

# Thoracostomy Tube Removal Procedural Pain Practice Guideline Implementation

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# Objectives

Nature and scope of the project  
Literature review and analysis  
Project methods  
Results  
Conclusions

# Nature and Scope of the Project

## Background

- The International Association for the Study of Pain (IASP) defines pain as an:  
“Unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage... The inability to communicate verbally does not negate the possibility that an individual is experiencing pain and is in need of appropriate pain-relieving treatment. Pain is always subjective” (IASP, 2011, p.3).
- Providing consistent appropriate and adequate analgesia for optimal comfort and pain management for our patients is an ethical obligation for all health care providers (Carson, Barton, Morrison & Tribble, 1994).

# Scope of the Project

- Approximately 550 congenital heart repair/palliation surgeries are performed annually in our stand alone pediatric hospital
- Thoracostomy tubes are placed in almost all patients undergoing congenital heart repair/palliation



# Scope of the Project

## Thoracostomy tube removal is painful



Images retrieved from: [http://astoryoftwomoms.blogspot.com/2011\\_03\\_01\\_archive.html](http://astoryoftwomoms.blogspot.com/2011_03_01_archive.html) & <http://hlhsdiary.com/wp/?p=109>

# Objectives and Aims

## Purpose

- To develop and implement evidenced-based changes to clinical practice for the provision of optimal pharmacologic and non-pharmacologic analgesia during removal of thoracostomy tubes in post-operative congenital heart surgery patients on one in-patient acute care unit.



# Problem

- No organizational clinical practice guideline (CPG) exists for specifically for the management of non-sedated procedural pain



Image retrieved from <http://www.entnet.org/content/clinical-practice-guideline-rhinoplasty>

# Project Aims

1. Develop a CPG and an educational intervention for the appropriate pharmacologic and non-pharmacologic management of pain during thoracostomy tube removal on the acute care floor.
2. Increase nursing staff and provider knowledge of developmentally appropriate pharmacological and non-pharmacological interventions for optimal analgesia and comfort during thoracostomy tube removal.
3. Increase the documentation and the use of child life therapy and the Comfort Care Team (CCT) to provide developmentally appropriate interventions and distraction during this procedure for all patients ages 1 week to 18 years of age; and
4. Establish nursing and provider satisfaction with the new CPG

# Synthesis and Analysis of Related Literature

- Children's National and The Catholic University of America's on-line libraries including:
  - OVID
  - Medline
  - Cochrane database
  - REFworks
  - Google Scholar
- Terms queried included:
  - Pain, procedural pain, distraction, thoracostomy tube removal, clinical practice guidelines & nursing satisfaction
- Recommendations from both the International Association for the Study of Pain and the American Society for Pain Management Nursing as well as organizational policies and procedures were also reviewed.

# Synthesis and Analysis of Related Literature

- Puntillo et al., (2014) completed a prospective, cross sectional, multicenter, multinational study of painful procedures in intensive care units to evaluate pain intensity in patients  $\geq 18$  years associated with 12 procedures routinely performed in ICUs
- **Chest tube removal was considered one of the three most painful procedures performed.**

# Synthesis and Analysis of Related Literature

- “Although topical analgesics and non-pharmacologic interventions have been shown to safely decrease procedure-related pain in children, they remain underutilized” (Cregin, Rappaport, Montagnino, Sabogal, Moreau & Abularr, 2008, p.724).
- Research suggests that infant and pediatric patients receiving inadequate analgesia for an initial painful procedure may have a diminished effect of adequate analgesia in subsequent procedures (Weisman, Bernstein & Schechter, 1998; Taddio & Katz, 1994).
- There is also evidence that inadequate pain relief may cause a higher pain response in subsequent procedures (Cregin, Rappaport, Montagnino, Sabogal, Moreau & Abularr, 2008; Taddio & Katz, 1997).

