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Research paper

Nurse titrated analgesia and sedation in intensive care increases the frequency of comfort assessment and reduces midazolam use in paediatric patients following cardiac surgery

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ABSTRACT

Background: Pain and sedation protocols are suggested to improve the outcomes of patients within paediatric intensive care. However, it is not clear how protocols will influence practice within individual units.
Objectives: Evaluate a nurse led pain and sedation protocols impact on pain scoring and analgesic and sedative administration for post-operative cardiac patients within a paediatric intensive care unit.
Methods: A retrospective chart review was performed on 100 patients admitted to a tertiary paediatric intensive care unit pre and post introduction of an analgesic and sedative protocol. Stata12 was used to perform Chi 2 or student t tests to compare data between the groups.
Results: Post protocol introduction documentation of pain assessments increased (pre protocol 3/24 h vs post protocol 5/24 h, p = 0.006). Along with a reduction in administration of midazolam (57.6 mcg/kg/min pre protocol vs 24.5 mcg/kg/min post protocol, p = 0.0001). Children's pain scores remained unchanged despite this change, with a trend towards more scores in the optimal range in the post protocol group (5 pre protocol vs 12 post protocol, p = 0.06).
Conclusions: Introducing a pain and sedation protocol changed bedside nurse practice in pain and sedation management. The protocol has enabled nurses to provide pain and sedation management in a consistent and timely manner and reduced the dose of midazolam required to maintain comfort according to the patients COMFORT B scores. Individual evaluation of practice change is recommended to units who implement nurse led analgesic and sedative protocols to monitor changes in practice.

1. Introduction

Providing optimal analgesia and sedation for children in intensive care is a challenge for clinicians.[1] Children who are not provided with sufficient analgesics are at risk of experiencing pain due to invasive treatments; if children are also not adequately sedated, they may be at risk of discomfort.[2] Alternatively, children treated with excessive analgesics or sedatives are at risk of developing withdrawal or tolerance.[3,4] Potential long-term consequences of administering sedatives include apoptosis of brain cells[5] and learning difficulties.[6] However, obtaining an accurate assessment of the child's level of pain and discomfort, in order to provide an appropriate level of treatment, is challenging in paediatric intensive care (PICU).[7,8] Developmental age, administration of sedatives and intubation all impair the child's ability to adequately communicate their needs.[9,10]

Self-report remains the gold standard of pain assessment,[11] though children are not always able to self-report their pain or discomfort due to different developmental stages.[12] Pain assessment tools utilise behavioural and physiological parameters in order to overcome developmental communication barriers with children.[12] Specific pain tools for children within intensive care have been developed and validated in order to assess children who may be unable to communicate due to developmental age and intensive treatments such as intubation and sedation.[13–16] Utilising a pain

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and sedation protocol that incorporates a validated assessment tool may aid clinicians to provide evidence- based treatment to children, and avoid incidences of under or over treatment of pain and discomfort.[17]

Introducing a protocol to manage pain and sedation may influence other outcomes than performing pain assessments, such as analgesic and sedative administration.[18,19] Evaluation of PICU pain and sedation protocols in current literature reveals that there are differences in primary outcome measures. Some studies have reported an increase in administration of sedatives and analgesics following the introduction of a pain and sedation protocol into PICUs[18,20] whilst others report a decrease.[19,21] At the time that this study was conducted, a consensus on how pain and sedation protocols influence ICU length of stay and duration of ventilation was unclear.[22]

