

The efficacy of structured assessment and analgesia provision in the paediatric emergency department

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Objectives: To ascertain if the use of a structured pain assessment tool and nurse initiated oral analgesia protocols improve uptake and time to analgesia for children presenting to the emergency department with minor or moderate musculoskeletal injuries.

Methods: Three groups of children with peripheral limb injuries were examined to identify the rates of analgesia provision and time from attendance to analgesia provision. These groups corresponded to an initial group with no pain scoring and physician initiated analgesia, a second group with pain scoring at triage then physician initiated analgesia, and a third group with pain scoring and nurse initiated analgesia.

Results: The mean time to analgesia in the initial group was 138 minutes. After initiation of triage pain assessment the mean time to analgesia was 93 minutes, there was no statistical difference between these two groups. After the introduction of nurse initiated analgesia, the time to analgesia fell to a mean of 46 minutes. The rate of analgesia provision was initially 20.5% while after the initiation of triage pain assessment the provision rate was 23%. After the initiation of nurse initiated analgesia the analgesia provision rate significantly rose to 34% of attendances.

Conclusions: The use of a nurse initiated, oral analgesia protocol for treatment of children with mild to moderate injury can significantly increase analgesia provision rates and decrease time to provision of analgesia.

The assessment of pain in children has proved problematic particularly in the acute setting.¹ There is now clear evidence to show that children and indeed neonates have well established and effective neural pathways to conduct pain.² A mounting body of evidence has shown that children are frequently underprovided for in terms of analgesia assessment and provision of pain relief.^{3–5} Indeed the use of analgesia in children is known to be consistently inferior to that in adults.⁶

The reasons behind this oligoanalgesia for acute pain in children is unclear but almost certainly includes staff inexperience in paediatric pain prescription, fear of causing drug side effects or dependence,⁷ and lack of proper pain assessment methods.¹ Adult work suggests that analgesic dependence is not a significant issue⁸ and that children are able to cope with even the most potent opioids in a similar fashion to adults.⁹ Validated pain tools for use in children are also now available and in use in many acute situations.¹⁰

We carried out a study to ascertain if changes in current traditional working practices, namely, triage pain assessment and nurse initiated analgesia can have an impact on the rates of analgesia provision and times to analgesia provision for children in the emergency department.

METHODS

This prospective interventional study was conducted in an urban Australasian emergency department with an annual attendance of 43 thousand patients per annum of which 14 000 are aged under 16 years. The study was conducted over a total of three, two month periods from February to August 2002.

All paediatric attendances, within triage category groups 3/4/5¹¹ and peripheral limb injuries within three time frames were identified on the departmental computerised database (HAS EDIS systems). These attendances were identified and anonymised data extracted from the case notes for the

following parameters—provision of analgesia started in the emergency department and time from registration at the emergency department to time of provision of analgesia as recorded in the patient chart by the administering staff.

The three time frames corresponded to an initial two month period where no formal pain scoring for children was undertaken while analgesia provision was started after physician attendance (initial cohort). The second two month period studied corresponded to a period after the initiation of formal pain scoring by nursing staff at triage (pain scoring cohort). This was undertaken using a modified Advanced Paediatric Life Support pain tool (see fig 1) after a departmental teaching programme on pain assessment techniques. The programme consisted of a pre-reading manual on pain relief and assessment. This was reinforced by pain assessment and management workshops followed by a MCQ test. There was a 95% completion rate for all registered nurses involved in triage. The third period corresponded to a two month period after the start of nurse initiated analgesia provision at triage. This was protocol driven analgesia provision delivered by registered nurses at triage after performing pain scoring (see box).

Statistical differences were analysed using χ^2 testing and Student's *t* test for normally distributed data. We used 95% confidence intervals and a *p* value of <0.05 was taken as denoting significance.

RESULTS

During the initial two month time period there were 151 sequential attendances identified. Data were available for 100% of these cases. Analgesia was provided in the department for 20.5% of cases (31 of 151). The mean time to start of analgesia was 138 minutes (95% CI 98 to 178).