# Synthesis and Analysis of Related Literature

- Congenital heart patients may require multiple surgeries
- Providing optimal analgesia with the first surgery may help provide better pain management for subsequent procedures

## Congenital Heart Disease Facts

It's the most common birth defect, so we took a closer look at some facts on congenital heart disease.

**15 min.**

Every 15 minutes, a baby is born with congenital heart disease.

**40,000**  
Babies born each year with congenital heart disease.

**1 million**  
Estimated number of adults living with congenital heart disease in the United States.



**#1**

Congenital heart disease is the most common birth defect

**25,000**  
Number of visits to Children's National Heart Institute each year.

**45%**  
of babies diagnosed with a congenital heart defect before birth at Children's National.

Learn more about **Children's National Heart Institute** and our efforts to implement pulse ox screening throughout the country.

**20%**  
of states that have passed legislation for pulse ox screening, which can detect CHD in newborns.

[www.ChildrensNational.org/Heart](http://www.ChildrensNational.org/Heart)  
[www.ChildrensNational.org/PulseOx](http://www.ChildrensNational.org/PulseOx)

# Synthesis and Analysis of Related Literature

Multiple factors are attributed to suboptimal pain management.

These include:

- Lack of understanding of preemptive pain management interventions
- Mistaken beliefs and patient expectations & inconsistent pain practices
- Lack of patient, family and clinician communication

Other pertinent factors include:

- Suboptimal use of “as needed” analgesics
- Insufficient orders for medications pre procedure
- Inadequate time to give analgesic medications prior to the procedure
- Underuse of topical medications
- Lack of structured pharmacological pain regimes or **guidelines** can lead to differences and inconsistencies in pain management practices (Dunwoody, Krensichek, Pasero, Rathmell & Polomano, 2008).

# Synthesis and Analysis of Related Literature

The literature supports the “3-P” approach, combining **p**harmacological, **p**sychological and **p**hysical interventions be utilized for optimal pain management (Petrovello, 2012)

## Unit-based thoracostomy tube removal is a planned procedure

- **Analgesic medications should be timed to be given so that their peak effect occurs at the time of the painful procedure.**
- Medication/ Peak Time of Effect
  - Morphine /20 minutes
  - Oxycodone/ 60 minutes
  - Hydromorphone/20 minutes
- Non-pharmacological interventions such as distraction are effective in reducing procedure related pain in pediatric hospitalized patients.

# Synthesis and Analysis of Related Literature

- Providing clear science based education and information in the form of organizational procedures and policies, helps to ensure staff has the best information, skills and equipment for safe practice
- “Evidence-based guidelines are needed to support a universal understanding of the effects of poorly managed procedural comfort and the best practices for procedural comfort management” (Czarnecki et al., 2011, p.98).
- Implementation of an acute pain management guideline can improve the quality of care.

(Hughes, 2008). In Patient Care and Safety. An Evidenced-Based Handbook for Nurses



# Synthesis and Analysis of Related Literature

## Summary

- Thoracostomy tube removal is painful
- Barriers remain to optimal pain management
- Published guidelines are available
- Providing appropriately timed pharmacologic and non-pharmacologic therapies such as distraction for infants and pediatric patients are essential in optimizing pain relief with procedures.

# Project Methods

## Project Design

The design was non-experimental

1. Utilized chart reviews for assessment of documentation compliance in accordance with the requirements of the pilot CPG  
Data was collected from LIP procedure notes pre and post CPG development and implementation.
2. Pre and post CPG development and implementation assessment of nurse and LIP knowledge of pharmacological & non-pharmacological analgesia  
CVS NPs and unit-based nursing staff completed a knowledge test pre and post CPG implementation education (power point lecture)
3. Nursing satisfaction survey to assess perceptions of the new guideline  
CVS NPs and unit-based nursing staff completed a nursing satisfaction survey post implementation of the CPG.

