

Pain management in the emergency department

急症室的痛症處理

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Objectives: To determine the waiting time for administration of analgesia to patients presenting to the emergency department (ED) with traumatic pain, and to determine how the severity of pain affects the patient's perception of pain and the treatment they receive. **Methods:** Consecutive patients aged 18–65 years presenting to the ED during the 2-week study period with complaint of pain secondary to trauma were prospectively recruited. The numeric rating scale (NRS) was used to indicate the level of pain experienced by the patients. They were interviewed using a structured questionnaire and a chart review was also done after the patients had completed their ED visit. **Results:** The mean time to analgesia was 77.6 min (95% CI = 63.2–92.0 min). Patients requesting analgesia at triage had a median pain score of 7 (range 0–10) while those who declined had a median pain score of 5 (range 0–10) ($p = 0.002$, Mann-Whitney U-test). The severity of the injuries sustained did not affect the patient's perception of their pain nor their preference for early analgesia. Indian patients had a significantly higher median pain score ($p = 0.048$). **Conclusion:** Time to delivery of analgesia fell short of our patients' expectations. Assessing pain using the NRS is useful and should be incorporated as the 'fifth' vital sign. Process-improvement, healthcare workers and patient education regarding pain management are needed. Patients with a pain score of 7 or more should be offered analgesia at triage. Those with a pain score of 6 or less should still be given analgesia at triage if they request it. (*Hong Kong j.emerg.med.* 2006;13:38-45)

目的：確定因創傷痛症到急症室求診的病者接受止痛藥的等候時間，並測定痛楚程度如何影響病者對痛楚及所接受治療的感受。**方法：**前瞻性地招募兩星期內因創傷引發痛楚到急症室求診而年齡由 18 至 65 歲的連續個案，並以數字評分標尺顯示病者感受痛楚的程度；病者會進行有組織的問卷訪問及其診治記錄會於完成急症室診治後接受審查。**結果：**接受止痛藥的平均時間為 77.6 分鐘（95% 置信區間：63.2–92.0 分鐘），在分流站要求止痛藥的病者的痛楚度中位數為 7（值域 0–10），拒絕止痛藥的病者痛楚度中位數為 5（值域 0–10）（ $p = 0.002$ 曼—惠特尼 U 檢驗）。創傷嚴重程度沒有影響病者對痛楚的感受與及他們對及早止痛的優先選擇。印裔病者的痛楚度中位數顯著地較高（ $p = 0.048$ ）。**總結：**施予止痛藥的時間並未達到病者的期望。以數字評分標尺評估痛楚是有效的，並應併入為第五項生命表徵。還需改善程序及教育健康服務工作者及病者對痛症的處理。痛楚度中位數為 7 或以上的病者應在分流時提供止痛藥，6 分或以下者仍應按病者要求在分流時給予止痛藥。

Keywords: Analgesia, numeric rating scale, nursing assessment, outcome and process assessment (health care), Singapore

關鍵詞：止痛、數字評分標尺、護理評估、結果及工序評估（健康護理）、新加坡

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Introduction

Pain is the most common reason patients seek treatment at the emergency department (ED). While the underlying pathology causing the pain may be diverse, the principle of management remains largely similar. However, the problem of inadequate pain treatment is prevalent among many EDs.¹

The reasons for 'oligoanalgesia' by ED doctors and nurses include inadequate knowledge of analgesic pharmacology, the use of inadequate doses of analgesics, fear of the 'masking' of symptoms, poor ED processes for the provision of analgesia as well as failure to recognise pain relief as a key component of ED management.^{2,3}

Our ED sees an average of 350 patients a day, and 15% of these cases seek medical attention because of pain.

Our current system of triage, physician evaluation, prescription and administration of analgesia affects the waiting time for analgesia for patients who are in pain.

