Non-pharmacologic Pain Management for Pediatric Lower Extremity Trauma: Decreasing Opioid Use and Length of Stay

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**Background.** Perioperative anxiety and postoperative pain are closely correlated and there can be an increased response to painful stimuli while a patient is experiencing anxiety (Chieng, Chan, Klainin-Yobas, & He, 2014). At Nationwide Children's Hospital (NCH) in Columbus, Ohio, it has been observed that patients who are admitted to the Orthopedic service with acute lower extremity injuries have inadequate pain control. As observed by the first author (JW), anxiety may be playing a large role in the level of pain experienced for the hospitalized child and adolescent, as evidenced by delaying the start of or stalling during physical therapy (PT) sessions. When patients are not able to participate in PT sessions due to pain, patients are medicated with opioids rather than attempting non-pharmacologic interventions. Poorly controlled pain and anxiety in children can lead to an increased length of hospitalization, postoperative complications such as suppressed respiratory function, and delayed healing (Chieng et al., 2014; Chng et al., 2015).

Strict guidelines for prescribing opioid pain medications for the treatment of acute pain have been implemented (Ohio Board of Pharmacy, 2017). Prescribers are limited to dispensing no more than a five-day prescription of opioids to children. Dose restrictions provide no more than 30 morphine equivalents per day and written consent from guardians must be obtained prior to providing an opioid prescription to a minor (Ohio Administrative Code, 2018; Ohio Board of Pharmacy, 2017). These rules have been put in place in response to opioid drug abuse that has reached epidemic proportions in Ohio and became a significant public health problem in 2010 (Winstanley et al., 2012). Non-pharmacologic pain management is necessary to decrease the amount of opioids given post-operatively.

**Purpose and Literature Review.** The purpose of this quality improvement (QI) project is to determine if consulting certified child life specialists (CCLS) within 24 hours of admission will improve patient outcomes such as pain management and minimize postoperative complications for children with lower extremity injuries admitted to the orthopedic service at NCH. This QI project will examine the effect of CCLS on length of hospitalization, amount of pain medications used postoperatively, number of physical therapy sessions required for safe discharge, and daily average pain rating scores. This project was implemented in August 2018 and will continue through December 2018; the data will be compared to previously admitted patients at the same hospital prior to the project.

Anxiety is a negative emotion that is experienced when a person is nervous or uneasy and perceives himself or herself to be in a vulnerable state (Chieng et al., 2014). Negative behaviors such as crying or verbal objections due to anxiety and distress in a child could interfere with his or her ability to cope with surgery, slow post-operative recovery, and lead to decreased cooperation with providers (He et al., 2015). PT is an essential component of recovery and a benchmark for discharge for patients with lower extremity injuries. When patients are experiencing negative behaviors, they are more likely to withdraw from the PTs and be uncooperative with care plans.

The available evidence revealed the many strengths and skills that CCLS possess to enhance the hospital experience for children and adolescents and their families (He et al., 2015; Hyland et al., 2015).
CCLS are trained to provide the non-pharmacologic interventions that are effective in reducing pain and anxiety for children who are hospitalized. Randomized controlled trials examining the impact of CCLS interventions indicated that the presence of CCLS during procedures and throughout the hospitalization reduced pain, anxiety, and negative behaviors while promoting recovery (Brewer, Gleditsch, Sybilk, Tietjens, & Vacik, 2006; Hyland et al., 2015; Li, Lopez, & Lee, 2007; Schlechter, Avik, & DeMello, 2017; Tyson, Bohl, & Blickman, 2014). These studies show that preparation (e.g., tour of the surgical unit, use of developmentally appropriate explanations, doll demonstrations, and therapeutic play) and debriefing (e.g., reviewing previous experiences and normalizing emotions and feelings related to hospitalizations and surgeries, encouraging children to ask questions about procedures and fears related to procedures) as well as distraction (e.g., bubbles, toys, music, and electronic devices such as tablets) performed by CCLS can reduce anxiety during stressful procedures, which decreases pain and improves cooperation (Brewer et al., 2006; Hyland et al., 2015; Li, Lopez, & Lee, 2007; Tyson, Bohl, & Blickman, 2014). CCLS consultation is recommended as an important adjunct to analgesic pain control as part of a multimodal approach to pain management for hospitalized children.

Overall, the evidence provided on the impact of CCLS on children’s anxiety and pain management is weak. Although a majority of the evidence is from systematic reviews and randomized controlled trials, the recommendations are not reliable due to small sample sizes and homogenous samples of patients in the literature. While the evidence is weak, it does suggest that the presence of CCLS during stressful procedures and hospitalization is beneficial for patients and parents to reduce anxiety and improve behavior recovery and pain control. Smaller studies show that parents are satisfied with their child’s care and children have a better overall hospital experience when CCLS is involved. This evidence supports the use of a CCLS consult in the practice change for this QI project.