# Project Methods

## Outcomes

1. Evidence of compliance with new documentation practices concerning optimal pharmacologic and non-pharmacologic analgesia during thoracostomy tube removal
2. An increase in nursing staff and provider knowledge of developmentally appropriate pharmacologic and non-pharmacologic interventions for optimal analgesia and comfort during thoracostomy removal
3. Evidence of nursing and provider satisfaction with the implementation of the CPG.

# Project Methods

## Setting

- Main campus of a large metropolitan pediatric health care system.
- One 26 bed acute care in-patient unit for cardiac and renal patients ranging in ages from newborn to adult.

# Project Methods

## Methods / Instruments

- Determination of Base Frequency
  - Chart audit of LIP thoracostomy tube removal procedure notes
- Pre and Post CPG Implementation Procedure Note Information
  - Pre and Post Implementation Procedure Note Data Collection Instrument
- Pre and Post Knowledge Testing
  - Pre and Post Knowledge Test
- Post CPG Implementation Nurse Satisfaction Survey
  - Satisfaction Survey for CVS NPs and Nursing Staff

# Results

Audit of LIP procedure notes to determine the average number of annual thoracostomy tube removal procedures performed was completed using the Endeca data base.

- Patient ages ranged from 2 weeks to 24 years of age (1-288 months).
- Mean age - 5.1 years
- Median age - is 2 years
- Mode- 5 months.
- 46 % of the patients were male
- 54 % were female.

# Results

## Compliance Documentation

- Pre pilot CPG implementation completed chart audit of 10 CT removal procedural notes to determine baseline documentation
- Post CPG implementation 11 chart audits completed for evaluation of documentation compliance with the new CPG .
- 1 point given for each data area documented for a total of 9 points.

# Results

## Demographics

<b>Population</b>	<b>Pre implementation n = 10</b>	<b>Post Implementation n =11</b>
<b>Male</b>	<b>4</b>	<b>7</b>
<b>Female</b>	<b>6</b>	<b>4</b>
<b>Age Range</b>	<b>8 weeks to 15 years</b>	<b>3 weeks to 17 years</b>

# Results– Compliance

Documentation	Points Pre n =10	Points Post n =11
Time of narcotic pre- procedure administration	0/10	10/11
Time of procedure	10/ 10	11/11
Pain scale used	0/10	11/11
Appropriate pain scale used for patient's developmental age	0/10	11/11
Pain scale level pre procedure	0/10	11/11
Pain scale level post procedure	0/10	11/11
Use of non-pharmacological/ distraction techniques	0/10	6/11
Type of distraction documented	0/10	6/11
Appropriate non- pharmacological measures used for patients developmental age	0/10	6/11

# Results- Knowledge Test

The total number of possible correct points for the pre and post test is 15.

- Average number of correct answers in the pre-test is 9.28 and Post-test is 14.07
- Significance with a p value of  $< .0001$

**There was an overall increase in total scores and nursing knowledge post CPG education and implementation.**

- Individually, 6 items or 54% of questions on the knowledge pre and post tests reflected increasing knowledge post CPG education.

# Results- Nursing Satisfaction Survey

Evidence for satisfaction with the new CPG on the nursing survey post-intervention was a mean score for the 12 Likert Scale items between strongly agree and strongly disagrees.

- 2 points given for each strongly agrees answer
- 1 point given for each agrees answer
- 0 points given for each neither answer.
- No one answered disagrees or strongly disagrees for any question.

**A total mean score of 1.82 was calculated showing an overall nursing satisfaction with the CPG.**

# Conclusions

## Limitations

- Inability to revise LIP procedure note
- Competing educational projects
- Abundance of daily emails

