Emergency Department Pain Management of Acute Abdominal Pain and Acute Appendicitis in Children

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Acute pain is a common presenting symptom in the pediatric emergency department (ED). This adverse stimulus occurs as a result of injury and illness. If a child's pain is not treated quickly and effectively, it can have long-term physical and psychological sequelae [1–3]. These long-term consequences may include anticipatory anxiety during future procedures, a lowering of the pain threshold and sensitization to future pain, reduced effectiveness of analgesics, and increased analgesic requirements [1–3].

Table 1. The Alder Hay Triage Pain Scale (AHTPS)

Category	Score 0	Score 1	Score 2
Cry or voice	No complaints No cry Normal conversation	Consolable	Inconsolable Complaining of pain
Facial expression	Normal	Short grimace (‹ 50% of the time)	Long grimace (› 50% of the time)
Posture	Normal	Touching/Rubbing/Sparing	Defensive/Tense
Movement	Normal	Reduced or restless	Immobile or thrashing
Color	Normal	Pale	Very pale

Table 2. The Face, Legs, Activity, Cry, Consolability (FLACC) Scale

Category	Score 1	Score 2	Score 3
Face	No particular expression or smile	Occasional grimace or frown, withdrawn, disinterested	Frequent to constant quivering chin, clenched jaw
Legs	Normal position or relaxed	Uneasy, restless, tense	Kicking, or legs drawn up
Activity	Lying quietly, normal position, moves easily	Squirming, shifting back and forth, tense	Arched, rigid or jerking
Cry	No cry (awake or asleep)	Moans or whimpers, occasional complaint	Crying steadily, screams or sobs, frequent complaints
Consolability	Content, relaxed	Reassured by occasional touching, hugging or being talked to, distractable	Difficulty to console or comfort

PAIN ASSESSMENT

Pain assessment is an important part of pain management, and ongoing assessment of the child's pain in the ED is essential. Because pain is a subjective experience, individual self-reporting is the preferred method for assessing pain. However, in non-verbal children, observational and behavioral assessment tools are acceptable alternatives when a valid self-report is not available [3]. Five instruments are commonly used to assess pain in the 0–18 year old age group:

- The Alder Hey Triage Pain scale (AHTPS) [Table 1] and the Face, Legs, Activity, Cry, Consolability scale (FLACC) [Table 2] are observational scoring tools designed for use in children aged 0–2 years
- The Faces Pain Rating scale (FPR) [Figure 1] and the Visual Analog Scale (VAS) [Figure 2] are self-report scoring scales designed for use in children aged 3–7 years and 8–15 years, respectively.
- Similar to adults, the self-report verbal numeric rating scale is used in children aged 16–18 years [3,4].

Despite the frequency of pain in the ED, children's pain assessment and documentation is often scarce, with poor correlation between pain perceived by children, parents and medical practitioners. The treatment of pain in infants and children has

Figure 1. The Faces Pain Rating Scale (in Hebrew, Russian and Arabic)

Figure 2. The Visual Analog Scale (in Hebrew, Russian and Arabic)

Table 3. List of analgesic medications available in Israel

Pain level	Medication	Trade name
Mild	Paracetamol (Oral)	Abrolet syrup Abrolet forte syrup/suppository Acamol syrup Acamoli syrup/ suppository Apotel IV ampules Dexamol syrup Dexamol kid syrup Novimol drops Paracet elixir Perfalgan IV ampules Tiptipot Aldolor drops Tiptipot Novimol drops
Mild / moderate	Ibuprofen (oral)	Nurofen syrup Nurofen suppository (60 mg, 125 mg) Tiptipot Ibuta syrup
Mild / moderate	Dipyrone (oral)	Optalgin drops V-Dalgin drops
Moderate / Severe	Tramadol (oral)	Tramadex drops Tramadex flashtab (50 mg)
Moderate / Severe	Tramadol/ Paracetamol (oral)	Zaldiar tablets (325 mg/37.5 mg)
Moderate / Severe	Tramadol (intravenous)	Tramal IV ampules / Trama
Moderate / Severe	Oxycodone (oral)	Oxycod syrup (2 mg/ml)
Severe	Morphine (intravenous)	Morphine IV ampules
Severe	Morphine (oral)	Oramorph oral drops (20 mg/ml)
Severe	Fentanyl (intravenous, intranasal)	Beatryl IV ampules

often been insufficient and lags behind analgesia provided for adults in similar situations [5–7].

PAIN TREATMENT

It is imperative for pediatricians and physicians who treat pediatric pain to be familiar with all pain medications available and with their use in children [8,9]. Table 1 presents a list of medications that can be used in Israel. Despite abundant evidence that children are undertreated for pain in the ED, there seems to be a trend of improvement over the last few years [1,2]. Among the reasons for this improvement are: increased parental and physician awareness and education, application of quality improvement initiatives and accreditation regulations, pain management protocols including nurse-driven protocols [10–13].

ACUTE ABDOMINAL PAIN IN THE ED

Abdominal pain is among the most frequent reasons for admission to the pediatric ED. Around 15% of school-aged children are brought to their physician with abdominal pain as a chief complaint [16]. Numerous studies have shown that children with acute abdominal pain are undertreated for pain in the ED [17–19]. There may be several reasons for the low rate of ED analgesia administration in children with abdominal pain, including inadequate pain assessment, belief that opioids can obscure a surgical condition, and fear of adverse events [17–20]. A delay in provision of analgesia may occur if analgesia is not being delivered until the surgeon has evaluated the patient [18]. Consequently, the 2012 report on pain by the American Academy of Pediatrics emphasized the importance of not withholding analgesia in children with abdominal pain in the ED [2].

OPIOIDS IN ACUTE ABDOMINAL PAIN IN CHILDREN

Four parallel-group randomized controlled studies have demonstrated the safety of opioids in acute abdominal pain in children [21–24]. A recent systematic review screened 1497 papers that investigated opioid management of acute abdominal pain in children. The findings of this comprehensive analysis suggest that, compared to placebo, opioid administration is associated with no difference in manageable side effects and it has no serious adverse events [20].

APPENDICITIS-RELATED PAIN IN THE ED

Recent reports from the United States and Canada demonstrate that in acute appendicitis the rate of any type of analgesia and the rate of opioids analgesia is low, especially when compared to adult patients [25-27]. One study reported that in the USA, general emergency physicians were more likely to provide analgesia to children diagnosed with appendicitis than were pediatric emergency physicians [28]. A large cross-sectional multicenter study of 0.94 million ED admissions in the USA demonstrated that the ED analgesia rate for children with appendicitis was approximately 60%, with an opioid analgesia rate of only 40% [25].

Despite its frequency, the diagnosis of acute appendicitis may be challenging and may take several hours during which the patients may suffer from pain if not treated. The American Academy of Pediatrics recommends the use of early analgesics in these patients to make the physical examination and diagnostic testing (such as sonography) more comfortable [2]. The findings of a recent systematic review concluded that with regard to acute appendicitis, opioids are not associated with an increased risk for perforation or abscess and can be provided safely [20].

CURRENT STATUS IN PEDIATRIC EDS ISRAEL

Acute pain is now recognized as the fifth vital sign, along with blood pressure, pulse, respiratory rate and temperature. In 2010, a report published by the Israel Medical Association emphasized the importance of using proper ED analgesia to treat children with acute abdominal pain [3]. To date, no Israeli study has investigated the rate of ED analgesia in these children. Research on a national level is needed to clarify the current

status of ED pain management of acute abdominal pain and acute appendicitis in Israeli children.

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