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

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

**Charlene Dekonenko, MD**

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**GME Research Days**

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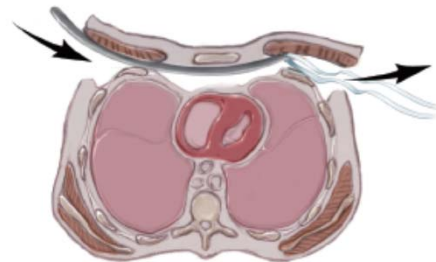
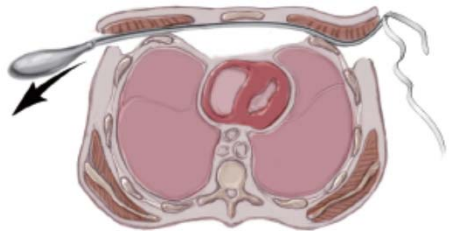
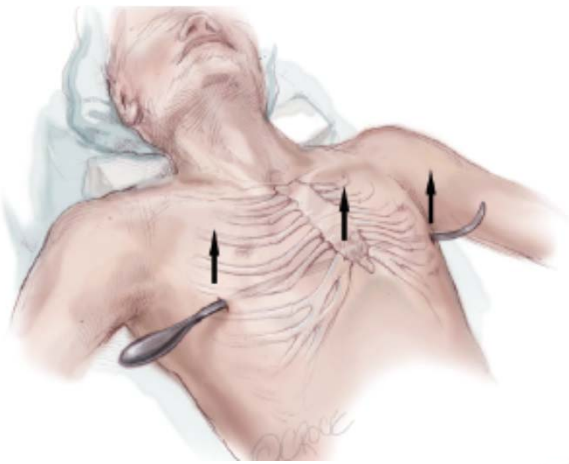
# Disclosures

