

Treatment of paediatric acute pain



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The attempt of this essay is to examine how the UK NHS paramedics treat acute pain in paediatric population. This essay will accentuate the importance of adequate training and research in paediatric care.

Paramedics employed by UK NHS Ambulance trust have a diverse selection of analgesics at their disposal for acute mild to severe pain, ranging from paracetamol and ibuprofen to Entonox and intravenous morphine sulphate. (JRCALC) This essay will look at the management of acute moderate to severe pain with emphasis on the barriers that prevent paramedics from assessing and treating paediatric patients with pain adequately, as well as intravenous morphine versus intranasal fentanyl debate.

Different ways of treating pain in emergency services and departments around the world will be discussed and appropriate literature from emergency care will be used to support the statements made throughout this essay.

Hennes, Kim, Ronald and Pirrallo (2005) describe pain as a complex multidimensional phenomenon that is difficult to assess, particularly in young children. Combined with the fact that pain is the most common symptom in the emergency setting (Alonso and Wensley, 2003), it is fundamental that we understand and improve the care for all patients in pain.

However, there is disparity between assessment and treatment of adults and paediatrics. This phenomenon has been described for over 25 years (Schechter, 1989). Watkins (2006) is in agreement with Schechter (1989) that adult patients are more than twice as likely to receive opiate analgesia

for acute moderate to severe pain, when compared with children who describe similar pain scores.

The UK NHS Ambulance trust has been under long term criticism, because of inadequate provision of analgesia for paediatric patients. This view has changed in 2003 when Medicines and Health care products Regulatory Agency approve the use of morphine in the aforementioned group of patients. Today, intravenous morphine sulphate and morphine sulphate oral solution can be safely administer by registered paramedics. Recently, many studies who targeted the emergency services around the world discovered that healthcare professionals are often unable to assess and treat paediatric patient in pain (JRCALC, 2013).

Important step in addressing oligoanalgesia is by identifying the barriers to inadequate pain management. This statement is supported by numerous authors including Ricard-Hibon, Chollet, Saada, Loridant and Marty (1999), Bruns, Dieckmann, Shagoury, Dingerson and Swatzell (1992) and Jones and Machen (2003). Sequelae of inadequate treatment of acute pain may lead to alteration in immune function, delayed wound healing and a lower pain threshold in subsequent painful experiences.

Firstly, a qualitative study by Murphy, Barrett, Cronin, McCoy, Larkin, Brenner, Wakai and O'Sullivan (2013) explores what barriers prevent adequate treatment of paediatric population by emergency service. The study focuses on acute pain in children from the perspective of advanced paramedics in Ireland.

Authors of the study believe that there are many factors, or barriers as they call it that render the potential pre-hospital treatment of children inadequate and ineffective. One of the biggest causes identified was the lack of training targeted specifically to paediatric care, current clinical practice guidelines for paediatric pain management, limited exposure to paediatric patients in pre-hospital setting and many others.

A huge part of the concern that has arisen from interviews was the difficulty and even inability to assess pain intensity in young children, especially in preverbal age. Also, a disturbing reason listed for oligoanalgesia was short hospital transfer time, which further added to all possible situations, when practitioners would be reluctant to administer analgesia when dealing with children.

Melzack and Wall (2003), Williamson and Williamson (1983) and Gilianu, Krane, Galloway And Yaster (2000) are all in agreement that exposure to severe pain in children can cause adverse psychological, biochemical, metabolic and behavioural changes.

The study concluded that emergency services must emphasise improvement in paramedic education and training, specifically giving alternatives to assessing pain in preverbal children. Some advanced paramedics even suggest that treatment of acute pain in paediatrics should be approached differently to acute pain in adults.

Through focused group interviews moderated by a paediatric emergency medicine specialist, the authors were able to collect the necessary data. Though the study was well designed, it had limitations. There were only

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twelve participants, however, as the authors point out, it has been argued by Howard and Moore (1989) and Kitzinger (1995) that a minimum of eight participants is accepted to be sufficient.

Another factor that have been identified by advanced paramedics in the aforementioned study and a study by Hennes, Kim and Pirrallo (2005) from the perspective of paramedics in United States highlights the inability to effectively administer medications available to paramedics.

A concern was raised in the area of cannulating a paediatric patient as well using medications that needed to be inhaled, such as Entonox. Both studies found that practitioners were in many cases unable to firstly, assess the pain score, and secondly treat the paediatric patient, due to the fact that children showed anxiety when trying to give intravenous morphine or oramorph.

Murphy, Barrett, Cronin, McCoy, Larkin, Brenner, Wakai and O'Sullivan (2013) strongly suggest that identification and mitigation of aforementioned barriers to the prehospital management and treatment of paediatric patients is crucial and should be one of the priorities in further development.

Secondly, a study by Watkins (2006) looked at whether the age of child influenced the likelihood of their receiving prehospital analgesia from their local ambulance services. The study investigated this question in Auckland.

Jones, Johnson and McNinch (1996) again raised a concern about inadequate analgesia in paediatric population, which has been further highlighted by Watkins (2006). The study found that children less than 5 years of age are in significant risk of being undertreated of pain by ambulance service.

