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Undertreatment of acute pain in the emergency department: a challenge

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Abstract

Objective. Evaluation and improvement of pain management in our emergency department (ED).

Design. This was a 'before–after' study. For each subject, the nurse, the physician, and the patient were asked to rate the initial intensity of the pain on a Visual Analogue Score (VAS). The timing and the type of analgesics administered were then recorded and follow-up VAS was performed.

Setting. A teaching, community-based, 400-bed hospital.

Study participants. 140 patients admitted for acute pain related to orthopedic injuries.

Main outcome measures. The gap between the VAS expressed by the patient and estimated by the staff, the proportion of patients receiving analgesics, and the length of time delays between admission and analgesic administration.

Intervention. The intervention included education of medical and nursing staffs, insertion of a VAS template in the patient's chart, initiation of routine VAS assessment and re-assessment, and implementation of a protocol for pain management with standing orders for nurses.

Results. The VAS gap between the patient and the nurse decreased significantly from 1.91 ± 2.04 to 1.03 ± 1.97 after the intervention ($P = 0.01$). The percentage of patients receiving analgesics rose from 70 to 82% following the intervention. Time from admission to analgesia decreased from 80 ± 68 min (mean $\pm$ SD) before the intervention, to 58 ± 37 min after the intervention ($P = 0.05$).

Conclusion. Inadequate pain management in the ED appears related to poor staff assessment of pain and may be improved by routine VAS recording and by a nurse-based pain protocol.

Keywords: emergency department, pain, visual analogue score

Introduction

Pain is one of the leading symptoms in emergency departments (EDs). However, studies have shown that as many as 70% of patients with acute painful conditions do not receive any pain medications in the ED [1–4]. Several causes contribute to undertreatment of pain and include: lack of reporting, poor communication, inadequate education of providers, and misconceptions on the part of both patients and staff. While the Joint Commission on Accreditation of Healthcare Organizations, in the USA, has set up standards for pain management, the implementation appears to be slow [5]. The purpose of the present study was to assess the level of pain management in our ED, to evaluate potential causes for undertreatment, to target these causes with an intervention, and finally to determine the effectiveness of the intervention.

Methods

Patients over the age of 12 years, presenting to the ED for acute pain related to orthopedic conditions such as fractures, sprain and strains (and no head injuries) were included in the study. A third of the patients sustained minor trauma, 30% fractures–dislocations, 17% road accidents, 4% cuts and lacerations, and 7% musculoskeletal pain. The study was prospective

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and observational, and included two phases—before and after an intervention; each designed to collect data on 70 patients over 3–4 weeks, during 2002. For each subject, the nurse, the physician, and the patient were asked to rate the initial intensity of pain on a Visual Analogue Score (VAS) from 1 to 10. The timing and the type of analgesics administered were then recorded and follow-up VAS was performed at 30–60 min after treatment and before discharge from the ED. To explore the potential contribution of patient misconceptions to undertreatment, 41 patients (from the first phase of the study) were asked to rank agreement with the following statements, on a scale of 0 (full disagreement) to 5 (full agreement): 'Analgesics do not influence pain'; 'One can easily become addicted to pain killers'; 'Good patients don't talk about pain'; 'It is easier to suffer from pain than from side effects of analgesics'; 'Pain complaint might distract the doctor from my real problem'; and 'Analgesics should be given only when pain is unbearable'.

After the first phase of the study, the results were presented at staff meetings and discussed with both physicians and nurses. An intervention was designed as follows:

1. A VAS template was included in each patient's chart, as a fifth vital sign.
2. The admitting nurse was instructed to assess VAS on admission for each patient and to reassess it 30–60 minutes after treatment.
3. Illustrated posters for patients encouraging pain control were hung at several places in the ED.
4. A protocol for pain management was developed and posted.
5. Several nurses were appointed as 'pain trustees' to promote the protocol.
6. Standing orders for the use of some analgesics (dipyrone and acetaminophen) were written for VAS up to 7 (and most nurses of the ED were authorized by the Head Nurse to implement these orders).

Nearly 3 months after the initiation of the intervention, the second phase of the study was conducted with a survey of an additional 70 patients. These patients were randomly selected and in all of them an initial VAS was completed. To compare the results from the two phases, a two-tailed Student's *t* test was used for continuous variables, and a chi-squared test for categorical variables. A paired *t* test was applied for comparison of pain ratings between patients, doctors, and nurses. Relationships between variables were examined using Pearson's correlation and testing. The outcomes variables for quality assessment were: the proportion of patients with documented VAS, the proportion of patients receiving analgesics, the length of delay between admission and analgesic administration, and the gap between the VAS expressed by the patient and that estimated by the staff. Data are presented as mean ± standard deviation (SD). Statistical significance was set at $P < 0.05$.