In the second cohort, again collected over a two month time period, pain scoring was routine (occurring in 82% of cases) and 140 sequential attendances were identified. Data

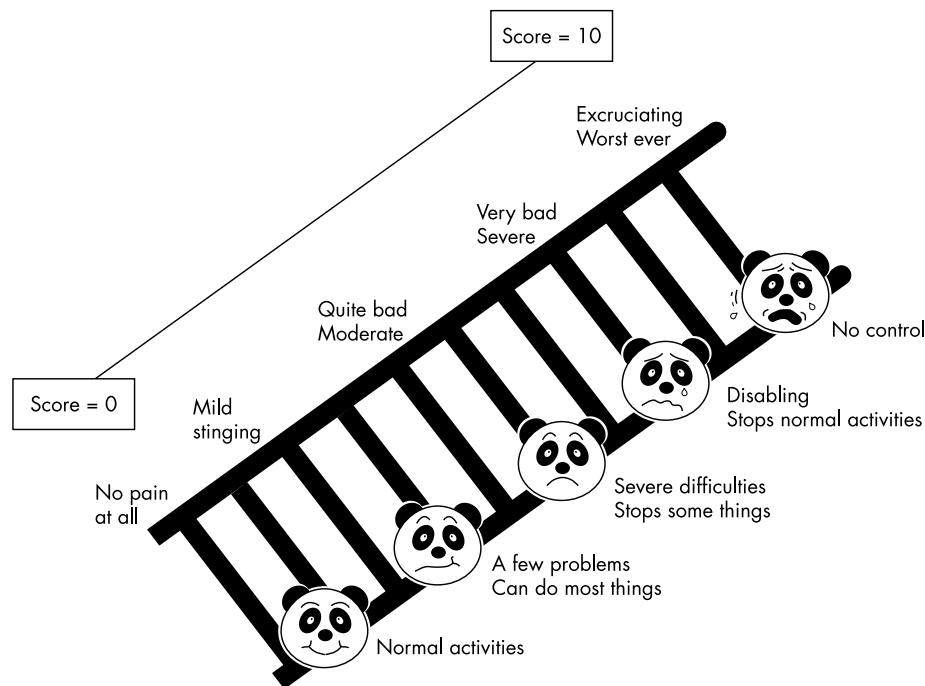


Figure 1 Modified Advanced Paediatric Life Support pain assessment tool (after APLS pain tool, Advanced Life Support Group, Manchester).

were available for 100% of cases. Analgesia was provided in 23% of cases (32 of 140). The mean time to provision of analgesia was 93.7 minutes (95% CI 51 to 136).

The final cohort included patients who had both pain scoring and analgesia provided under a nurse initiated analgesia protocol. The data were collected over a two month time period. Data were available for 100% of cases. Analgesia was provided in 34% of cases (43 of 126). All analgesia provision in this study was nurse initiated at triage. Mean time to provision of analgesia was 47 minutes (95% CI 33 to 60).

There was no significant difference in terms of analgesia provision rates between the initial and subsequent time period after initiation of pain scoring. After the introduction of nurse initiated analgesia there was a significant difference in rates of analgesia provision as compared with the initial and pain scoring time periods ($p = 0.004$ and $p = 0.04$).

On testing with Student's *t* test there was no significant difference in mean time to analgesia after introduction of

pain scoring from the initial period ($p = 0.13$). There was a significant difference, on *t* test, for mean time to analgesia after the introduction of nurse initiated analgesia as compared with the previous pain scoring only time period, and the initial control cohort ($p = 0.03$ and $p = 0.0001$ respectively).

These data are shown graphically in figures 2 and 3.

One adverse event episode was recorded using departmental critical incident reporting systems. A duplicate administration of paracetamol was administered to one child 40 minutes after an initial nurse initiated dose under instructions by the attending medical staff. The combined dose administered was substantially below a potentially toxic dose.

Protocol for nurse initiated analgesia in children with peripheral limb injuries triage category 3/4/5

Children's pain relief protocol
Pain score as derived using pain assessment tool

- Score 1 to 2 paracetamol 15 mg/kg
- Score 3 to 4 paracetamol 15 mg/kg plus ibuprofen 10 mg/kg
- Score 5 to 6 paracetamol/codeine solution (codeine 1 mg/ml with paracetamol 24 mg/ml) at 0.6 ml/kg plus ibuprofen 10 mg/kg

Pain score >6—requires urgent physician assessment with view to parenteral analgesia and not included in protocol.

