Brief Report

Use of a triage pain protocol in the ED

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Abstract

Purposes: This study was designed to evaluate the ability of a triage pain protocol to improve frequency and time to delivery of analgesia for musculoskeletal injuries in the emergency department (ED).

Basic Procedures: Frequency and time to analgesic administration were measured before and after use of a triage pain protocol. The protocol allowed analgesic medications to be given at the time of triage.

Main Findings: Time to medication administration was 76 minutes (95% confidence interval [CI], 68-84 minutes) before and 40 minutes (95% CI, 32-47 minutes) after the protocol. Five hundred fifty-nine (70%) of 800 patients received analgesics using the protocol compared with 212 of 471 (45%) patients prior.

Principal Conclusions: Use of a triage pain protocol increased the number of patients with musculoskeletal injury who received pain medication in the ED. Use of the protocol also resulted in a decrease in the time to analgesic medication administration.

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1. Introduction

The lack of adequate analgesia in the emergency department (ED) has been documented repeatedly since Wilson and Pendleton [1] described “oligoanalgesia in the ED” in 1989 [2-4]. Triage protocols have been shown to improve the time to intervention for the presenting complaints of chest pain and pediatric fever in the ED [5,6]. Establishment of triage pain protocols in the ED may improve the percentage of patients that receive analgesia and the timeliness of analgesia administration. A British study, however, reported limited success using an analgesia protocol to improve delivery of pain medication [7]. This study was designed to evaluate the effectiveness of a triage pain protocol on improving frequency of analgesia administration and time to delivery of analgesia for painful musculoskeletal injuries in the ED.

2. Methods

A before and after observational study was performed in an urban university ED with an annual volume of 30,000 patients. The university institutional review board approved the study protocol.

A convenience sample of patients was enrolled over a 4-month period. Enrollment occurred between the 8:00 AM and 12:00 midnight when research associates were available for data collection. A historical control group of patients treated before initiation of the triage protocol was used for comparison. The historical group was a convenience sample of patients presenting with the same chief complaints enrolled over a 1-year period before initiation of the protocol. Inclusion criteria included all patients presenting with traumatic extremity or back pain. Exclusion criteria included age less than 18 years, inability or unwillingness to complete the study, and use of protocol or other analgesic medications within 6 hours of presentation.
A triage pain protocol (Fig. 1) was initiated by nursing personnel upon identification of patients presenting with isolated extremity or back pain at the time of ED arrival. The triage pain protocol was designed to allow the triage nurse to initiate analgesia at the time of triage and before physician evaluation. A 2-month trial period preceded data collection for the triage protocol. A 15-minute nursing in-service was given by the principal investigator at the start of the trial period and 1 month into the trial period. Monthly nursing quality assurance audits were performed with feedback given to the nursing staff as a whole and individually regarding enrollment of eligible patients.

Pain intensity was measured using a previously validated 100-mm Visual Analog Scale (VAS)[8,9]. The pain VAS was a 100-mm horizontal line with the words “least possible pain” on the left border and “worst possible pain” on the right border.

Research associates blinded to the study objective collected all data related to the study from 8:00 am to midnight 7 days of the week. Raw data were entered into a Microsoft Access Database (Microsoft, Redmond, WA). A nursing chart audit of all ED patients was used to determine the percentage of eligible patients who were enrolled in the triage pain protocol.

The primary outcome measures were time to pain medication administration and percentage of patients receiving pain medications. Time to medication administration was recorded from the nursing record. Secondary outcome measures were change in pain intensity between arrival and the time of discharge, and compliance with the pain protocol. Demographic data included age and sex.

Results are reported using descriptive statistics and as means with comparison of effect size using 95% confidence intervals (CIs). Time to medication administration was also compared using Mann-Whitney U test with significance defined as $P < .05$. All data analysis was performed using SPSS (SPSS, Chicago, Ill).