A recent review of patients presenting with a chief complaint of pain to our ED showed that 55% of these patients did not receive any analgesia while in the ED. The average waiting time from registration to the time of administration of analgesia was 71.4 minutes.⁴ There was therefore a need to study the management of pain within our ED.

This study was undertaken with the following objectives: (1) to determine the waiting time for administration of analgesia to patients presenting with traumatic pain; and (2) to study how the severity of pain affects the patient's perception of the pain and the treatment they receive.

Methods

Recruitment of study participants

The study was conducted over a 2-week period from 26 November 2002 to 7 December 2002 in the

emergency department of a regional hospital in Singapore. Consecutive patients who presented to the ED during the study period with a chief complaint of pain as a result of trauma were prospectively recruited into the study after they had consented verbally.

The inclusion criteria of the study were:

1. Patients who were 18–65 years of age.
2. Patients who presented with the chief complaint of pain as a result of trauma.
3. Patients who were haemodynamically stable (systolic blood pressure > 100 mmHg, pulse rate < 100/min and respiration rate < 20/min).
4. Injuries sustained less than 72 hours prior to presentation at the ED.
5. Patients who were not trolley-bound.
6. Patients who were able to understand and converse in the language spoken.

The exclusion criteria of the study were:

1. Patients with multiple injuries requiring immediate care.
2. Patients who sustained head injury and had a Glasgow Coma Scale score of less than 15.
3. Patients who had altered mental status as assessed by the registered nurse at the point of triage.
4. Patients who had evidence of alcohol intoxication.
5. Patients who had self-administered any analgesia prior to their arrival at the ED.

Procedure

The registered nurse at triage would identify patients who were eligible for the study. Patients would only be recruited into the study after they had given verbal consent, after which they would be interviewed using a structured questionnaire. Patients were also asked to rate the pain they experienced on the Numeric Rating Scale (NRS).

Patients were then asked if they wanted analgesia to be given while they were waiting to be seen by the doctor. Those who wanted analgesia before consultation were brought to the doctor for a quick assessment and prescription of appropriate analgesia. Those who declined analgesia before consultation were asked to indicate the reason(s) for declining. The

doctors in the ED were blinded to the patients' response to the study questionnaire as well as their pain score on the NRS. Each participant's case record was reviewed at the end of the consultation.

Data analysis

The data were analysed using SPSS 11 for Windows. The data set was analysed using a two-tailed t-test for all continuous variables (such as waiting times) with the confidence level set at 95%.

Cross tabulation was done on both nominal (such as gender, type of injuries sustained) and ordinal variables (such as NRS scores) to determine if the proportions of occurrences between two or multiple groups varied significantly.

The Pearson chi-square test was used to analyse the differences between two proportions for nominal variables. The Mann-Whitney U-test was used for differences between the medians of two ordinal variables while the Kruskal-Wallis test was used for comparing three or more medians. A p-value of less than 0.05 was considered significant.

Results

One hundred and seventy-five patients were eligible for the study during the study period. Only 167 patients consented to participating in the study while

eight declined, and 54 (32.3%) patients were given analgesia during their consultation in the ED while 113 (67.7%) patients were not.

Among the 167 patients who had participated in the study, 157 participants expressed their preference of whether they wanted analgesia at triage (69 wanted, 88 declined analgesia at triage, nine were unsure and one patient did not respond to the question).

The mean waiting time from arrival at the ED to the time the patient received analgesia was 77.6 min (95% CI = 63.2–92.0 min). The median waiting time to analgesia was 70.0 min (minimum, 18.0 min; maximum, 243.0 min). The 25th and 75th percentile for time to analgesia were 47.0 min and 90.5 min, respectively.

The distribution of the ethnicity and gender of the study population and the types of injuries sustained are listed in Table 1.

