COMMENTARY

Effective Management of Pain in Pediatric Hematology and Oncology

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Abstract

In the last several decades, there have been major advances in the treatment of pediatric cancers. 5 year survival of children with acute lymphoblastic leukemia has increased from 25% to 80%. Early stages of non -Hodgkin's, Hodgkin's and Wilms tumors all have more than 90% long term survival. In addition to improving survival, the comprehensive care of children with cancer must offer total care including special emphasis on pain management and psychosocial support by a multidisciplinary team. Pain considerations in children are unique and differ from those in adults. For example, bone pain is often one of the presenting symptoms of leukemia in children, but can be mistaken for growing pain or labeled psychological. Bone pain is also a prominent symptom in late stage neuroblastoma, and of course in bone tumors. The American Medical Association and National Cancer Institute promote the absence of pain as a patient right and a marker of good clinical care and a quality of care issue. Pain due to disease burden responds dramatically to chemotherapy and the uninitiated are often surprised by the sudden increase in activity and playfulness of children undergoing induction chemotherapy. History and physical data, with special assessment of pain should be part of the medical record of all children.

Keywords: Pediatric hematology - oncology - pain control

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Assessment of Pain in Children

Pain in children can be caused by the disease process, diagnostic procedures and treatment. Pain can be definitely assessed in children using any of several validated scales (see Figure 1). Children as young as 3 year old can quantify their pain with reasonable accuracy. Wong-Baker faces scale, 10 cm visual analog scale are few of the commonly used tools for pain assessment in children (Scott and Huskisson, 1976; Beyer and Aradine, 1986; Wong et al., 1999). Physicians can also use behavioral scales along with physical findings to have an accurate estimate of pain (Mc Grath, 1985; Grunau and Craig, 1987; McGrath, 1998). Pain medication and management has not been found to interfere with process of pain assessment.

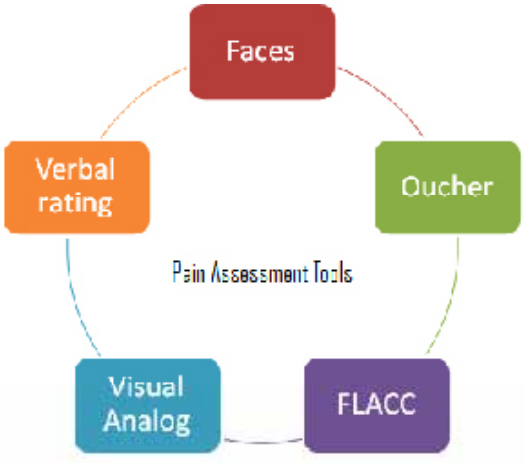

Figure 1. Different Types of Pain Assessement Tools

Pharmacological Measures

World Health Organization has framed a 3 step pain management protocol for cancer patients. Depending on severity of pain, mild to strong analgesics are used to ease the pain (see Figure 2).

The first step on the analgesic ladder includes NSAIDS or acetaminophen. Use of NSAIDS like ibuprofen can make patient prone for gastric or renal injuries. Hepatotoxicity is associated with acetaminophen use. Hence the adverse effects on likely organs should be kept in mind. Most of the time cancer patients come with severe pain and it becomes necessary to institute strong drugs superseding Step 1.

It should also be kept in mind that diagnostic procedures, therapeutic procedures or treatment which might add on to the burden of pain should be dealt with an increment in dosage of drug or by adding a new drug. Certain drugs are more suited in certain scenarios for instance bone pain is effectively managed by ibuprofen and pamidronate, for neuropathic pain gabapentin is the drugs of choice. Muscle spasm can be relieved by baclofen or cyclobenzaprine. Pain secondary to raised intra cranial tension can be addressed with dexamethasone

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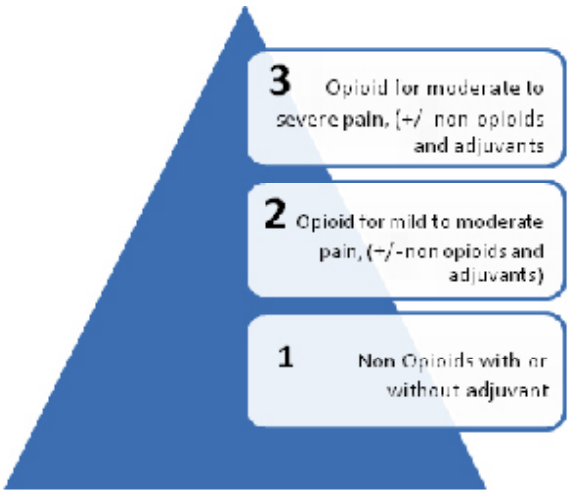

Figure 2. WHO Pain Relief Ladder for Freedom from Cancer Pain

or mannitol. Oral opiods or intravenous on demand or patient controlled analgesia may be indicated in children with severe persistent pain as in post BMT GVHD or severe mucositis. Fentanyl patches are less commonly used in younger children and should be considered only under special circumstances.