**Procedure and Data Collection.** International Statistical Classification of Diseases and Related Health Problems version 10 (ICD-10) codes were used to identify patients for this project for both the retrospective and prospective chart reviews. Meetings were held with stakeholders over the summer of 2018 to engage PTs and CCLSs in the QI project to ensure training was similar across both disciplines and patients would receive the same information with each consult. Patients were admitted with lower extremity injuries throughout the day and night, therefore the admission order set used for lower extremity injuries for Orthopedics was modified to include a CCLS consult that is pre-selected so as to not miss a patient who requires a consult. When the patient was admitted, the provider, typically the resident or advanced practice provider, completed the consult information included in the order set. This included pertinent patient information such as age, type of injury, and plan for surgery. This consult was automatically sent to the CCLS census in the electronic health record and the details entered in the consult on admission could be viewed. Once the consult was received by the CCLS, the patient was evaluated within 24 hours. The CCLS performed their duties as they typically would: They evaluated the patient and developed a coping plan as well as completed a psychosocial evaluation to determine the patient’s and family’s needs. Once the CCLS had determined the best course of action for the patient, they collaborated with PT to provide interventions within their scope of practice, such as distraction, medical play, or developmentally appropriate procedural preparation, before and/or during the PT session. PT consults are placed post-operatively and are used to assist the patient with learning safe and appropriate mobility. Based on age and ability, the therapist chooses crutches or a walker as a mobility aid and instructs the patient on correct usage. The patient is required to demonstrate safe usage of the assistive devices prior to passing PT and hospital discharge. This can take multiple attempts that occur typically twice per day for half an hour to an hour based on the therapist’s availability. CCLS continued to work with the patients throughout the hospitalization.

**Results.** Retrospective chart review using admission diagnosis codes were used to determine length of stay, pain rating scores, number of pain medication doses, number of PT attempts, and patient demographics prior to the implementation of the QI project. The nursing staff on the Orthopedic unit at NCH assessed pain in patients with lower extremity trauma using the numeric rating scale 11 (NRS-11) and Faces Pain Scale-Revised (FPS-R) scales. The NRS-11 is a numerical pain rating tool approved for ages 8 and older; it is a measure of pain intensity on a scale of 0-10 (Castarlenas, Jensen, von Baeyer, & Miro, 2017). The FPS-R scale is used with children ages 4 to 17 and is a self-report tool that asks
children to rate pain on a 0-10 scale using corresponding faces (Le May et al., 2018). Prospective data from current patients is identical to retrospective data and includes: 1) length of hospital stay, 2) all NRS-11 and FPS-R scores, 3) total number of pain medication doses received, 4) number of PT attempts, 5) ICD-10 codes, and 6) patient demographics (e.g. age, gender, insurance, zip code, and county of residence). The project is considered a QI project by the sponsoring institution. Data were collected for 3 months during the fall of 2018 and compared to retrospective data.

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Keywords:
Certified child life specialists, Lower extremity trauma and Non-pharmacologic pain management

References:


**Abstract Summary:**
Heightened anxiety can increase a child’s experience of post-operative pain. An evidence-based, non-pharmacologic method of anxiety and pain management was implemented for children with lower extremity trauma of a 3-month period. Pain medication use, pain ratings, length of stay, and number of physical therapy sessions will be compared.

**Content Outline:**

1. Non-pharmacologic pain resources for children with lower extremity injuries
   1. Perioperative anxiety increases the experience of post-operative pain
   2. Non-pharmacologic pain resources are a viable adjunct for pain and anxiety management in children with lower extremity injuries
2. Background and literature review
   1. Opioid crisis
      1. Ohio is the 4th highest state for drug-related overdose deaths
      2. New laws and rules to regulate prescribing in Ohio
   2. Relationship between anxiety and pain in hospitalized patients
      1. Anxiety increases pain response and subsequent opioid use
      2. Increased opioid use often results in increased length of stay
   3. Role of non-pharmacologic pain resources in minimizing opioid use
      1. Use of distraction, medical play, music, massage, etc. to improve pain management without the use of opioids
      2. Certified child life specialists are trained to provide non-pharmacologic pain management and normalization of the hospital experience
3. Methods
   1. Lower extremity patients with unplanned hospitalization
      1. Ages 6 to 18
      2. Requiring surgery
   2. Routine child life consult within 24 hours of admission
   3. 3 month retrospective and 3 month prospective chart review
4. Results
   1. Outcome data includes: demographics, pain rating scores, number of doses of pain medications given, number of physical therapy attempts, and length of hospitalization

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