Type of injury sustained

There were 118 patients (70.7%) who suffered minor injuries such as abrasions, lacerations and contusions and 44 patients (26.3%) who sustained fractures or dislocations. For the median pain score of both groups, those with minor injuries and those with fractures or dislocations were 6 (range, 0–10) ($p = 0.99$, Mann-Whitney U-test). There was no indication of the nature of injury in five (2.9%) cases.

Table 1. Race and gender distribution among patients who sustained minor injuries versus those who sustained fractures and/or dislocations

	Type of injury		Total (n=162)	p-value
	Minor injury	Fracture/dislocation		
RACE				
Chinese	62 (73.8%)	22 (26.2%)	84 (100%)	p = 0.76 (chi-square test)
Malay	11 (78.6%)	3 (21.4%)	14 (100%)	
Indian	25 (67.6%)	12 (32.4%)	37 (100%)	
Others	20 (74.1%)	7 (25.9%)	27 (100%)	
GENDER				
Male	95 (75.4%)	31 (24.6%)	126 (100%)	p = 0.20 (chi-square test)
Female	23 (63.9%)	13 (36.1%)	36 (100%)	

The type of injury sustained also did not affect the patients' decision for analgesia before consultation ($p = 0.58$, chi-square test) (Table 2) nor the treatment they received at the ED ($p = 0.35$, chi-square test) (Table 3).

Patients' decisions on analgesia

The median pain score on the NRS of patients wanting and not wanting analgesia before consultation was 7 (range, 0–10) and 5 (range, 0–10), respectively ($p = 0.002$, Mann-Whitney U-test) (Figure 1).

Among the 69 patients who had expressed their preference for analgesia while waiting to be seen by the doctor, 34 (49.3%) of them received analgesia while 35 (50.7%) did not. In contrast, of the 88 patients who declined any analgesia while waiting to be seen by the doctor, 20 (22.7%) received analgesia after being seen by the doctor ($p = 0.002$, chi-square test).

The median pain score for patients who were given analgesia while in the ED was 7 (range, 3–10) while it was 6 (range, 0–10) for those who did not ($p = 0.01$, Mann-Whitney U-test).

Waiting time for analgesia

Only 157 of the 167 participants responded to the question asking them 'how long they expected to wait for analgesia to be administered': 66.9% wanted

analgesia to be given within 15 minutes of their arrival at the ED (78.3% of those who wanted analgesia at triage) and 16.6% were willing to wait up to 30 minutes. Only 16.6% (26) were willing to wait for more than 30 minutes and 8.9% (14) for more than an hour for analgesia to be administered.

Effect of age and gender

Median pain score was not affected by age ($r = -0.075$, Spearman's correlation co-efficient) or gender (median pain score for both male and female patients was 6 [range, 0–10], and $p = 0.31$ [Mann-Whitney U-test]).

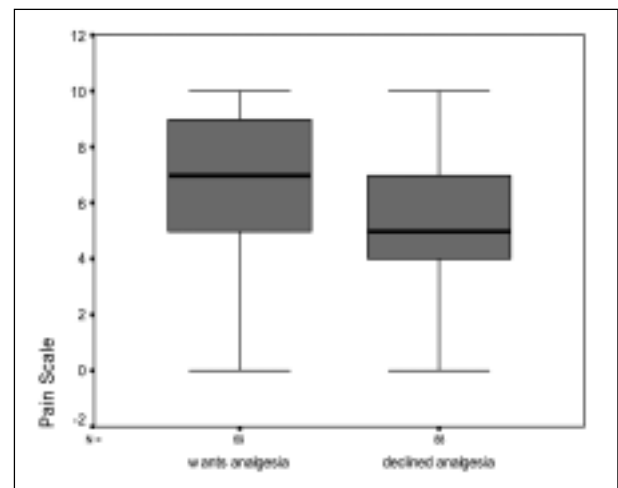


Figure 1. Pain score of patients who wanted or declined analgesia at triage.