Management of pain due to procedures is done by "conscious sedation procedures" using oral and or IV medications including ketamine, midazolam, Fentanyl or propfol among others. A procedure room with specialized pediatric anesthesia support, ACLS certified nurses and monitoring equipment (pulse oximetry etc) is a requirement. Local analgesics are being more frequently used for venous access and IM injections.

Physical Measures

Physical methods for pain management are valuable tools in hands of physicians to limit pain with minimal side effects. Transcutaneous electrical stimulation (TENS) (Fishbain et al., 1998), application of heat or cold (Fishbain et al., 1998; Willick et al., 2001; Menefee and Katz, 2003; Bercovitch and White, 2004) and physical exercises are some less frequently used modalities for relieving muscle tension in children.

Behavioral and Psychosocial Measures

Studies suggest that cancer pain is aggravated by psychological distress, anxiety and fear. (Zaza and Baine, 2002). Cognitive-behavioral therapy (CBT), meditation, hypnosis, music therapy, biofeedback and relaxation (Brietbart et al., 2004) have been found to be beneficial as adjunctive therapy. Repetitive interventional procedures as a part of cancer therapy can often lead to anxiety and distress in children. CBT helps in alleviating anxiety associated with medical procedures (Walco et akl., 2002). These techniques takes time to master and should not be used as the sole therapy for pain management. Simple techniques like distraction from pain stimuli or reward technique can go a long way in managing pain.

Table 1. Various Drugs

Drugs	Dose and Route
Ibuprofen	4-10mg/kg/dose PO TID (max 40mg/kg/day)
Acetaminophen	10-15mg/kg/dose PO QID
Codeine	0.5-1mg/kg/dose PO QID (max 60mg/dose)
Morphine	0.05-0.2mg/kg/dose IV every 2-4 hour \ (max 15mg/dose)
Oxycodone	Immediate release 0.05-0.15 mg/kg/dose PO QID (max 5mg/dose)

Sickle-Cell Anemia--a Unique Pediatric Pain Management Challenge

Sickle cell disease is an inherited hemoglobinopathy with a varied clinical picture. One of the most important clinical manifestations, often responsible for patient morbidity is painful crisis or vaso occlusive crises. The importance of vaso occlusive pain crises is emphasized by the fact that it is the single most important reason for frequent emergency department visit by a sickle cell disease patient (Ellison and Shaw, 2007). In fact vaso-occlusive crises account for about 79-91% of emergency department visits and about 59-68% of all admissions (Jacob and Mueller, 2008) As the name suggests, micro vascular occlusion by sickled red blood cell lies at the core of pathophysiology of pain crises. It is imperative to diagnose and treat the acute crises state early but lack of authoritative evidence on treatment protocol often creates confusion and allows pain to escalate prior to effective therapy. The variation in intensity of vaso-occlusive crises occurs not only in different patients but also within single patient. Recently few studies have been done to delineate the role of day hospitals in pain management and how they can reduce financial burden and patient morbidity by efficient management at day hospital followed by home management thereby drastically reducing frequent visits to emergency room (Raphael et al., 2008).

Broadly, the painful crises can be divided into two groups, mild to moderate and severe. Mild to moderate crises are better treated with anti inflammatory drugs rather than opioids; this can sometime lead to under treatment of pain. On the other hand a severe attack of pain crises is best treated with IV infusion of opioids in an emergency care setting. Dr Manuel Carcao of University of Toronto suggests "Hospitalization is mandatory if pain control with oral analgesic is not adequate, or if other problems (such as fever and dehydration) exists" (Carcao et al., 2006). Empirical institution of antibiotic therapy is also recommended in children with high grade fever, as infections with capsulated organism especially pneumococcal is a well known complication due to hyposplenism. Patient controlled analgesia is routinely employed in older children. With adequate education, a child as young as a 6 year old can be taught to effectively use a patient controlled analgesia(PCA) pump (Berde et al., 1991). Children who cannot operate PCA button are offered another alternative called nurse controlled analgesia(NCA) wherein a small titrated dose of analgesic is permitted (Monitto et al., 2000). Meperidne(Demerol or Pethidine) should be avoided in sickle cell due to risk of CNS complications.

Recurrent severe crisis requiring multiple admissions are often treated with Hydroxyurea to increase the Hb F level and decrease sickling. Multidisciplinary teams with nurse clinician, social worker, psychologist, pharmacist and pediatric hematologists to offer comprehensive care. It is important to foster further research in pain management of sickle cell crises so that frequently faced problems associated with present treatment protocols can be alleviated. Last but not the least, the treating physician who is managing acute painful episode in sickle cell patient should always keep in mind other coexisting pathologies like priapism, infections, aplastic crises etc and should treat them accordingly (Carcao et al., 2006). Sometime a unique problem is faced by sickle cell anemia patient. A pain crisis while travelling in such patients can often be misinterpreted as malingering. An ID card with brief patient medical profile with contact information of physician can help tackle this situation.

