Pediatric Pain, Tools, and Assessment

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Inadequate pain assessment in children may lead to an underestimation of pain, and consequently, undertreatment in this population. This article provides an overview of pain assessment and describes specific measurement tools that can be used with infants, children, and adolescents. Nationally published practice guidelines and standards recommend pain assessment at regular intervals with age-appropriate tools. Pain assessment must be integrated into perianesthesia nursing practice, and nurses must develop competency in the assessment and treatment of pain in children.

LACK OF PAIN assessment is frequently cited as a major cause of unrelieved pain in both adults and children.[1] Inadequate postoperative pain control has been associated with poor outcomes after surgery. Thus, the quality of pain management may influence length of hospital stay and the incidence of complications, thereby increasing the use of health care resources. The limited cognitive and language skills of young children contribute to underestimation of pain and consequently undertreatment. It is essential that perianesthesia nurses caring for pediatric patients develop competency and expertise in assessment and management of pain in children.

Most perioperative pediatric patients will experience acute pain associated with surgical or invasive diagnostic procedures. Depending on the nature of the procedure, such pain is usually short lived and subsides as healing takes place. There are children with cancer and long-term pain, however, who will experience acute pain from surgery and painful procedures as well. A pain history is beneficial to identify prior and current pain, as well as therapies used to relieve pain. An example is neuropathic pain after nerve injury. Children with this type of pain describe a burning sensation that does not significantly decrease with opioid analgesia. These children require continuation of their membrane-stabilizing agents for their long-standing pain in addition to opioids for their acute surgical pain. Another example is pain triggered by muscle spasms after orthopedic surgery. This pain can be quite severe, and the underlying spasms will need to be treated as well as the surgical pain. As a child emerges from the effects of anesthesia, pain assessment can be difficult because of the child's inability to clearly report and describe the pain. Behaviors associated with pain such as crying and agitation may be related to emergence, anxiety, or effects of preoperative sedatives. The perianesthesia nurse must analyze these behaviors within the context of the situation and explore all possible sources of distress.

ASSESSMENT AND MEASUREMENT

A child's pain can be difficult to quantify and qualify. Children vary in their cognitive and emotional development, medical conditions and operations, and their responses to pain and therapies.

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Therefore, the same painful stimulus or surgical procedure does not necessarily produce the same pain behaviors or intensity ratings in all children.

Measurement and assessment of pain are two aspects in the comprehensive assessment of a child in pain. The measurement of pain answers the question, "How much?" and provides data for determining if the pain is more or less in response to prescribed therapies. Assessment is a broader concept that includes not only measurement but also judgement based on the nature of the pain and observations of the child. A preoperative pain history and assessment is important to prepare the child and family regarding the expected pain and the options for pain control. The content of this evaluation should include prior painful events, previously used methods for pain control, words that the child uses for pain, anxiety or distress, introduction to pain assessment tools, and any special information that the child or family believes the staff need to know. Assessment of pain in children in the PACU should include the following elements: location of the surgical site, location of pain, pain intensity, and any descriptions, such as tight, stabbing, cramping. When a child chooses words such as stabbing or cutting, the perianesthesia nurse may consider that the child is describing incisional pain. Words such as tight or cramping might describe bladder spasms or pressure in a casted extremity. Contributing situational factors and anxiety should also be assessed. Fear, anxiety, nausea, and vomiting can make pain more severe and increase the physiologic response to pain.

Although anxiety clearly contributes to pain, it is uncertain whether the child who shows high distress levels before surgery is really at risk for excessive postoperative pain. Palermo et al report that children who show minimal distress before surgery may actually have high postoperative pain and distress because they have not thought about and prepared for the event.[2] Small children who have not been prepared for surgery may be particularly vulnerable, and the combination of pain and anxiety may result in extreme distress. Regardless of the distress level, all children need to be targeted for preparation and assistance in developing skills for coping with postoperative pain.

