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Evaluating a medical directive for nurse-initiated analgesia in the Emergency Department

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ABSTRACT

Objectives: Although acute pain is a common presentation in the Emergency Department (ED), analgesics are often delayed until the patient is seen by a physician. We assessed the effect of a medical directive for nurse-initiated analgesia on time to first dose of analgesics, proportion of patients receiving analgesics in less than 30 min, and total length of stay in the ED.
Methods: A medical directive for nurse-initiated analgesia was introduced in our ED in October 2011. This before-after health record review included all patients presenting to the ED with musculoskeletal back pain in 4 month periods before and after implementation of the medical directive.
Results: A total of 524 cases were reviewed, of which 401 were included – 201 and 200 in the before and after implementation groups respectively. After implementation there was a shorter time to first dose of analgesic (mean of 118 vs 160 min, $p < 0.001$), and a higher proportion of patients receiving analgesics in the first 30 min (20% vs 4%, $p < 0.001$). However there was no difference in total proportion of patients receiving analgesics (71% vs 67%, $p = 0.46$) or total length of stay in the ED (337 vs 323 min, $p = 0.51$).
Conclusions: A medical directive for nurse-initiated analgesia in the ED was associated with significantly reduced time to the first dose of analgesic, and increased the proportion of patients receiving analgesics within 30 min. We can conclude that medical directives for nurse-initiated analgesia effectively improve the timeliness and quality of care for patients with acute pain.

1. Introduction

Acute pain is the most common primary complaint seen in the emergency department (ED) [1,2]. Unfortunately, pain is often poorly treated in the ED [2–7]. In particular, patients expect to receive analgesics more rapidly than routinely occurs. A survey of ED patients revealed they expected to receive analgesics within 30 min of their arrival [5]. Although triage nurses routinely assess patients' pain, medications are usually not provided prior to being ordered by a physician, which leads to significant delays in analgesia. Nurse-initiated analgesia protocols have been proposed as a potential solution to decrease the time to first dose of analgesics in the ED [2,8,9].

In October 2011, The Ottawa Hospital ED introduced a medical directive enabling nurses to provide three classes of oral analgesic medications to a broad spectrum of patients presenting to the ED with pain, prior to the patient being seen by a physician (see Appendix).

This protocol is generally applied by the triage nurse, but can be applied by any ED nurse looking after a patient. Eligible patients under this medical directive may receive any combination of the three medications (Acetaminophen 975 mg, Naproxen 250 mg, Tramadol 50 mg), depending on the severity of pain, and on the presence of pre-specified contraindications to each medication. Thus, for example, a patient who had recently taken Acetaminophen might still be eligible to receive Naproxen and Tramadol.

The objectives of this study were to assess the impact of this medical directive on (i) the proportion of patients receiving analgesics, of any kind, in the ED; (ii) the mean time interval between ED arrival and the administration of the first dose of analgesic, (iii) the proportion of patients receiving analgesics in the first 30 min of their ED arrival, and (iv) the mean total length of stay in the ED. We chose to limit our patient population to patients presenting with musculoskeletal back pain in order to decrease clinical heterogene-

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ity, and because guidelines suggest these patients do not routinely require investigations or management beyond analgesia [10].

2. Methods

2.1. Study design and setting

We conducted this before-after health record review at two of the three Ottawa Hospital campuses between September 2010 and December 2012. The Ottawa Hospital is a tertiary care, University affiliated institution with an annual ED census of 160,000 visits. The Civic campus of the Ottawa Hospital is a level one accredited trauma center.

2.2. Medical directive development and implementation

The Medical Directive was developed by a team of experienced local emergency physicians and nurses, based on local prescribing patterns, best practices, and local regulations controlling which medications can be administered without a direct physician order.

Emergency Department nurses were provided written information about the medical directive, along with a power point presentation. This was followed by in-person small group, or one-on-one, education sessions about the medical directive, which occurred over a period of several weeks, involving roughly 250 nurses divided between two campuses. Nurses were required to complete this training before using the protocol.