Results

Patients enrolled in the two phases of the study were similar with regard to age, ethnicity, and education (although slightly more women were included in the post-intervention phase) (Table 1). No relationship was found between these variables and the degree of pain assessment or management.

We examined beliefs of patients about pain in the first 41 patients included in the pre-intervention phase. Approximately one-third of the patients agreed with the first five statements consistent with attitudes leading to reluctance to report pain. Two-thirds agreed with the last statement indicating that patients should not ask for analgesia unless pain is unbearable (Table 2). No relationship was found between these attitudes and the demographic variables or whether the patients actually received analgesics during the current ED visit.

VAS ratings by patients, nurses, and doctors are shown in Table 3. The average pain scores by patients were slightly lower after the intervention, both upon admission and after 30–60 minutes. From an average VAS of 7–8 upon admission, the patients reported a decrease in pain level 30–60 minutes after analgesics and at discharge. This decrease in pain level was still slightly higher than their expressed threshold to go home with (this value expresses the maximal average VAS at which patients are ready to go home). A significant gap was observed for VAS ratings by the patient, by the nurse, and by the doctor. The gap between the patient and the nurse decreased significantly from 1.91 ± 2.04 to 1.03 ± 1.97 after the intervention.

In the first phase of the survey, 70% of patients received analgesics. The mean time from admission to analgesia was 80 ± 68 minutes and nearly 40% of patients with severe pain (VAS

Table 1 Demographic characteristics of the patients in the survey

	Phase 1 (before intervention)	Phase 2 (after intervention)
Number of patients	70	70
Mean age (years) ± SD	33 ± 21	30 ± 20
Proportion of non-Jews (%)	56	55
Proportion of females (%)	29	44
Education		
Proportion with <10 years of schooling	48	35
Proportion with >10 years of schooling	39	46
Proportion with university level education	13	19

All comparisons were non-significant.

Table 2 Patients' attitudes towards pain ($n = 41$)

Statement	Proportion of patients agreeing with statement (%)
Analgesics do not influence pain	37
One can easily become addicted to pain killers	42
'Good patients' don't talk about pain	32
It is easier to suffer from pain than from side effects of analgesics	42
Pain complaint might distract the doctor from my real problem	30
Analgesics should be given only when pain is unbearable	66

above 7) had to wait more than an hour for analgesics. After the intervention, 82% of patients received analgesics and the time from admission to analgesia significantly decreased to 58 ± 37 minutes ($P = 0.047$). After the intervention there was also a reduction of 'time from order to administration' of analgesics from 14.64 ± 20.13 minutes to 5.38 ± 9.97 minutes ($P = 0.008$). The improvement was most prominent for patients with moderate pain (VAS in the range 5–7), for which the nurses used the standing orders. In this group, the percentage of patients who received analgesics increased from 50 to 76% ($P = 0.05$) and the time from admission to analgesia decreased significantly from 101 ± 66 to 56 ± 32 minutes ($P = 0.01$). Interestingly, although analgesics led to 50% decrease in pain intensity, patients who did not get them reached the same level of pain amelioration upon discharge from the ED (data not shown).

Discussion

For the purposes of this study, we evaluated orthopedic injuries as pain control in the ED is medically acceptable in these patients, as opposed to patients with acute abdominal pain where controversy exists as to the role of pain control [6]. Before the present study, in our ED, the use of VAS for initial and subsequent evaluation of pain was sporadic and never recorded. A pain scale was used mainly in patients with acute chest pain, reflecting, in the eye of nurses and physicians, its important implications regarding ongoing cardiac ischemia [5]. Previous studies have documented the underuse of pain medication in the ED, with only about half of patients receiving analgesics [4], with a range of 30–77% in patients with fractures [1,7]. A study of the role of ethnicity found that Hispanics and black patients were twice as likely as non-Hispanic white patients to receive no pain medication in the ED [8]. In our survey, 70–80% of patients received analgesics, and we did not identify risk factors for undertreatment: there was no relationship between age, sex, education, ethnicity, or beliefs and pain management. Pain improvement without analgesia could be related to the fact that about a third of the patients in both groups were treated with mechanical measures (such as fixation of fractures, reposition of dislocations). While medications are important in pain management, reassurance, empathy, and explanations—about the condition and its likely course—are no less important [9].