The measurement of pain in children can be accomplished with physiologic, behavioral, and psychological measures; however, no single pain scale or tool is valid and useful for all purposes. Many different measurement tools are available, and it may be helpful to use more than one.

PHYSIOLOGIC MEASURES

Physiologic indicators such as increased heart rate and blood pressure, changes in respiratory rate and pattern, and changes in oxygen saturation are used to provide information about a child's response to noxious stimuli. These indicators vary among children and are not specific to pain, but are used with behavioral changes and self-report to determine a level of pain and make a decision for treatment. Physiologic measures, therefore, must be used in conjunction with other pain assessment tools whenever possible.

SELF REPORT OF PAIN

Pain is a subjective perception, and self-report of pain should be obtained whenever possible. Children can identify the location of pain and provide self-report by using words, numbers, pictures, or measurement tools that help indicate how much pain they experience. To use a tool or scale that estimates or quantifies pain, a child needs the ability to classify, match, and estimate. These skills develop around the age of 3 to 4 years.[3] Children may exhibit pain behaviors and yet be unable or unwilling to report pain because they are expected to be brave or they anticipate receiving an injection or other painful therapies if they complain about pain.[4] Young children tend to assign higher intensity scores to pain descriptors than older children, possibly because of the fact that they have fewer pain experiences to draw on as reference points. Children less than 5 years of age may have difficulty with more than 4 or 5 choices; therefore, any scale used with young children needs to have fewer options.

Pain scales and tools that are selected for use in the clinical setting should be valid and reliable, able to accommodate the needs of the child, and easy to use. Hester's Poker Chip tool[5] is a validated tool that works well with children as young as 4 years of age, but it is difficult to use in the immediate postoperative period in the PACU. A variety of faces scales are available, and when one is used, it is important to explain to the child that the first face represents no pain and that the last face represents extreme or severe pain. The Oucher scale has 6 photographs of a child's face with pain expressions of varying pain intensity that are

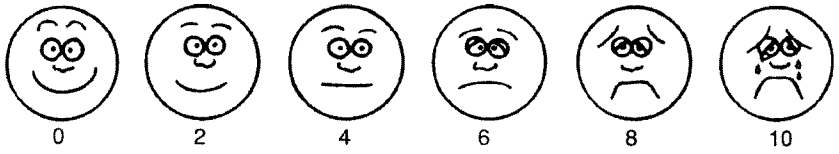

Fig 1. Wong-Baker FACES pain rating scale with a number scale of 0 to 10. From Wong DL, Hockenberry-Eaton M, Wilson D, Winkelstein ML, Ahmann E, DiVito-Thomas PA: Whaley and Wong's Nursing Care of Infants and Children, ed 6, St Louis, MO, 1999, Mosby, p 1153. Copyright Mosby. Reprinted with permission.[32]

scored from 0 to 5. An ethnic version with photographs of Hispanic, white, and black children is available.[6] The Wong-Baker FACES scale consists of 6 faces with word descriptors and numbers from 0 to 5.[7] The child looks at the faces, the nurse or parent uses the words to describe the expression, and the child is asked to point to the face that describes how he/she feels. The number is used to record a pain score.[8] The numbers on this scale can be adjusted to a 0 to 10 scale to promote consistency with other 0 to 10 scales (Fig 1). This simple scale can be easily reproduced for use at the bedside with children as young as 3 years of age. In one large study, the Wong-Baker FACES scale was preferred by a majority of children.[9] Furthermore, it was also the preferred assessment instrument of children 3 to 7, 8 to 12, and 13 to 18 years of age in another study by Keck et al.[10]

Children 6 years of age and older can indicate the intensity of pain by using a visual analog scale (VAS) modified with 5 word anchors (Fig 2).[11] Older children can use a VAS that has only 2 end anchor points. A child who is able to count to 10 and understand the ratio relationship between those numbers can also use a verbal number scale. Using a picture of a number scale can be beneficial to some children. A vertical number scale has been used to help describe the concept of escalating pain (Fig 3). Visual analog scales and number scales can also be used by older children to rate the intensity of anxiety, nausea, and other components of discomfort.

