Abstract:
Painful conditions are a common cause for emergency medical services transport. Adequate and appropriate treatment for pain in the prehospital setting is considered an essential part of care. Despite this, several studies have identified that pain in the prehospital setting is often undertreated with even greater disparities in the pediatric population. As a result, several organizations have written policy statements surrounding this issue advocating for better treatment of pain and further research into barriers and disparities in care. The aim of this article is to review the current state of prehospital pain management in children and adolescents and to highlight advances made in this area with a look toward future directions of care.

Keywords:
emergency medical services; pain management; analgesia; prehospital; pediatric

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Pediatric Prehospital Pain Management: Impact of Advocacy and Research

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Pain from acute injury and illness is a common cause for seeking care from emergency medical services (EMS) of which between 25% and 50% of calls are for children with traumatic injuries.[1-9] Despite being so common, painful injuries are frequently undertreated. Failure to treat pain in the field may lead to negative outcomes for patients with painful conditions. Studies show that inadequate treatment of pain in children can lead to posttraumatic stress disorder, physiologic and psychologic changes in pain behavior responses, and a reduced response to appropriate weight-based doses of analgesia.[10-13] Most notably, when prehospital providers fail to treat pain in the out-of-hospital setting, there is a delay in pain relief.[14,15] Given the importance of pain management in acutely ill and injured children and recognized disparities in treatment, this subject has lately received a significant amount of attention. Statements supporting pain management for pediatric patients have been issued by the American Academy of Pediatrics and the American College of Emergency Physicians.[16,17] In addition, relief of discomfort in the prehospital setting has been addressed in a policy statement by the National Association of EMS Physicians (NAEMSP) and has been identified as one of the most important outcome

measures for prehospital care by members of the EMS Outcomes Project.[18,19]

HISTORICAL PERSPECTIVE

Prehospital analgesia was introduced during the development of ambulance services at the time of the Civil War. Despite the early introduction of prehospital analgesia, it has lagged behind hospital-based treatment of pain. Original barriers to prehospital opioid analgesia included the restriction of its use to specially trained prehospital providers and reservation of its use for patients with presumed cardiac ischemia. In the 1970s, there was an increase in pain research followed by improved drug development in the 1980s. In 1993, Chambers and Guly[20] published an article calling for improved prehospital analgesia administration. This was followed by subsequent literature describing low rates of pain treatment in the prehospital setting and reporting on the numerous perceived barriers to prehospital treatment of pain in this last decade.

In 1987, Tsai and Kallsen[7] reported on the epidemiology of pediatric prehospital care. Pediatric patients comprised 10% of all EMS calls. Overall, 50% of pediatric calls were for trauma-related complaints, most of those being due to motor vehicle crashes. The authors noted that the largest users of prehospital care in the pediatric age range were in the extremes of the pediatric age range, young infants and older adolescents. In a larger and more recent study published by the Pediatric Emergency Care Applied Research Network (PECARN), trauma comprised 28% of prehospital calls for children; however, less than 1% of pediatric patients received pain medication.[9]

Initial studies examining the frequency of prehospital pain management found rates to be quite disparate. White et al[21] studied 1073 adults with extremity fractures and found pharmacologic treatment in 1.8%, predominately with nitrous oxide. Most prehospital interventions were nonpharmacologic including splinting, ice, and elevation. This is in contrast to a study by Swor et al[2] who noted that pain treatment was as high as 21% in children and 35% in adults with extremity fractures. McEachin et al[1] found that approximately 18.3% of adults were treated with prehospital analgesia for lower extremity fractures. They also noted a significant time delay of almost 2 hours to analgesia in patients not treated in the prehospital setting. Hennes et al[3] found very low rates of treatment in their pediatric patients; 3% of children with fractures and 8% of children with burns were given morphine for analgesia in the prehospital setting. However, there is evidence that the increased attention to pain management may be leading to improved rates of analgesia administration in the field at least in some systems. A recent study of the implementation of a new protocol for pain treatment based on an evidence-based guideline in the Maryland EMS system demonstrated an overall rate of narcotic medication administration of 70% for patients with traumatic conditions transported by advanced life support providers. The same study did not demonstrate disparities in the rate of administration of pain medications by age or sex.[22]

Nationally, organizations have begun to comment on the need for better pain management in the prehospital setting, recognizing that it is a common complaint and reason for activating an EMS response. In 1990, the NAEMSP issued a position statement supporting the use of nitrous oxide in the field for pain management. A more recent position statement recommended mandatory pain assessments, intervention with medications and nonpharmacologic treatments, and appropriate patient monitoring all combined with use of quality improvement programs to monitor safety and compliance.[18]

In 1999, the EMS Outcome Project identified relief of discomfort as one of the most relevant outcome measures for prehospital conditions. Finally, in 2003 an NAEMSP committee composed of representatives from several national organizations established the NAEMSP Model Pediatric Protocols document.[23] This document contained approximately 20 pediatric prehospital protocols including a specific protocol for pain management with indications for medication administration and dosing specifications. This protocol has served as a model for several individual agencies and states.

RESEARCH INTO BARRIERS

Given the known disparities in pain management, many organizations called for research into improving prehospital pain management. Hennes et al [3] published the first comprehensive survey on perceived barriers to pain treatment of patients in the prehospital setting, uncovering several interesting themes. First, they found multiple reported barriers to pain treatment including the inability to assess pain, difficulty in obtaining intravenous access, and a fear of medication complications (Table 1). Second, they noted that the frequency of these barriers were often higher when considering the pediatric patients compared with adult patients. The authors noted that there were presumptions made by prehospital providers regarding pediatric