Table 2. Preference for analgesia at triage among those who sustained minor injury versus those who sustained fracture/dislocation ($p = 0.58$, chi-square test)

	Preference for analgesia at triage		Total (n=152)
	Yes	No	
Minor injury	47 (42.3%)	64 (57.7%)	111 (100%)
Fracture/dislocation	20 (48.8%)	21 (51.2%)	41 (100%)

Table 3. Receipt of analgesia among those who sustained minor injury versus those who sustained fractures/dislocations ($p = 0.35$, chi-square test)

	Received analgesia at ED		Total (n=162)
	Yes	No	
Minor injury	36 (30.5%)	82 (69.5%)	118 (100%)
Fracture/dislocation	17 (38.6%)	27 (61.4%)	44 (100%)

Effect of race

The median pain score for the four ethnic groups, Chinese, Malay, Indian and patients of 'other' races were 6 (range, 0–10), 5 (range, 3–10), 8 (range, 1–10) and 6.5 (range, 3–10), respectively. The median pain score among Indian patients was found to be significantly higher ($p = 0.048$, Kruskal-Wallis test).

Twenty-one (56.8%) out of the 37 Indian patients and 15 (62.5%) of the 27 patients of other races had requested analgesia at triage. This was significantly higher than the 26 (31.0%) of 84 Chinese patients and seven (50.0%) of the 14 Malay patients ($p = 0.001$, chi-square test).

Twenty-eight (33.3%) of the 84 Chinese patients, four (28.6%) of the 14 Malay patients, 14 (37.8%) of the 37 Indian patients and 10 of the 27 patients of other races received analgesia while at the ED. Race was not found to affect receipt of analgesia at the ED ($p = 0.65$, chi-square test).

Discussion

Waiting time for analgesia: the expectations vs. the truth

Of the patients in this study, 66.9% indicated that they expected analgesia to be given within 15 minutes of their arrival at the ED. This was even higher among those who wanted analgesia at triage (78.3%). Only 14 (8.9%) of the patients in the study were willing to wait for more than an hour before receiving analgesia. It is sobering to note that we were unable to meet our patients' expectations 91.1% of the time.

The mean waiting time from arrival at the ED to the time patients received analgesia during the study was 77.6 minutes (95% CI = 63.2–92.0 min). This finding was consistent with other studies where patients waited between 74–140 minutes before analgesia was administered.^{5,6}

To date, there is no 'gold standard' on what is the optimal 'door-to-analgesia' time. The difficulty lies with the fact that pain is a subjective feeling and the underlying aetiology varies.

Furthermore, the nature of work in most EDs will not allow for patients in pain to see a doctor and be prescribed analgesia the moment they arrive. Triage decision is based on the severity and prognosis of the patient's condition. Thus patients with emergent life-threatening conditions will gain priority to the provision of care while patients in pain will have to wait for their turn in the current situation. Is there a way out?

The direction taken by some EDs is to re-invent processes and put in place protocols so that patients in pain may receive analgesia at the earliest possible time before being seen by the doctor.^{2,3}

Does the NRS score at triage affect patients' preferences for analgesia or their subsequent receipt of analgesia?

Patients who wanted analgesia at triage were found to have a significantly higher median pain score compared to those who declined. Those who were given analgesia while in the ED were also found to have a higher median pain score.

While it is logical to assume that patients who sustained fractures or dislocations will experience 'more pain' compared to those who sustained minor injuries, the results of this study revealed that there was in fact no difference in the median pain score of these two groups of patients. The type of injury sustained also had no significant effect on whether the patients wanted analgesia to be given at triage or during their consultation at the ED.

It has been reported in the literature that the perception of pain could be affected by many factors, such as gender, age, race, ethnicity and psychosocial background.^{1,7-12} However, the patients in this study showed that those who wanted analgesia and those who were given analgesia did have a higher median pain score.