2. Background

In 2010 the COMFORT B tool was introduced into the PICU for the assessment of both pain and sedation. The COMFORT B tool has demonstrated internal consistency (Cronbach's alpha 0.78), concurrent validity (Kruskal–Wallis chi squared = 237, df = 2, p = <0.001) and interrater reliability (Kappa 0.71) within the paediatric intensive care for patients aged 0–18 years.[14,15] Using one tool to assess for both pain and sedation is controversial, however the COMFORT B tool has been used for this purpose previously.[8] The COMFORT B tool is used to assess intubated patients on six behavioural categories to provide a score between 6–25.[23] These categories include alertness, respiratory response, calmness and agitation, physical movement, muscle tone and facial tension. Nurses examined the category where the patient had the highest score to determine if they were likely in pain or in need of sedation. The comprehensive sedation scale developed by the American Association of Critical Care Nurses acknowledges consciousness, agitation, anxiety and ventilator synchronisation as areas of sedation assessment in intensive care.[24] Therefore patients who score high in the COMFORT B areas of alertness, respiratory response and calmness and agitation are considered to need a sedative rather than an analgesic. In the PICU where this study was conducted scores less than 10 were indicative of heavy sedation, 10–20 the optimal range and greater than 20 indicated the patient was a high risk of pain or distress. An audit that was conducted following the introduction of the tool revealed that compliance with the tools use decreased over time.[25] In order to further improve assessment and management of pain and sedation a clinical practice guideline (CPG) was developed. Following introduction of the CPG an increase in the use of a validated pain and sedation assessment was observed in our setting, along with increased communication of plans for patient's pain and sedation and prescription of analgesic and sedative boluses.[26] However, as a guideline will only provide a summary of best practice recommendations further improvements to pain and sedation management were thought to be achievable through the introduction of a pain and sedation protocol consisting of a treatment algorithm.[27] This paper will focus on how the introduction of this protocol might have impacted management of pain and sedation by the bedside nurse. The protocol was to provide a prescription for the escalation of pharmacological treatment. One major recommendation of the protocol was to optimise analgesia post operatively by providing boluses of morphine prior to increasing the rate of infusion. Another recommendation of the protocol that differed from usual practice was the use of clonidine rather than midazolam as a first line sedative agent.

The protocol was developed with contributions from nursing, medical and pharmacy teams. The protocol was introduced following in-service education for both nursing and medical staff. A medical and nursing lead ensured ongoing education for staff members in their respective teams. Printed copies of the protocol

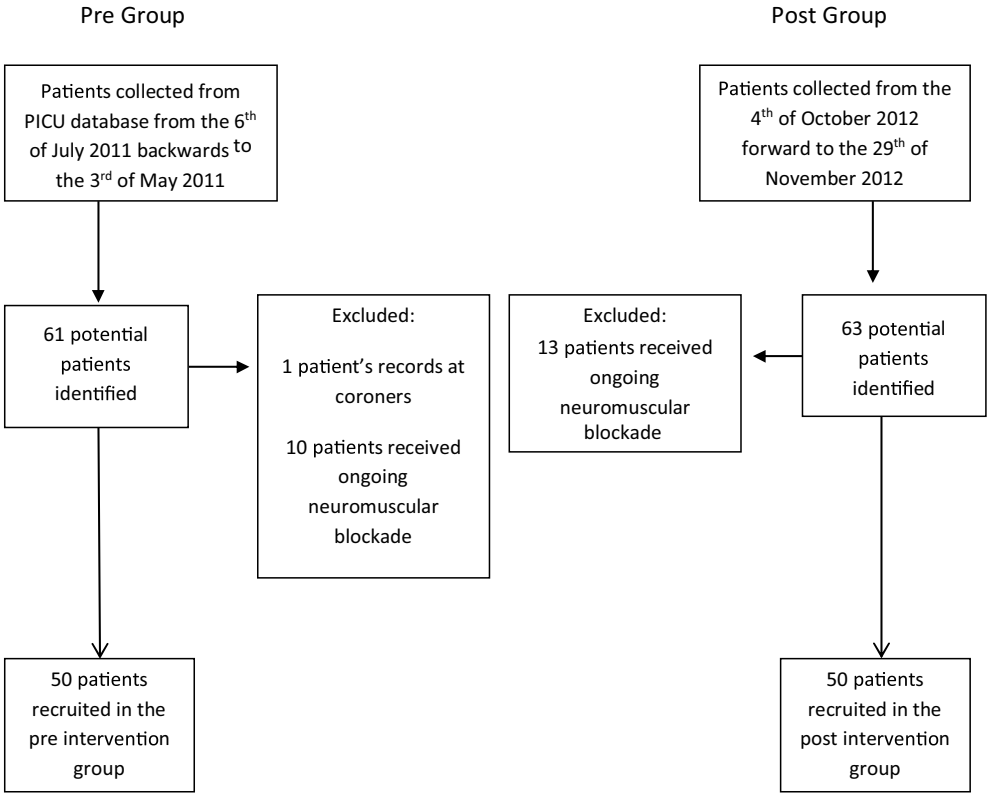

Fig. 1. Flow chart of data collection process.

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