A visual analog scale that is useful with children of various ages is the finger span scale. The child is asked to touch together the thumb and forefinger of one hand to represent no pain. Stretching the thumb and forefinger as far apart as possible is severe or the worst pain. A pain estimation is communicated by holding the thumb and forefinger an appropriate distance (Fig 4). Pain intensity is based on the ratio of the observed distance to the maximum distance from the thumb to forefinger.[3] Children and young people sometimes find it hard to describe their pain experience. The ability to give a separate rating for the intensity of the pain and describe or rate the unpleasantness of pain begins at about 8 years of age.[12] With proper explanation and instruction, children at this age can accurately quantify their sensory and emotional experience of pain and can assign a value with a variety of scales. The words pain, hurt, and ache

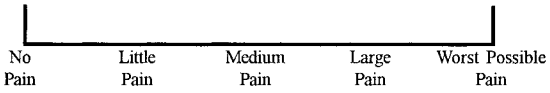

Fig 2. Visual Analog Scale (VAS) with word anchors. Reprinted with permission.[33]

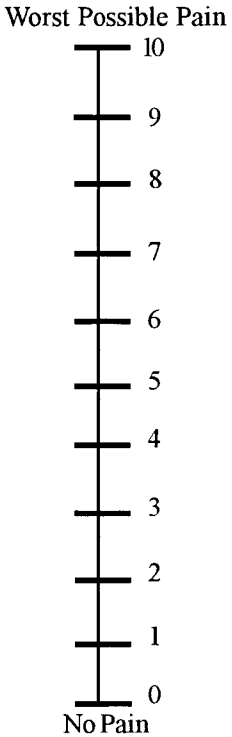

Fig 3. A number scale in a vertical position.

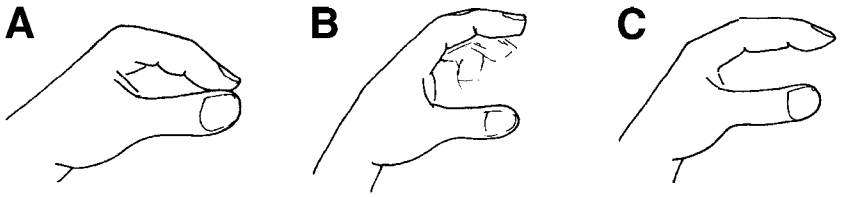

Fig 4. Finger Span Scale: (A) the bottom anchor of no pain, (B) the top anchor of the most pain, and (C) a pain estimation.

seem to be used across cultures to describe pain intensity. Pain is usually used for the most intense pain, followed by hurt, with ache being used for the least intense.[13] To aid the measurement of pain, a tool should be selected that is appropriate for the child's developmental level and physical condition, whereas older children and adolescents can be offered a choice.

BEHAVIORAL MEASURES

Behavioral observation is the primary approach for the assessment of pain in children with limited verbal and cognitive skills. Specific behaviors such as vocalization (crying and groaning), facial expression, body posture, rigidity, undue quietness, and inability to be consoled are used to determine the presence and intensity of a child's pain.[14] Several scales based on behaviors have been developed for clinical use and provide a reliable and valid measure of moderate to severe pain. Use of behavioral observations to guide pain therapies requires consideration of the context of a child's behavior because children will respond to other types of distress such as hunger and anxiety.[15] Sleeping and withdrawn behavior can be misinterpreted as the absence of pain, although the child may be attempting to control pain by limiting activity and interactions. Children who are cognitively and physically disabled and unable to report pain may be at a greater risk than other children for undertreatment of pain because of difficulty with pain assessment. Children with cerebral palsy and other neurodevelopmental disorders have behavior idiosyncrasies and patterns of facial expression that are difficult to interpret. Pain behaviors exhibited by these children, however, occur in the areas of facial expression, body position, activity, vocalization, and social interaction.[16] The Face, Legs, Activity, Cry, and Consolability (FLACC) scale was developed for use in young children who are 2 months to 7 years of age and includes 5 categories of behavior (face, legs, activity, cry, and consolability). The acronym FLACC helps recall the categories for assessment (Table 1). Preliminary studies have established its validity, interrater reliability, and ease of use in the clinical setting.[17]