Summary

Children with cancer have excellent options for therapy with significant increase in survival. Disease state, procedures and treatment can lead to acute and or chronic pain. Excellent protocols for pain management using a wide array of drugs and procedures including behavioral modification are available and should be used in an individualized fashion. Tailoring therapy based on diagnosis, etiology of pain, extent of pain, age of child, familial and social issues should be formulated for each case with continued close follow up or relief of pain and undue side effects. No child should be denied needed pain medication for the unproven assumptions like they don't feel pain, there is increased risk of respiratory depression or addiction (www. AMA-CMEONLINE.com).

References

Bercovitch M, White A (2004). Transcutaneous electrical nerve stimulation (TENS). In: Doyle D, Hanks NC, Calman K, eds. Oxford Textbook of Palliative Medicine. 3rd Ed. New York, NY: Oxford University Press, 405-10.

Berde CB, Lehn BM, Yee JD, Sethna NF, Russo D (1991). Patient-controlled analgesia in children and adolescents: a randomized, prospective comparison with intramuscular administration of morphine for postoperative analgesia. *J Pediatr*, **118**, 460-6.

Beyer JE, Aradine CR (1986). Content validity of an instrument to measure young children's perception of intensity of their pain. *J Pediatr Nurs*, **1**, 386-95.

Brietbart W, Payne D, Passik SD (2004). Psychological and psychiatric interventions in pain control. In: Doyle D, Hanks NC, Calman K, eds. Oxford Textbook of Palliative Medicine. 3rd Ed. New York, NY: Oxford University Press, 424-43.

Carcao MD, Dawn Cook, Upton Allen, et al (2006). Guidelines for In-patient Management of Children with Sickle Cell Disease. http://www.sickkids.ca/pdfs/Haematology-Oncology/8217-SickleCellguidelines2006.pdf.

Ellison AM, Shaw K (2007). Management of vasoocclusive pain events in sickle cell disease. *Pediatric Emerg Care*, **23**, 832-8; quiz 838-41.

Fishbain DA, Chabal C, Abbott A, Heine LW, Cutler R (1996). Transcutaneous electrical nerve stimulation (TENS) treatment outcome in long-term users. *Clin J Pain*, **12**, 201-14

Grunau RV, Craig KD (1987). Pain expression in neonates: facial action and crying. *Pain*, **28**, 395-410

Jacob E, Mueller BU (2008). Pain experience of children with sickle cell disease who had prolonged hospitalizations for acute painful episodes. *Pain*, **9**, 13-21

McGrath PA et al (1985). CHEOPS: a behavioral scale for rating postoperative pain in children. *Adv Pain Res Ther*, **9**, 395-402.

McGrath PJ (1998). Behavioral measures of pain. In: Finley GA, Mc Grath PJ, eds. Measurment of Pain in Infants and Children. Seattle, WA: IASP Press, 83-102.

Menefee LA, Katz NP (2003). The PainEdu.org Manual: A Clinical Companion. Newton, Mass: Inflexion, Inc.

Monitto CL, Greenberg RS, Kost-Byerly S, et al (2000). The safety and efficacy of parent-/nurse-controlled analgesia in patients less than six years of age. *Anesth Analg*, **91**, 573-9.

Raphael JL, Kamdar A, Beavers MB, Mahoney DH, Mueller BU (2008). Treatment of uncomplicated vaso-occlusive crises in children with sickle cell disease in a day hospital. *Pediatr Blood Cancer*, **51**, 82-5.

Scott J, Huskisson EC (1976). Graphic representation of pain. *Pain*, **2**, 175-84.

Walco GA, Halpern SL, Conte PM (2002). Pain in Infants and Children. In: Tollison CD, Satterthwaithe JR, Tollison JW, eds. Practical Pain Management. Philadelphia:Lippincott Williams & Wilkins, 748-59.

Willick SE, Herring SA, Press JM (2001). Basic concepts in biomechanics and musculoskeletal rehabilitation. In: Loeser JD, Bugler SH, Chapman CR, Turk DC, eds. Bonica's Management of Pain. 3rd ed. Philadelphia, Pa: Lippincott Williams & Wilkins, 1815-31.

Wong DL, Hockenberry-Eaton M, et al (1999). Pain assessment. In: Whaley and Wong's Nursing Care of Infants and Children. 6th Ed. St Louis, MO: Mosby, 1148-59.

Zaza C, Baine N (2002). Cancer pain and psychosocial factors: a critical review of the literature. *J Pain Symptom Manage*, **24**, 526-42.