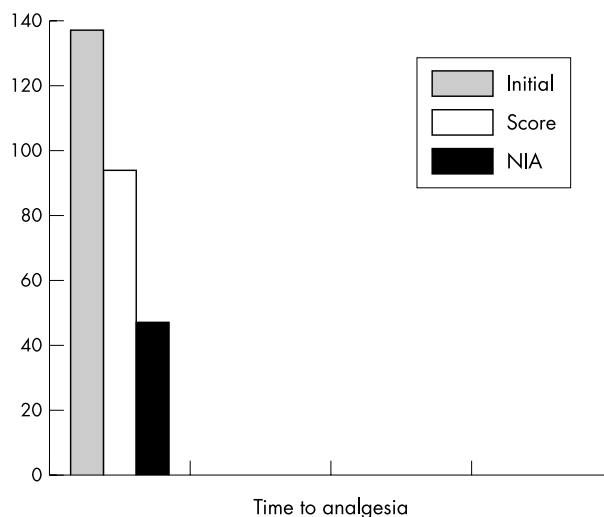


Figure 2 Mean time to analgesia (min) after introduction of pain scoring (score) and nurse initiated analgesia (NIA).

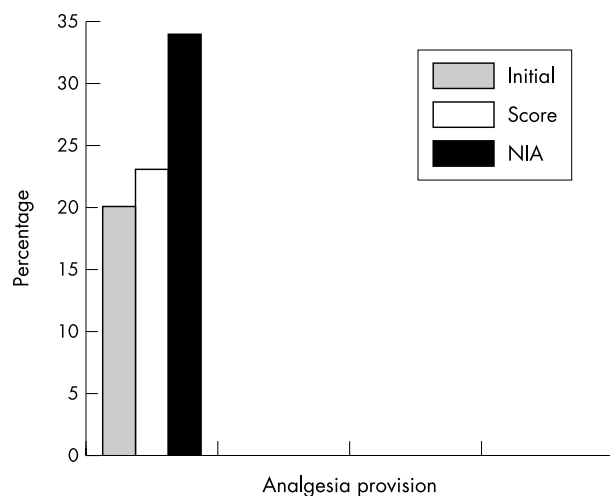


Figure 3 Rates of analgesia provision after initiation of pain scoring (score) and nurse initiated analgesia (NIA).

DISCUSSION

Rates of administration for oral analgesia in emergency departments have previously been studied and the rates shown to be disappointingly small.¹² This also holds true for parenteral analgesia.¹³ The initial rates indicated in this study would equate to those previously quoted.¹² Rates of analgesia provision above 50% may not in fact be practicable given that children may well have had analgesia before attendance or may decline analgesia. The optimum rate to aim for in terms of provision is not currently known but the rises achievable in this study suggest that significant advances can be made with simple “process of care” changes.

This study shows the combined effect of two simple interventions namely pain scoring and protocol driven nurse initiated analgesia. Previous work has shown mixed results in terms of introducing pain scores.¹⁴ Protocol driven nurse managed analgesia has previously been shown to be effective and safe in terms of titrated opioids.¹³ The introduction of teaching and a pain assessment process at triage may have raised awareness of pain issues but did not significantly increase analgesia provision rates or hasten analgesia provision. Education alone appeared not to significantly change process of care. However, after the introduction of a nurse initiated analgesia protocol both the rates and time to analgesia significantly improved suggesting that in this case empowerment rather than education alone was responsible for the process of care changes. This study reflects previous findings in terms of nurse initiated parenteral analgesia¹⁵ again suggesting that changing current work practices can produce significant changes. The process of change was done incrementally to enable the effect of each change to be analysed separately and the contribution of each to be evaluated discreetly. As with all process changes the main

concern is over sustainability. This study measured a two month sampling period only and will require continued resampling to ascertain if these changes are in fact permanent.

One further point of concern is whether in fact, children benefited directly from these “process of care” changes. Initial pain scores were taken but repeat scores after a suitable time period were not always performed. To date, little work exists in the paediatric emergency care setting to show if analgesia provision does in fact reduce pain scores. This may sound illogical, but the interaction of anxiety and the stress of attending a busy emergency department may negate any benefit from analgesics given. The next phase of this study aims to identify the follow up pain scores after analgesia provision in the emergency department.

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