Assessing pain in the newborn presents an additional challenge because many of the pain tools measure an active and robust response to pain, whereas the preterm and ill newborn may with-

Table 1. FLACC Pain Assessment Tool

	Scoring		
Categories	0	1	2
Face	No particular expression or smile	Occasional grimace or frown, withdrawn, disinterested	Frequent to constant frown, clenched jaw, quivering chin
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 talking to; distractable	Difficult to console or comfort

Each of the 5 categories, (F) face, (L) legs, (A) activity, (C) cry, (C) consolability, is scored from 0 to 2, which results in a total score between 0 and 10.

Abbreviation: FLACC, face, legs, activity, cry, and consolability.

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draw and seem to be asleep and pain free.[18] Premature Infant Pain Profile (PIPP) includes 7 pain measures, each evaluated on a 4-point scale.[19] This tool takes into account the infant's gestational age and behavioral state. CRIES was developed as a neonatal postoperative pain assessment score. The name is an acronym representing the following: crying, requires oxygen to maintain saturation more than 95%, increased vital signs, expression, and sleepless.[19] One disadvantage of this tool is that it uses a measure of oxygenation that can be affected by other factors, especially in the postanesthesia period.[18]

Other behavioral tools that could be used for pain measurement are the Toddler-Preschooler Pain Scale (TPPPS)[20] and the Preverbal, Early Verbal Pediatric Pain Scale (PEPPS).[21] No single behavioral observational scale has been shown to be superior to the others, but all provide a method for measurement of pain. Although there is reported disparity between observed pain behaviors and self-report of pain,[22] behavioral cues remain the primary indicator of pain in children who are unable to report pain. Difficulties with behavioral observations arise when there is a great discrepancy between what is expected and what is observed. It is difficult to assess pain if a child exhibits more or fewer pain behaviors in the presence of certain people or other environmental stimuli. The nurse must use these data and the context in which the pain behaviors were observed when deciding how to treat the pain. Children who are in obvious pain and are unable to focus on learning a pain scale should receive immediate treatment. Once pain is under control, a pain tool can be explained. Assessing pain with a specific pain tool provides a framework for quantifying behaviors to use for clinical decisions related to pain. Colwell et al[23] reported that nurses who used a chromatic pain scale after being taught how to use it more closely matched the self-report of pain in children than those nurses who did not use scales.

PARENT AND PAIN ASSESSMENT

Parents are often the primary source of information about how their child exhibits pain and should be encouraged to contribute to the assessment of pain. Studies examining child and parent pain ratings report frequent agreement on pain scores. In a recent study, however, Chambers et al[24] report that parents may underestimate their child's pain and thus contribute to inadequate pain control. In a study by Manne et al,[25] parents' ratings of pain were focused on the parents' anxiety and preconceived ideas about the pain their child would experience, whereas nurses' pain ratings were based on the child's overt distress and pain behaviors. Taken together, these data suggest that parents can identify the presence of pain in their hospitalized child but may have difficulty assessing its severity. When obtaining a parent's rating of pain, nurses should focus more on the specific behaviors the child exhibits when in pain rather than how much pain the parent believes the child is experiencing. Before discharge, specific methods for assessing and measuring pain should be reviewed with the child and family and information provided about how to treat the pain.