The NRS is a well-validated tool^{13,14} and the score that the patients indicate on the NRS is perhaps the summary of patients' multiple constructs to express how they perceive the intensity of the pain experienced at that point. The challenge remains that given the

pain score on the NRS summarises the patient's feelings about the intensity of the pain, what then is a pain score to decide who should get analgesia at triage? This remains a practical issue for doctors and nurses, as they need to walk the tightrope of giving good compassionate care while guarding against drug abusers at the same time.

The nurses at our ED do not currently use any objective tools to assess patient's pain intensity. Assessment of pain is usually documented in terms of a description of the patient's complaints. Nonetheless, it is important for us to document patients' perceptions of their pain in an objective manner, such as using the NRS. This will give us an indication of who may require early analgesia.

Why do we not give analgesia when the patients want it?

All the 69 (41.3%) patients who had expressed that they wanted analgesia while waiting to be seen by the doctor, were brought to the doctor for analgesia to be prescribed after triage. However, only 34 (49.3%) of them were given analgesia, while the other 35 (50.7%) did not receive analgesia.

There is cause for concern for this low analgesia prescription rate among those who indicated that they wanted analgesia. Anecdotal discussion with doctors revealed that many of them felt that the patient's injury was 'not that severe' to warrant immediate analgesia. They did not ask patients if they wanted analgesia and they were also blinded to the patient's earlier preference at triage. These doctors also felt that their top priority was to treat patients with acute life-threatening injury, while patients with pain after minor injury could wait for their turn to be seen.

One major duty of the ED is to alleviate pain. This is especially so since pain is the most common complaint from patients seeking treatment at the ED.¹ While it is important to treat those with emergent life-threatening condition, it is equally important to relieve patients' pain. While it is appropriate for doctors to prioritise the provision of care, the ED should develop

creative solutions to overcome this problem. Protocol-based nurse deliveries of analgesia and process evaluation are possible approaches to overcome this problem.^{2,3}

Fifty-four out of 167 patients (32.3%) received analgesia while at the ED. This was consistent with figures reported in other studies,^{1,14-16} which reported figures ranging from 23–56%. This figure needs to be improved as it reveals to us that we are under-treating our patients who are in pain.

We must inculcate in our staff the importance of pain management. The need to look at disease processes and injuries through the patient's eyes is an important value to inculcate in our doctors and nurses, so that they can empathise with patients who are in pain and understand the need for relieving it in the quickest possible time. This will ensure success in whatever protocols or work processes that may be implemented, since we have a group of people who share the same values in our approach towards good pain management in the ED.

Race

Indian patients were found to have a significantly higher median pain score compared to other races ($p = 0.048$). There was no significant difference in the proportion of minor injuries and fractures/dislocations among the various races. It is a common observation among local healthcare workers that Indian patients tend to have a greater emotional response to pain. Other studies have also reported that the response to pain is varied and influenced by people of different psychosocial backgrounds.⁷

The proportion of Indian patients and patients of 'other' races who wanted analgesia were also significantly higher ($p = 0.001$). However, the proportion of patients from various races who subsequently received analgesia at the ED was not significantly different ($p = 0.65$, chi-square test). While race is a significant predicting factor as to whether patients wanted analgesia at triage, it does not affect the likelihood of them receiving analgesia at the ED.

This indicates that patients' perception of their pain and their preference for early analgesia did not affect the doctor's decision to prescribe analgesia.

Limitations

Study of patient satisfaction

This study examined the pain score of patients who presented to our ED in pain as a result of trauma. It also looked at their desire for analgesia and how their pain was actually treated. However, there was no follow-up to assess the adequacy of the analgesia rendered. Finally, patients' satisfaction regarding the treatment rendered was also not studied.

Suffice to say that process improvement may result in more expeditious delivery of analgesia in our ED. It is perhaps even more important to ensure that we provide services that meet patients' expectations. Time and manpower constraints encountered in this study have hampered efforts to include these aspects of the study. This will be included in future studies so that the important component of patient satisfaction with the total care provided can be studied.