# Conclusions

## Recommendations

Future opportunities exist for this evidenced- based project

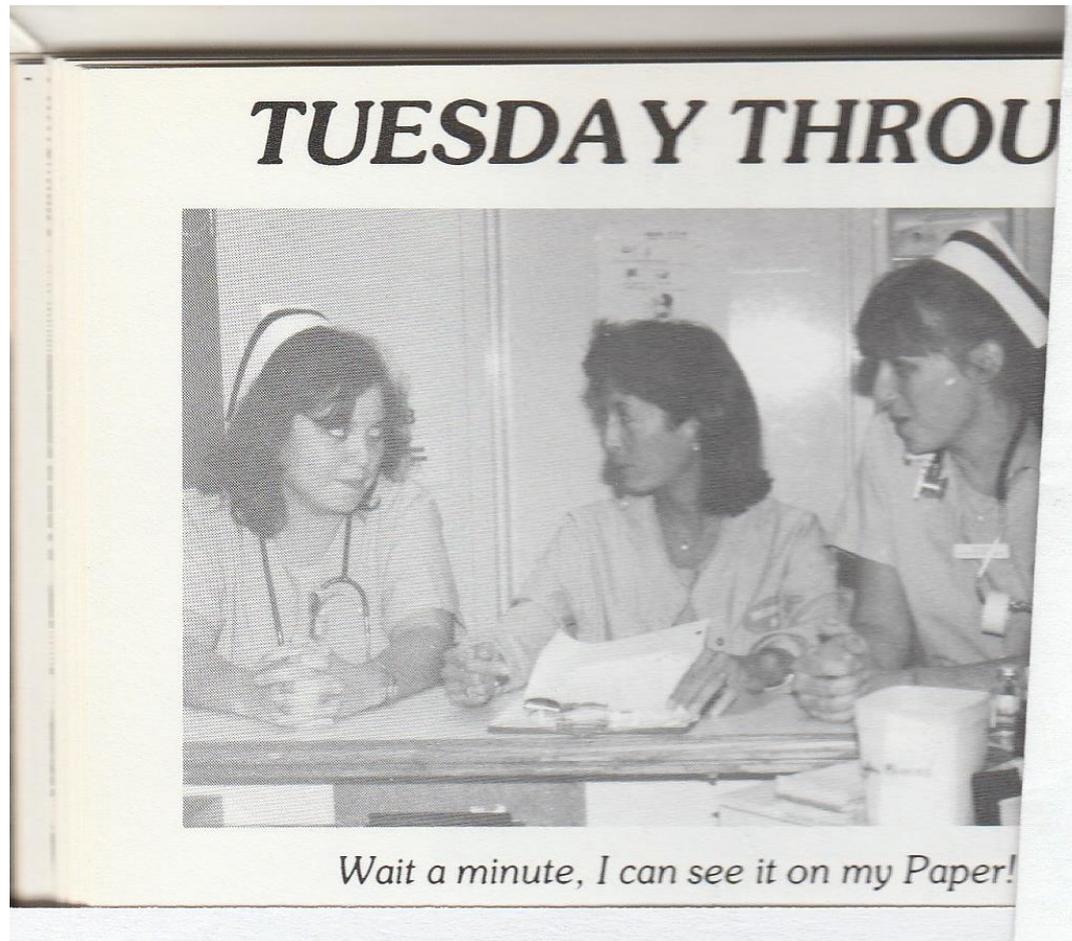
- Sharing and dissemination of the project results with the cardiovascular surgery, unit- based staff members and other Heart Institute members
  - Training CICU resource nurses to remove CTs and utilize CPG
- Sharing and vetting of CPG with Nursing Practice Council for utilization on other units and with other procedures
- Use of distraction and child life therapy could potentially support hiring additional child-life therapists or purchasing additional distraction resources such as Ipads and developmentally appropriate toys.
- Opportunity for further research in this patient population
  - Topical anesthetics

# Summary

Development and implementation of this unit-based pilot CPG for optimal pharmacologic and non-pharmacological analgesia with thoracostomy tube removal on one in-patient unit in a free standing pediatric tertiary care hospital:

1. Provided standardization and continuity with thoracostomy tube removal procedure for both the unit-based bedside nursing staff and CVS NP staff;
2. Documentation compliance was improved
3. Nursing knowledge was increased;
4. Nurses seemed satisfied with the CPG; and
5. CPG implementation is feasible

# Questions



# References Available on Request