Another important factor leading to undertreatment of pain is the tendency for care-givers to underestimate the pain level experienced by patients [10]. More research is needed to understand this issue, as statistically significant differences in pain ratings may not be clinically meaningful [11]. One study found that nurses underestimated the pain level experienced by patients more than physicians [12] while in our study, nurses were closer to patients in their evaluation of pain. Furthermore, after the intervention, the VAS gap between the patient and the nurse (but not between the patient and the doctor) decreased significantly. In addition, after the intervention, time delays were reduced and more patients with moderate pain received analgesics, probably because nurses were allowed to give medicines to patients before they were evaluated by a physician. Still it is not clear why it took so long for patients to receive medication after intervention. The majority

Table 3 VAS assessment by patients, nurses and doctors

VAS (mean ± SD)	Phase 1 (before intervention)	Phase 2 (after intervention)	Statistical significance for comparison of phases 1 and 2
By patients			
Upon admission	7.99 ± 2.12	7.06 ± 1.96	$P = 0.01$
30–60 minutes after analgesia	5.11 ± 2.91	3.77 ± 2.37	$P = 0.01$
At discharge	4.16 ± 2.17	3.81 ± 2.34	NS
Threshold to go home	3.00 ± 2.43	ND	
By nurses (upon admission)	6.09 ± 2.52	6.06 ± 2.34	NS
By doctors (upon admission)	5.43 ± 2.11	4.01 ± 1.97	$P < 0.001$
VAS gap			
Between patient and nurse	1.91 ± 2.04*	1.03 ± 1.97*	$P = 0.01$
Between patient and doctor	2.47 ± 1.89*	2.91 ± 1.98*	NS

*$P < 0.001$ vs. zero (paired t test).
ND, not determined.

of ED patients are in fact willing to receive pain medication from a nurse, before evaluation by a physician [7]. Thus, it may be reasonable to have registered nurses administer drugs for pain control before physician evaluation, using a well-defined triage protocol.

In both phases of our study, many patients with severe pain either did not receive analgesia at all or only after a significant delay. Since these patients require stronger medications requiring a doctor's order, underestimation of pain by the physician could have led to poor pain control. A potential solution to this problem is the implementation of a nurse-managed, intravenous narcotic policy, shown by Kelly [13] to induce a remarkable improvement in pain management in the ED.

In conclusion, poor pain management in the ED may be related to inadequate assessment of pain level by care-givers and may be improved by initiation of routine VAS recording and by the implementation of a nurse-based pain protocol.

References

1. Lewis LM, Lasater LC, Brooks CB. Are emergency physicians too stingy with analgesics? *South Med J* 1994; **87**: 7–9.
2. Selbst SM, Clark M. Analgesic use in the emergency department. *Ann Emerg Med* 1990; **19**: 1010–1013.
3. Wendel TD. Risk factors for oligoanalgesia in U.S. emergency departments. *Acad Emerg Med* 2001; **8**: 427–428.
4. Wilson JE, Pendleton JM. Oligoanalgesia in the emergency department. *Am J Emerg Med* 1989; **7**: 620–623.
5. Eder SC, Sloan EP, Todd K. Documentation of ED patient pain by nurses and physicians. *Am J Emerg Med* 2003; **21**: 253–257.
6. Wolfe JM, Lein DY, Lenkoski K, Smithline HA. Analgesic administration to patients with an acute abdomen: a survey of emergency medicine physicians. *Am J Emerg Med* 2000; **18**: 250–253.
7. Beel TL, Mitchiner JC, Frederiksen SM, McCormick J. Patient preferences regarding pain medication in the ED. *Am J Emerg Med* 2000; **18**: 376–380.
8. Todd KH, Deaton C, D'Adamo AP, Goe L. Ethnicity and analgesic practice. *Ann Emerg Med* 2000; **35**: 11–16.
9. Ducharme J. Emergency pain management: a Canadian Association of Emergency Physicians (CAEP) consensus document. *J Emerg Med* 1994; **12**: 855–866.
10. Guru V, Dubinsky I. The patient vs. caregiver perception of acute pain in the emergency department. *J Emerg Med* 2000; **18**: 7–12.
11. Todd KH. Clinical versus statistical significance in the assessment of pain relief. *Ann Emerg Med* 1996; **27**: 439–441.
12. Harrison A. Comparing nurses' and patients' pain evaluations: a study of hospitalized patients in Kuwait. *Soc Sci Med* 1993; **36**: 683–692.
13. Kelly AM. A process approach to improving pain management in the emergency department: development and evaluation. *J Accid Emerg Med* 2000; **17**: 185–187.

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