

# Thoracostomy Tube Removal: Implementation of a Multidisciplinary Procedural Pain Management Guideline

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## ABSTRACT

**Objective:** Thoracostomy tubes are placed following cardiothoracic surgery for the repair or palliation of congenital heart defects. The aim of this project was to develop and implement a clinical practice guideline for the provision of optimal analgesia during removal of thoracostomy tubes in pediatric postoperative cardiothoracic surgery patients.

**Methods:** Methods used include a nonexperimental design utilizing chart audits to determine baseline documentation as well as procedure note evaluation to determine both baseline documentation and compliance with the new guideline. A convenience sample of unit-based nurses

completed a knowledge test and a post-implementation survey.

**Results:** There was a significant increase in nursing knowledge related to the clinical practice guideline education and implementation. Documentation compliance was observed. Nursing satisfaction and feasibility of the new guideline was demonstrated.

**Discussion:** This project was successful in increasing nursing knowledge of available resources for optimal procedural pain management in pediatric patients requiring thoracostomy tube removal on one in-patient acute care unit. *J Pediatr Health Care.* (2017) ■, ■-■.

## KEY WORDS

pain management, pediatrics, postoperative, thoracostomy

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Conflicts of interest: None to report.

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## INTRODUCTION

Nearly all congenital heart surgery patients will have thoracostomy tubes placed during surgery. Removal of these tubes is painful. There has been a substantial body of research on pain management and how best to optimize pain relief during procedures, but there is also research showing that patients undergoing painful procedures are still receiving suboptimal relief of pain and anxiety. Development of an organizational clinical practice guideline (CPG) in the management of nonsedation procedures is important to ensure that documentation and recommended and adequate pharmacologic and nonpharmacological

methods are consistently provided during painful procedures. Procedural pain practice guidelines for patients are applicable for multiple procedures within medical and surgical specialties. Examples of other applicable procedures include but are not limited to the following: venipuncture, lumbar puncture, chest tube insertion, and burn and/or wound dressing changes (Lago et al., 2009; Wilson-Smith, 2011).

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## BACKGROUND

To help avoid potential postoperative complications, thoracostomy tubes are electively placed in patients undergoing congenital heart repair or palliation to drain existing fluid or air or to prevent their accumulation (Aru et al., 1999; Pacharn et al., 2002; Woodward, Dowling, Taylor, & Savin, 2013). They also help with lung re-expansion and restoration of pulmonary mechanics, and they promote postoperative recovery (Kwiatt et al., 2014; Utter, 2013). These tubes are removed once drainage has decreased and/or a pneumothorax has resolved (Preze, 2011). Removal times generally range from 1 to 4 days after surgery, and their removal may cause significant pain and distress (Carson et al., 1994).

In 2011, the American Society for Pain Management in Nursing published clinical practice recommendations for health professionals to advocate for procedural pain management that entails having a plan in place for promoting optimal comfort, pain management, and relief of anxiety before, during, and after the procedure. The new adaptation of the World Health Organization Analgesic Ladder for Pain recommends a step-wise approach for effective pain management using analgesics (Tobias, 2014; Vargas-Schaffer, 2010). Although anti-anxiety medications are not routinely administered to patients for nonsedated painful procedures, if significant anxiety is anticipated or there is a history of significant pain or distress related to previous procedures, then anti-anxiolytics may be considered as an adjunct to analgesia (Wilson-Smith, 2011). However, these medications do not provide analgesia, and the provision of nonpharmacologic techniques to address pain with anxiety are also recommended (Bennet, 2008b; Czarnecki et al., 2011b; Wilson-Smith, 2011). Therefore, each painful procedure should include both pharmacologic and nonpharmacologic measures, such as distraction, to limit pain and anxiety (Czarnecki et al., 2011a; Friesner, Curry, &

Moddeman, 2005; McCarthy et al., 2013; Morton, 2012; Puntillo et al., 2014).

Multiple studies have observed thoracostomy removal pain in adults (e.g., Akrofi et al., 2005; Bruce, Howard, & Franck, 2006); however, few studies have focused on pediatric thoracostomy tube removal pain (Puntillo & Ley, 2004; Rosen et al., 2000). Although evidence exists for the efficacy of pediatric pain management (Cregin et al., 2008; Crocker, Higgenbotham, King, Taylor & Milling, 2011), translation of this knowledge for treatment of procedural pain into clinical practice remains a challenge (Buscemi, Van Dermeer, & Curtis, 2008; Ortiz, Lopez-Zarco, & Arreola-Bautista, 2012; Petovello, 2012). Optimizing procedural pain relief during initial congenital heart surgeries may help reduce pain with future procedures, because acute pain can lead to stimulation of the stress response and result in changes to major organ systems (Taddio & Katz, 1997; Simone & Scorce, 2012; Weisman, Bernstein, & Schechter, 1998). Although pediatric procedural pain guidelines have been published (Bennet, 2008a; Lago et al., 2009; Lee et al. 2014; Wilson-Smith, 2011), according to a systemic review published in 2014 by Lee, Yamada, Kyololo, Shorkey, and Stevens, most are considered to be of average quality.

Multiple factors affect postoperative pain management including understanding of preemptive pain management interventions, mistaken beliefs and patient expectations, inconsistent pain practices, suboptimal use of “as needed” analgesics, and, importantly, the absence of structured pharmacologic pain management regimens (Dunwoody, Krensichek, Pasero, Rathmell, & Polomano, 2008). The lack of clear guidelines leads to differences and inconsistencies in pain management, including the underuse of topical medications; lack of patient, family, and clinician communication; insufficient orders for medications before the procedure; and inadequate time to give analgesic medications before the procedure (Czarnecki et al., 2011a, 2011b). Nonpharmacologic interventions such as distraction are also effective in reducing procedure-related pain in pediatric hospitalized patients and should be incorporated into a procedural pain management plan (Bennet, 2008a; Nilsson, Hallqvist, Sidenvall, & Enskar, 2011). The American Academy of Pediatrics (Child Life Council, Committee on Hospital Care, 2006) recommends that child life services be an essential part of the delivery of best practice models of health care in the pediatric hospitalized population (see Child Life Council and Committee on Hospital Care, 2006). Finally, more studies are needed using validated pain scales to guide best practice for managing pediatric acute pain (Stinson, Yamada, Dickson, Lamb, & Stevens, 2008; Uman, Chambers, McGrath, & Kisley, 2008).

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