previous randomized trial comparing epidural vs PCA
- Inclusion Criteria
 - minimally invasive pectus repair w/bar placement, using cryoablation
- Exclusion Criteria
 - open repair or re-do operation

Methods

- Primary & secondary outcomes obtained from chart review
- Statistical analyses
 - STATA v15
 - t-tests
 - Fisher's exact tests
 - Kruskal-Wallis for group comparisons

Results

Demographics

| | Epidural (n=32) | PCA (n=33) | Cryoablation (n=35) | p-value |
|----------------------|----------------------------|-----------------------|--------------------------------|----------------|
| Male (%) | 91 | 94 | 82 | 0.20 |
| Age (y) | 15 [14,16] | 14 [13,16] | 16 [14,17] | 0.02* |
| Height (m) | 1.8 [1.7,1.8] | 1.7 [1.7,1.8] | 1.7 [1.7,1.8] | 0.42 |
| Weight (kg) | 57 [52,62] | 56 [48,58] | 57 [50,64] | 0.23 |
| Haller Index | 3.4 [3.3,4.2] | 3.5 [3.3,4.7] | 4.6 [3.6] | <0.01* |
| Correction Index (%) | 30 [27,30] | 30 [30,40] | 35 [30,47] | <0.01* |

Values reported in frequencies and medians with [IQR]

Results

Hospital Course

| | Epidural (n=32) | PCA (n=33) | Cryoablation (n=35) | p- value |
|--------------------------------|----------------------------|-----------------------|--------------------------------|---------------------|
| Time to Incision (min) | 52 [44,59] | 30 [25,34] | 27 [24,30] | <0.01* |
| Operative time (min) | 58 [51,79] | 57 [47,68] | 101 [78,124] | <0.01* |
| Total OR time (min) | 124 [106,144] | 103 [87,115] | 142 [115,163] | <0.01* |
| Time to only PO pain meds (hr) | 72 [50,83] | 67 [50,70] | 21 [12,28] | <0.01* |
| LOS (d) | 4.3 [4.1,5.1] | 4.2 [3.4,5.2] | 1 [1,1.3] | <0.01* |

Values reported in frequencies and medians with [IQR]

Results

Maximum Pain Scores

| | Day 0 | Day 1 | Day 2 | Day 3 |
|----------|----------|---------|-----------|-----------|
| Epidural | 7 [4,7] | 6 [4,7] | 6 [4,7] | 6 [6,8] |
| PCA | 8 [6,10] | 5 [4,7] | 5 [4,8] | 5 [4,7] |
| Cryo | 6 [5,8] | 5 [4,7] | 6.5 [5,7] | 4.5 [2,7] |
| p-value | 0.01* | 0.12 | 0.80 | 0.16 |

Pain scale 1-10

Conclusions

Intercostal cryoablation during minimally invasive pectus excavatum repair significantly reduces LOS and time to oral analgesics alone.

Future Directions

- Prospective observational study for long-term outcomes
 - Follow-up at 2 weeks, 3 months, after bar removal (2-3 years)
- Limitations
 - Small sample size, data limited to documentation in chart

Acknowledgements

- Mentors: Tolulope A. Oyetunji MD MPH, David Juang MD, Pablo Aguayo MD, Jason D. Fraser MD, Charles L. Snyder MD, George W. Holcomb III MD MBA, Daniel L. Millspaugh MD
- Research Coordinators: Yara Duran RN, Pete Muenks

Thank you.

Questions?