Studying the attitudes of health care workers

This study did not examine the attitudes of doctors and nurses who played a critical role in the management of patients in the ED. It was the intention to review patient perception first before exploring further into this broad and complex subject.

Conclusion and recommendations

It is evident that more needs to be done for patients who present at the ED in pain.

Healthcare workers need to be educated regarding the importance of delivering analgesia at the earliest possible time once patients arrive at the ED in pain. It is also essential to improve our processes in this area while not compromising the ED's task of giving patients with emergent life-threatening medical conditions our best care.

Patients with a pain score of 7 or more on the NRS should be offered analgesia at triage, while those with a pain score of 6 or less on the NRS should still be given analgesia at triage if they request it. The pain score should be incorporated as the 'fifth' vital sign in the ED record and serve as a guide for nurses and doctors to decide who should be promptly treated for their pain and who could wait. It also allows doctors to reassess patients' pain score sequentially to evaluate the effectiveness of the treatment rendered.

There is indeed no magical 'door-to-analgesia' time. There never will be. Medicine is inherently subjective to begin with and the sensation of pain is equally so. However, we must still treat our patients to the best of our ability, and the management of pain in the ED is certainly no different.

References

1. Wilson JE, Pendleton JM. Oligoanalgesia in the emergency department. *Am J Emerg Med* 1989;7(6):620-3.
2. Kelly AM. A process approach to improving pain management in the emergency department: development and evaluation. *J Accid Emerg Med* 2000;17(3):185-7.
3. Goodacre SW, Roden RK. A protocol to improve analgesia use in the accident and emergency department. *J Accid Emerg Med* 1996;13(3):177-9.
4. Ducharme J. Emergency pain management: a Canadian Association of Emergency Physicians (CAEP) consensus document. *J Emerg Med* 1994;12(6):855-66.
5. Tanabe P, Thomas R, Paice J, Spiller M, Marcantonio R. The effect of standard care, ibuprofen, and music on pain relief and patient satisfaction in adults with musculoskeletal trauma. *J Emerg Nurs* 2001;27(2):124-31.
6. Ducharme J, Barber C. A prospective blinded study on emergency pain assessment and therapy. *J Emerg Med* 1995;13(4):571-5.
7. Holdcroft A, Power I. Recent developments: management of pain. *BMJ* 2003;326(7390):635-9.
8. Raftery KA, Smith-Coggins R, Chen AH. Gender-associated differences in emergency department pain management. *Ann Emerg Med* 1995;26(4):414-21.
9. Weisse CS, Sorum PC, Sanders KN, Syat BL. Do gender and race affect decisions about pain management? *J Gen Intern Med* 2001;16(4):211-7.
10. Jones JS, Johnson K, McNinch M. Age as a risk factor for inadequate emergency department analgesia. *Am J Emerg Med* 1996;14(2):157-60.
11. Todd KH, Samaroo N, Hoffman JR. Ethnicity as a risk

- factor for inadequate emergency department analgesia. *JAMA* 1993;269(12):1537-9.
12. Todd KH, Deaton C, D'Adamo AP, Goe L. Ethnicity and analgesic practice. *Ann Emerg Med* 2000;35(1):11-6.
 13. Berthier F, Potel G, Leconte P, Touze MD, Baron D. Comparative study of methods of measuring acute pain intensity in an ED. *Am J Emerg Med* 1998;16(2):132-6.
 14. Beel TL, Mitchiner JC, Frederiksen SM, McCormick J. Patient preferences regarding pain medication in the ED. *Am J Emerg Med* 2000;18(4):376-80.
 15. Lewis LM, Lasater LC, Brooks CB. Are emergency physicians too stingy with analgesics? *South Med J* 1994;87(1):7-9.
 16. Selbst SM, Clark M. Analgesic use in the emergency department. *Ann Emerg Med* 1990;19(9):1010-3.