3. Results

A total of 112 patients were enrolled in the triage pain protocol, and 471 patients were enrolled in the control group during times when research associates were available for data collection. Within the pain protocol cohort, 18 patients presented with mild pain (VAS, 1-33 mm) and were enrolled in the mild pain arm, 24 patients presented with moderate pain (VAS, 34-66 mm) and were enrolled in the moderate pain arm, 29 patients presented with severe pain (VAS, >66 mm) and were enrolled in the severe pain arm, and 31 patients presented with severe pain and were enrolled in the moderate pain arm because of nursing discretion of severity of illness or injury.

The mean time to medication administration was 76 minutes (95% CI, 68-84 minutes; range, 0-405 minutes; median, 65 minutes) for the preprotocol group and decreased to 40 minutes (95% CI, 32-47 minutes; range, 0-141 minutes; median, 26 minutes) after initiation of the protocol ($P < .001$).

The nursing chart audit of all presenting patients showed a total of 800 patients eligible for the pain protocol. The protocol was used in 559 patients (70%). Individual triage nurse compliance varied between 8% and 96%. In the historical control group collected 1 year before the start of the triage pain protocol, 212 (45%) of 471 patients received pain medication.

The mean change in pain intensity at discharge was not different between the triage pain protocol group and the historical control group that received analgesic medication. However, the triage pain protocol group had a larger mean change in pain intensity at discharge when compared with

![Fig. 1 Triage pain protocol.](image-url)

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the historical control group that did not receive pain medication. Demographic and pain intensity data are detailed in Table 1.

4. Discussion

Inadequate treatment of pain in the ED has been the subject of numerous studies. The outcome measure most frequently used to reach this conclusion has been the number or percentage of patients with pain who receive pain medication in the ED. The percentage of ED patients with pain who receive pain medication has been shown to be consistently in the 30% to 45% range [1-4]. The mean time to medication administration was reported to be 76 minutes in an academic ED; yet, patients expect to receive pain medication an average of 29 minutes after arrival [4].

In this study, the use of a triage pain protocol decreased the mean time to pain medication administration from 76 to 40 minutes. The time to medication administration reported reflects time elapsed from patient registration until delivery of pain medication by nursing staff. These times were recorded directly from the patient chart. It is possible that the recording of these times may have been affected by the study. Although the time to pain medication administration with this protocol exceeds previously reported patient expectations, there is improvement from standard practice in our ED.

The triage pain protocol did not improve pain relief at discharge when compared with a historical control group that received pain medication. However, 70% of eligible patients received pain medication using the triage pain protocol compared with 45% of the historical control group. Pain relief at discharge was improved for the triage pain protocol group when compared with the historical control group not receiving pain medication. However, the difference in pain intensity (13 mm) is near the threshold for clinical significance described by Todd et al [10], and the pain intensity of these 2 groups are similar at the time of discharge.

Limiting the inclusion criteria to those patients with moderate to severe pain would simplify the protocol process and target patients most in need of analgesic intervention. Allowing nursing discretion to place patients with severe pain (VAS, >66 mm) in the “moderate” or “severe” pain arm was necessary to gain nursing “buy in” to the protocol process and avoid the perception of increased time and work to establish intravenous access. Use of alternative drug delivery systems may avoid this issue. The wide range of nursing compliance with the protocols is an interesting finding. This may reflect the wide range of practice patterns seen with pain treatment in the ED and the reluctance of many ED caregivers to treat pain with opioid analgesics, but it is beyond the scope of this study. The study excluded patients who had taken analgesic medication in 6 hours before ED arrival to avoid the influence of other analgesics on pain intensity.

Limitations of this study include use of a single academic ED site, historical controls, and convenience sampling of patients. Research associates attempted to enroll all eligible patients; however, the number of potential patients who were not enrolled or those excluded from the protocol is unknown. In addition, the treatment protocols used were an empiric attempt to provide adequate pain relief across the full range of the VAS but have not been tested or validated in a controlled setting. The study itself may have resulted in an increased awareness of pain treatment and have been partially responsible for the increased percentage of patients receiving pain medication and the decrease in time to medication administration independent of the triage pain protocol.

In summary, implementation of a triage pain protocol in the ED decreased time to pain medication administration and increased the number of patients who received pain medication. Change in pain intensity at discharge with use of the triage pain protocol was similar to historical controls who received pain medication and showed improved pain relief compared with historical controls who received no pain medication.

References