

# **Reducing the Pain: Comparison of Multiple Modalities of Analgesia after Pectus Excavatum Repair**

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## **Background**

Pectus Excavatum is a deformity of the chest wall characterized by sternal depression that can lead to cardiac compression and requires surgery in severe cases. The Nuss procedure allows complete correction, however post operative pain can be prohibitive, and solutions for that pain are critical. The purpose of this study is to better understand the outcomes from pain control with different regimens in our experience.

## **Methods**

All patients at UF Health Shands Hospital who underwent Pectus Excavatum repair between 1/1/2011 and 12/31/2019 were included. Data regarding patient history of disease, intraoperative course, and post-operative course and outcomes were collected from the charts creating a database which was analyzed as a whole as well as after creation of cohorts based on type of analgesia used (Epidural, sub-pleural Elastomeric pump, and thoracic intercostal nerve cryoablation). Hospital length of stay and total narcotic use measured as oral morphine equivalents were measured as a proxy for pain control. The three groups were compared to each other using appropriate statistical tests (ANOVA, students t test, Mann Whitney U test), and a p value of less than 0.05 was considered significant.

## **Results**

A total of 58 cases had surgical repair during the study period. The overall mean age was 17.9, with 77.6% male and 86.2% Caucasian. The average Haller index (depth of deformity) overall was 4.7 and the mean duration of symptoms 14.1 years. Analgesia was achieved in 29 by a thoracic epidural, 18 underwent cryoablation and 11 had Elastomeric Pumps placed. There were no differences in age, gender, severity of the deformity, insurance status, or number of bars used for repair between the three groups. The operation was significantly longer for either the cryoablation or pump groups compared to epidural ( $p=0.001$ ). Epidural cases had a 4.4 day length of stay (Median 4), while cryoablation had 3.7 days (Median 3) and pump 3.9 days (Median 4) ( $p=0.005$  comparing epidural and cryoablation median LOS). Both the epidural and pump patients had an average 2.2 days spent in the ICU, compared to 0.4 days for cryoablation ( $p<0.0002$ ). When comparing the total narcotic use during the hospital stay, we noted 454.3 mg, 725.4 mg, and 246.2 mg morphine equivalents for epidural, pump, and cryoablation cases respectively, which were significantly different ( $p<0.002$ ).

## **Conclusions**

These data suggest that cryoablation may be the most effective mechanism for controlling pain after a Nuss procedure when measured by the hospital length of stay as well as morphine equivalent narcotic use. This likely translates to a cost saving for cryoablation as well, despite the longer operative time. Further multicenter trials would be beneficial to understand the role of these analgesic techniques.