When compared with children who were 5-15 years of age, Watkins (2006) also observed that there was a significant change as they received some form of analgesia in 50% of cases.

The study also points out an interesting fact about the use of pre-hospital Entonox. Children given Entonox alone appeared to be in more pain than non-treated children, which is surprising as in adult population, it is reported to produce adequate analgesia for 50% of patients. (Ricard-Hibon, Chollet, Saada, Loridant and Marty, 1999).

“ I am sure the air in heaven must be this wonder-working gas of delight”
(Fullmer, 2000)

Watkins (2006) suggested several possible reasons for this perception of the effect of Entonox, such as incorrect use leading to inadequate effect, as children are in many scenarios crying preventing them from using the equipment properly. Also, it might be relevant to mention that children achieving sufficient level of analgesia using Entonox were 8 years of age or older. As indicated by Watkins (2006), further research is necessary to establish whether the use of Entonox is suitable for analgesia in children.

The study also found that no child aged less than 5 years of age received analgesia in form of morphine, which disagrees with claims made by ambulance officers who participated in the study. Again, the author further confirms the theorem that even qualified practitioners have difficulties in assessing and administering analgesia to young children.

As mentioned above, the pain caused by gaining intravascular access leads to underuse of opiate analgesia in younger children. As highlighted by Braude and Richards (2004), further investigation of non-invasive methods of pain relief in pre-hospital setting is absolutely crucial.

This leads to a morphine sulphate and intranasal fentanyl debate, which has been the subject of several studies.

In hospital setting, intravenous fentanyl was shown as an effective alternative to morphine sulphate, however during the last decade, a new option became available.

Braude and Richards (2004) indicate that there are at least four reasons to use intranasal fentanyl in pre-hospital setting. This claim is supported by numerous publications including Watkins (2006), Maurice, O'Donnell and Beattie (2002), and Rickard, O'Meara, McGrail, Garner, McLean and Lievre (2007).

Maurice, et. al (2007) identified that management of acute pain in paediatrics relies on successful intravenous cannulation that may be technically impossible to perform. Moreover, the author also acknowledged that this increases the risk of needle stick injuries to either the patient or patient's family and to the staff.

A possible replacement in the form of intranasal fentanyl has been long discussed by many authors. Braude and Richards (2004) have reported that intranasal fentanyl has a rapid peak, short duration of action and does not cause the release of histamine, which may cause hypotension. Also, there

are very few instances of nausea being caused by administering intranasal fentanyl.

Rickard, O'Meara, McGrail, Garner, McLean and Le Lievre (2007) conducted a randomised controlled trial to compare intravenous morphine and intranasal fentanyl for pre-hospital analgesia.

Intranasal fentanyl has been used in the inpatient hospital setting, but prior to this randomised controlled trial, there has been no other trial comparing the aforementioned drugs in pre-hospital setting.

The study found that there was no significant difference between the effect of intranasal fentanyl and intravenous morphine sulphate in pain reduction. The study identified that there were no previous randomised controlled trials available. The lack of supporting evidence for analgesics have been identified by Borland, Jacobs and Rogers (2002) who also recognised that there was paucity of data to support practice with no randomised trials.

Moreover a trial by Borland, Jacobs and Rogers (2002) further confirmed that intranasal fentanyl was comparably effective at reducing pain paediatric in an emergency department.

The study had several limitations, including the sample size, which was set out to be 400 patients. Due to time constraints, a total of 258 patients were randomised and out of them, only 227 were evaluable. Also, the side effects were observed by paramedics who were treating the patients, which may have produced biased results. The author notes that a more reliable way of

recording such data would be by a trained physician or dedicated paramedic researcher who would not be busy with clinical care.

The study notes that nausea and vomiting may still be a problem with the use of fentanyl, especially in the mucosal routes and particularly in children, as they may become uncooperative. It has also been noted that the ability to absorb any medication through nostrils changes throughout the day, because of mucous congestion. Following this conclusion, some Australian ambulance services increased the doses of intranasal fentanyl with reported beneficial outcomes.

In conclusion, it is clear that the pain management in paediatric population continues to evolve not only in pre-hospital setting within the United Kingdom, but also around the world where doctors are using their experience with synthetic analgesia to drive the patient care further, broadening the scope of emergency practitioners, such as paramedics employed by UK NHS Ambulance trust.

In 2003, morphine sulphate was introduced and marked as a solution to ever increasing problem with oligoanalgesia. More recently, complex studies evaluated the risk to benefit ratio of alternative analgesia more suited for specific part of our population, such as the use of intranasal fentanyl for paediatric patients.

Moreover, the essay demonstrated that the improvement must start with clinicians, their understanding of protocols and ways to treat aforementioned group of patients.

“ Paediatric patients seldom need medication for the relief of pain. They tolerate discomfort well.”

This citation clearly demonstrates how far the care for paediatrics in acute pain has come in recent decades and thanks to the research mentioned throughout the essay, it continues to improve within a hospital as well as pre-hospital setting.