CLINICAL INTEGRATION OF PAIN MEASUREMENT AND ASSESSMENT

Pain management is a major component of perianesthesia nursing practice and requires skills of assessment, evaluation, and decision making. The failure to act on pain assessment is largely influenced by knowledge, personal beliefs, and institutional barriers. Crying and vocal expression of pain has been found to be the strongest influence in nurses' decision making regarding pain management, yet a child's self-report of pain is sometimes ignored or disbelieved. A nurse's personal experience with pain or having a child who has experienced severe pain increases his/her administration of analgesics in clinical situations.[26] Literature on the influence of culture is scarce but suggests that greater differences in racial and cultural background between the child and the nurse increase the difficulty of pain assessment by the clinician. Communication about pain and expectation for treatment is culturally influenced, and both are part of pain assessment and treatment.[27] Decision making related to pain assessment and management in children is complicated, and clinicians will need training to dispel myths and to learn to assess and measure pain. A common misconception is that increased experience with pain should prepare a child to tolerate it and cope with it. Repeated exposure to pain, however, teaches a child that pain can be severe and that it is difficult to get pain relief. Consequently, the child with repeated procedures may have high levels of anxiety and lower pain tolerance.

Changing practice to include pain measurement and assessment can be a difficult process. A major issue with the integration of pain into routine care is the amount of time that may be added to nurses' work. If time requirement is high for using pain tools and documenting scores, the likelihood of adoption and change is low.[28] When selecting a tool for use with children in the PACU, it is important to consider the simplicity and appeal from the viewpoint of the child and also the nurse. Using standard pain tools within a given health care system minimizes confusion for the children, families, and staff. Whichever tools are chosen, it is important to explain the specific tool clearly to the child and, if possible, provide some opportunity to practice preoperatively. Pain assessment and the use of pain scales will not become routine unless they are coupled with ongoing events and assessments such as vital signs. Pain management becomes a higher priority when pain assessment becomes the fifth vital sign. Changes on flowsheets that aid documentation of pain will also help support consistent measurement and monitoring.

Changes in practice will occur more quickly when the innovation fits the organization's agenda. The Agency for Health Care Policy and Research (AHCPR) guidelines for acute pain emphasizes clinical and institutional responsibilities for managing acute pain in children. The guideline suggests that effective management of pain in infants and children requires assessment of pain intensity and pain relief at regular intervals by using consistent and valid criteria and that self-report measures should be used whenever possible.[29] The Joint Commission on Accreditation of Healthcare Organizations (JCAHO) has included pain management in its standards for 2000 (Table 2). These standards focus on assuring that patients with pain are identified and then treated or referred for treatment.[30] Hospital surveyors will look for evidence of quality pain management in interviews of families, review of records, analysis of policies, and identification of education materials for patients and staff.

Table 2. JCAHO Standards of Care Related to Pain Management

RI.1.2 Patients are involved in all aspects of their care including pain management.
RI.1.2.8 Patients have the right to appropriate assessment and management of pain.
PE.1.4 Pain is assessed in all patients.
TX.3.3 Policies and procedures support safe medication prescription or ordering.
TX.5.4 The patient is monitored for pain during the post-procedure period.
PF.1.7 Patients are taught that pain management is a part of treatment.
CC.6.1 The discharge process provides for continuing care based on the patient's assessed needs at the time of discharge (for example, pain).
PI.3.1 The organization collects data to monitor its performance.

Intent of the standards and examples of implementation are available on the JCAHO Web site.[30]

Abbreviation: JCAHO, Joint Commission on Accreditation of Healthcare Organizations.

Data from the JCAHO.[30]

CONCLUSION

Institutional barriers to pain assessment in the perianesthesia setting need to be identified and then removed to provide good pain management. Policies and standards should be revised to require the routine assessment and measurement of pain in children. Quality improvement programs can provide the structure for a multifaceted approach that includes education of clinicians and patients and the implementation of policies, procedures, and processes that help assessment, treatment, and evaluation of pain management.[31] To meet the emerging standards of pain management and to provide optimal patient outcomes for pediatric patients, perianesthesia nurses must develop competency in pain assessment and measurement in children. In addition, perianesthesia nursing practice must be examined and age appropriate pain assessment and treatments incorporated in the routine care of children.

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