



<http://dx.doi.org/10.1016/j.jemermed.2016.07.015>

Original Contribution

EMERGENCY DEPARTMENT PAIN MANAGEMENT IN ADULT PATIENTS WITH TRAUMATIC INJURIES BEFORE AND AFTER IMPLEMENTATION OF A NURSE-INITIATED PAIN TREATMENT PROTOCOL UTILIZING FENTANYL FOR SEVERE PAIN

Milan L. Ridderikhof, MD,* Frederick J. Schyns, MD,* Niels W. Schep, MD, PHD,† Philipp Lirk, MD, PHD,‡ Markus W. Hollmann, MD, PHD,‡ and J. Carel Goslings, MD, PHD†

*Department of Emergency Medicine, Academic Medical Center, Amsterdam, The Netherlands, †Trauma Unit, Department of Surgery, Academic Medical Center, Amsterdam, The Netherlands, and ‡Department of Anesthesiology, Academic Medical Center, Amsterdam, The Netherlands

Reprint Address: Milan L. Ridderikhof, MD, Department of Emergency Medicine, Academic Medical Center, PO Box 22660, 1100 DD Amsterdam, The Netherlands

Abstract—Background: Pain management in the emergency department (ED) remains suboptimal. Nursing staff protocols could improve this, but studies show divergent results. **Objective:** Our aim was to evaluate a nurse-initiated pain-management protocol in adult patients with traumatic injuries in the short and in the long term, utilizing fentanyl for severe pain. **Methods:** In this pre–post implementation study, ED patients were included during three periods. The protocol allowed nurses to administer acetaminophen, non-steroidal anti-inflammatory drugs, or fentanyl autonomously, based on Numeric Rating Scale pain scores. **Primary outcome** was frequency of analgesic administration at 6 and 18 months after implementation. **Secondary outcomes** were pain awareness, occurrence of adverse events, and pain treatment after discharge. **Results:** Five hundred and twelve patients before implementation were compared with 507 and 468 patients at 6 and 18 months after implementation, respectively. Analgesic administration increased significantly at 18 months (from 29% to 36%; $p = 0.016$), not at 6 months (33%; $p = 0.19$) after implementation. Pain awareness increased from 30% to 51% ($p = 0.00$) at 6 months and to 56% ($p = 0.00$) at 18 months, due to a significant in-

crease in pain assessment: 3% to 30% ($p = 0.00$) and 32% ($p = 0.00$), respectively. Post-discharge pain treatment increased significantly at 18 months compared to baseline (from 25% to 33%; $p = 0.016$) and to 6 months (from 24% to 33%; $p = 0.004$). No adverse events were recorded. **Conclusions:** Implementation of a nurse-initiated pain-management protocol only increases analgesic administration in adult patients with traumatic injuries in the long term. Auditing might have promoted adherence. Pain awareness increases significantly in the short and the long term. © 2016 Elsevier Inc. All rights reserved.

Keywords—pain; pain management; trauma; orthopedics; musculoskeletal disorders

INTRODUCTION

Almost 20 years ago, pain was recognized as the “fifth vital sign” (1). This has been emphasized by the American Pain Society, the Joint Commission International, and several other scientific and professional organizations.

Patients in the emergency department (ED) frequently need treatment of acute pain, with a reported prevalence in adult patients between 61% and 79% (2–4). In patients

Niels W. Schep’s current address: Department of Surgery, Maasstad Ziekenhuis, Rotterdam, The Netherlands.

with traumatic injuries, the prevalence of pain is even higher, with a reported rate of 90% (5). Despite these figures, pain is frequently treated inadequately. Adult patients with traumatic injuries receive pharmacologic pain treatment in 11–74% (5–8). However, studies addressing the relationship between pain score documentation and analgesic administration show conflicting results (9,10). Incremental pain assessment did not lead to a significant increase in analgesic administration in trauma patients (9). Implementing a template chart, in which it was compulsory to note pain scores, improved pain assessment but not pain treatment (10). Introduction of a pain protocol for emergency physicians decreased unsatisfactory analgesia and increased use of intravenous (i.v.) opiates in patients with musculoskeletal injuries (11). Several studies examined the effect of introducing a nursing staff pain protocol using morphine or pethidine administered i.v. or intramuscularly (i.m.) (12–17). This seemed effective and safe in treating pain of varying causes; nonetheless, several opioid-related adverse events were described (12–14). Nursing staff pain protocols can be divided into two types. They can be nurse-driven, in which nursing staff is allowed to administer analgesic drugs after initial approval and signing off by the treating physician. They can also be nurse-initiated, in which nursing staff is mandated to administer analgesia autonomously, without any interference of a physician beforehand, as a standing order. The latter was reported in three studies investigating opioids in patients with pain from all (non-traumatic) causes (12,14,17). Because results were divergent and different study populations were studied using heterogeneous methods, evidence is lacking on whether a nurse-initiated pain protocol improves pain management in adult patients with acute traumatic injuries. The objective of this study was to evaluate the effect of introducing a pain-management protocol based on Numeric Rating Scale (NRS) pain scores using fentanyl in severe pain, in adults with acute traumatic injuries. Primarily, the effect on frequency of analgesic administration in the short term as well as long term is evaluated. We hypothesized that analgesic drugs, in general, would be administered more frequently after implementation of a formal nurse-initiated pain protocol, and that this effect would be maintained in the long term.

MATERIALS AND METHODS

This study was approved by the Institutional Review Board (waiver W11-066 11.17.0669) of our institution. In reporting this study, we adhered to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) Statement.

Study Design

This is a retrospective, comparative pre–post implementation observational study. The formal pain protocol was implemented in daily clinical practice in January 2012. Patients were included during three periods. All consecutive patients within these periods were screened if eligible for inclusion in the study. The periods were: 1) between June 1 and June 30, 2011 (baseline); 2) between July 1 and July 31, 2012 (6 months after implementation); and 3) between July 1 and July 31, 2013 (18 months after implementation).

Study Setting and Population

All patients were included at the ED of a Dutch Level I trauma center. The inclusion criteria were age 18 years or older and any traumatic injury within 48 h before presentation. Exclusion criteria were presence of an endotracheal tube (ETT); hemodynamic instability (systolic blood pressure < 90 mm Hg); Glasgow Coma Scale < 13 without presence of an ETT; intoxication (as clinically diagnosed by the treating physician); self-inflicted injury; cognitive impairment; pregnancy; transfer from another hospital; allergies for analgesics, and daily use of pain medication or suffering from chronic pain.

Pain Management Protocol

Before implementation, all ED nurses had to attend a 1-h educational session before they could use the pain-management protocol (Figure 1). This was based on a national Dutch pain treatment guideline (18). Pain is assessed using the 11-item, ED-validated NRS pain score; in which 0 is no pain and 10 is the worst pain imaginable (19). Patients are classified as mild pain (NRS 1–3), moderate pain (NRS 4–6), or severe pain (NRS 7–10). Nurses administer analgesia autonomously, depending on these pain scores. Legislation in The Netherlands allows this as long as there is an up-to-date approved protocol in place. The analgesic drugs administered are acetaminophen (APAP) orally or i.v., oral non-steroidal anti-inflammatory drugs, and in case of severe pain, fentanyl i.v.

Study Protocol

Patient's charts were reviewed before implementation and compared with charts at 6 months and 18 months after implementation of the pain management protocol. To improve accuracy and minimize inconsistencies in data collection, the criteria for medical chart review proposed by Worster et al. were used (20). This means that two trained data abstractors (M.L.R. and F.J.S.) extracted

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