- No Disclosures
- Not previously presented
- No grant support

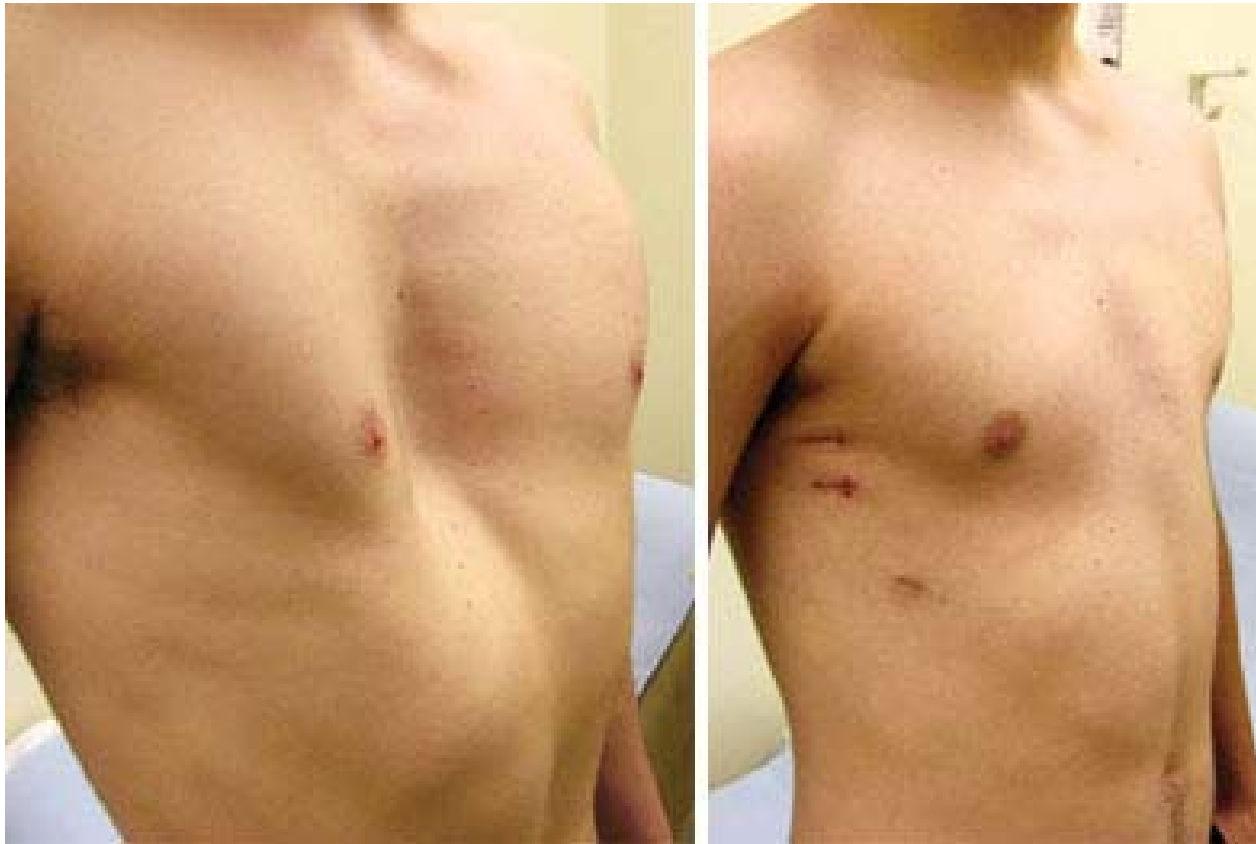
# Background

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

# Background



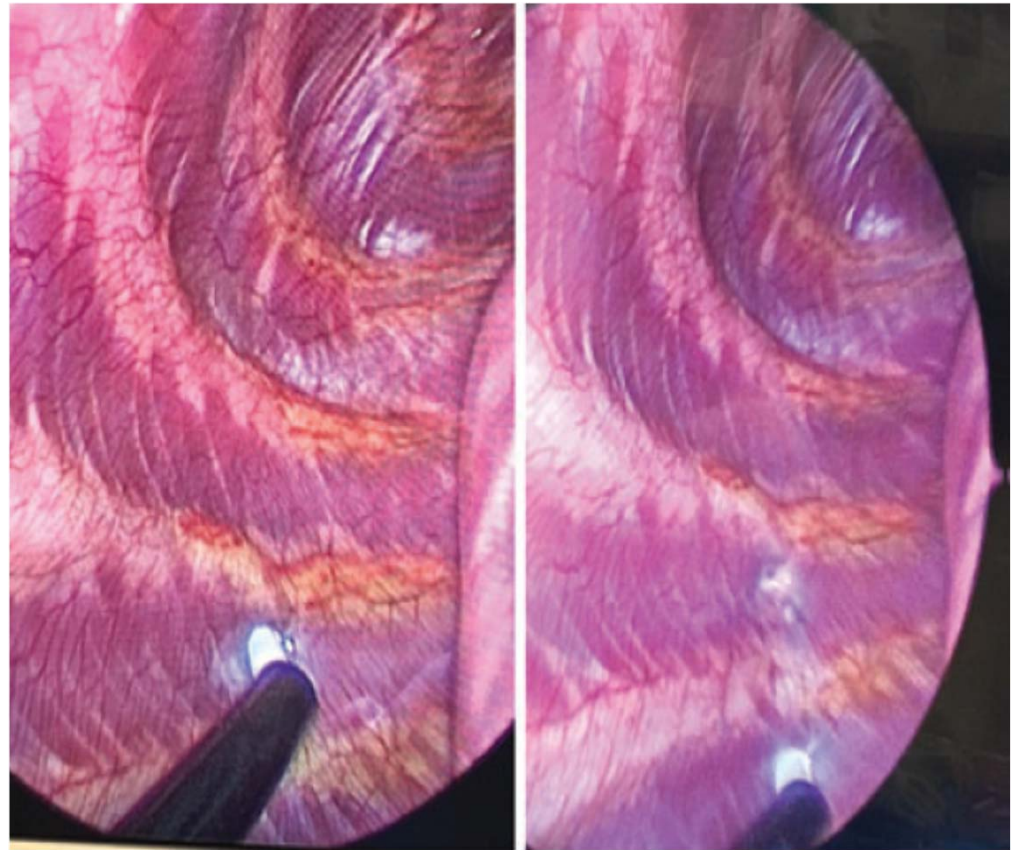
# Background



# 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

	<b>Epidural (n=32)</b>	<b>PCA (n=33)</b>	<b>Cryoablation (n=35)</b>	<b>p-value</b>
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

	<b>Epidural (n=32)</b>	<b>PCA (n=33)</b>	<b>Cryoablation (n=35)</b>	<b>p- value</b>
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

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Thank you.

Questions?