2.3. Selection of participants

We enrolled two separate cohorts of consecutive ED patient visits that were discharged home from the ED with a primary diagnosis of musculoskeletal back pain. The first cohort, from September to December 2010, comprised the pre-implementation group, while the second cohort, from September to December 2012, was the post-implementation group. These time periods were chosen to compare similar periods of the calendar year, and to allow enough time after introduction of the medical directive to minimize the risk of early implementation biases. We included patients who met all the eligibility criteria for the nurse-initiated analgesia protocol which were: all adults (over 16 years old) presenting to the ED with pain. We excluded patients who: presented with multiple trauma, had a significant head injury or altered level of consciousness, presented with potentially ischemic chest pain, had a triage systolic blood pressure under 100 mmHg, or had vomited within the last hour, as these were exclusion parameters for the nurse-initiated analgesia protocol. Patients were also excluded if they had a known non-musculoskeletal cause of back pain, or were diagnosed with one in the month following their initial ED visit – these alternate diagnoses included: vertebral fracture or subluxation; spinal stenosis; spinal tumor (primary or metastatic); discitis, vertebral osteomyelitis, or epidural abscess; epidural hematoma, abdominal aortic aneurysm or aortic dissection; pancreatitis or gall bladder disease; pyelonephritis, and renal or ureteric calculi. These patients were excluded in order to decrease heterogeneity within our study population, in order to better determine what, if any, effect the medical directive had on total length of stay in the ED for patients with uncomplicated back pain. The Ottawa Health Science Network Research Ethics Board approved the study protocol.

2.4. Data collection

Potential cases were identified from the Ottawa Hospital health records using ICD-10 codes consistent with musculoskeletal back pain. We reviewed the patient care record, imaging reports, triage nurse assessment and other nursing records associated with the index ED visit. We also reviewed all documentation from subsequent ED visits, as well as further imaging reports and consultation notes, occurring within one month of the index visit. The study variables were explicitly defined, and a standardized data collection form was created and piloted before two trained data abstractors began data collection. Variables collected included demographic characteristics, medical interventions, and specific contraindications to protocol medications. Time to first dose of analgesia was defined as the time elapsed between patient registration, and the first documented time of an analgesic given. The first 50 consecutive charts in the after-implementation group were independently reviewed by both abstractors to measure agreement.

2.5. Outcome measures

We measured the impact of the medical directive on (i) the proportion of patients receiving analgesics in the ED; (ii) the mean time interval between ED arrival and the administration of the first dose of analgesic, (iii) the proportion of patients receiving analgesics in the first 30 min of their ED arrival, and (iv) the mean total length of stay in the ED. We also recorded whether the medical directive protocol was implemented in each patient in the post-intervention group – the protocol was deemed to have been used if the patient received the medications specified in the protocol without a written order for those medications on the medical chart.

2.6. Data analysis

We performed all data analyses using SAS (Version 9.2, Cary, NC, USA). We calculated descriptive statistics using proportions, means, or medians with standard deviations or interquartile ranges as appropriate for the data. We report effectiveness data comparing the periods before and after the implementation of the medical directive, and efficacy data comparing whether the medical directive was used or not during the after period. Means and proportions were compared using *t*-tests with reported p-values. We used kappa statistics to measure agreement between trained investigators on selection of cases to be included, and on whether the medical directive was applied appropriately.

In order to determine the efficacy and effectiveness of the medical directive on our outcome measures, we also performed multivariate stepwise linear (for mean time to administration of analgesics, and mean total length of stay) and logistic (for proportion of patients receiving any analgesic, and proportion of patients receiving analgesics within 30 min) regression analyses. The following variables were considered for inclusion in the modeling exercise: age, sex, campus location, triage pain score, Canadian triage assessment score (CTAS), arrival by emergency medical services (EMS), diagnostic medical imaging performed, and referral to a consulting service in the ED. First, we performed a series of univariate analyses, only selected those variables with a two-tailed level of significance of $p \leq 0.15$. Second, we used a stepwise approach to determine which remaining variables should be included in the final regression models. Finally, before reporting on the adjusted influence of each variable included in the final model, we verified that basic model assumptions were met, that residuals were normally distributed, that there were no significant outliers or confounders, and that acceptable homoscedasticity was present. We intended to report results from the logistic regression as adjusted odds ratio (OR) with 95% confidence intervals (CI) and the Hosmer Lemeshow goodness of fit, and results from the linear