Battlefield analgesia

Autor: Steven G. Schauer, DO, RDMS; John B. Robinson, PA; Robert L. Mabry, MD; Jeffrey T. Howard, PhD
Zpracoval: Jaroslav Duchoň

Introduction

Intramuscular morphine sulfate has been the primary battlefield analgesic since the American Civil War. Safer and more effective methods of pain control have been described and were recommended by the Committee on Tactical Combat Casualty Care in October 2013 (previous TCCC guidelines).

Importance

Battlefield analgesia has remained a challenging issue in the field of combat medicine since the wars in Iraq and Afghanistan began. In our experience, the importance of analgesia appears to have been underemphasized in the past, mostly due to the fact that it is not a lifesaving intervention and administration is low in the sequence of casualty treatment. Due to fears of respiratory and cardiac depression and the potential of worsening shock, opioid analgesics are often underdosed by combat medical personnel. Misuse or abuse of narcotics is a concern and leads to some medics being issued only one or two doses of morphine. Pain is regarded as a symptom instead of a disease process. Lack of analgesia in close proximity to the injury appears to cause both peripheral and central sensitization, which lead to changes in neuroplasticity, and to chronic pain and posttraumatic stress disorder (PTSD).1 Previous military-based research has shown a strong association between lack of acute analgesia and the development of PTSD.2 The after effects of underdosing can have significant effects on Soldiers' and Veterans' quality of life, speed of recovery, and rehabilitation. 3 Increasing the risk of downstream chronic diseases likely leads to an increase in overall healthcare costs and utilization.

Goals of This Project

The primary objective of this project was to determine the adherence of caregivers to Tactical Combat Casual Care (TCCC) analgesia recommendations before and after the release of the TCCC guidelines during this project period. Table 1 outlines the relevant TCCC guidelines on analgesia. We also sought to compare analgesia use by conventional forces (CON) versus Special Operations Forces (SOF), as the latter typically have medics with a wider scope of practice. Additionally, we sought to describe the challenges to achieving adequate analgesia for combat casualties and then offer thoughts on how such challenges can be overcome.

Methods

This was a process improvement (PI) project initiated to study the effects of the change of the TCCC guidelines on 31 October 2013 by comparing caregiver adherence before and after the change. This was initially an internal PI project. It was submitted for review by a PI versus research advisory panel and deemed a PI not requiring institutional review board approval. The time period of review was from 31 July 2013 to 31 March 2014, inclusive. One author (JBR) reviewed available records. Data collected included the type of causal agent of the injury, the resultant injury, medications administered, and caregiver type (CON or SOF). Documentation of the point-of-injury (POI) care was annotated by the field medic on standard TCCC treatment cards or TCCC After Action Reviews submitted to the Pre-Hospital Trauma Registry (PHTR). A standardized data extraction spreadsheet was used during data extraction. The "before" period was considered 31 July to 31 October 2013. The "after" period was considered 1 November 2013 to 31 March 2014. Due to small sample size, results for medication use and compliance (binary measurement) with TCCC guidelines were compared only between before and after time periods using $\chi 2$ tests for the before and after periods. The primary measurement this PI project was the administration of analgesia in accordance with contemporary TCCC guidelines at the POI. Secondary measurements included the types of medications being administered. The injury and mechanism of injury (MOI) criteria selected for TCCC POI analgesia eligibility included peppering, gunshot wound, amputation, fracture, burn, laceration, and degloving caused by MOI and blast from a rocket-propelled grenade, improvised explosive device, mine, grenade, and fragmentation or shrapnel.

Data

In this project, we counted 346 US casualties that were evacuated to a higher level of care from the POI. Joint Theater Trauma System PHTR data were available for 185 (53.4%) of these casualties, of whom 134 (66 before, 68 after) met the selected injury and MOI criteria for this project. Before the guidelines changed, there were 66 casualties: 45 SOF casualties and 21 CON casualties. Of the 66 casualties, 65% received no medication and 17% received a medication within TCCC guidelines. The remaining 18% received a medication not listed in the TCCC guidelines.

After the guidelines changed, there were 68 casualties: 27 SOF casualties and 41 CON casualties. Of the 68 casualties, 53% received no medication and 29% received a medication within TCCC guidelines; the remainder received a medication not listed in the TCCC guidelines. These findings represented a 71% increase in the rate of compliance, which approached statistical significance ($p = .08$). These compliance results indicate that a little more than two-thirds of casualties are still not receiving analgesia in accordance with TCCC guidelines. The most common medication administered pre- and post-release was oral transmucosal fentanyl citrate (OTFC). Tables 2 and 3 outline adherence rates before and after the guidelines changed. Tables 4 and 5 outline the breakdown of medications administered. Of the patients receiving medications, 55 casualties received 62 medication doses. Table 6 outlines the injuries.

Discussion

In this data set, most patients did not receive analgesia at the POI, but SOF had higher rates of administration than CON forces. Even after the change in TCCC guidelines, we found limited adherence to recommended strategies in both CON forces and SOF. This data set demonstrates that future interventions are still necessary to improve adherence rates. The reasons for this low adherence is likely multifactorial. Until March 2014, the TCCC guidelines on analgesia recommendations were just recommendations and not accepted standards of the Command in Afghanistan. CON Army medics in garrison do not receive formal medical training in the administration of narcotics and parenteral analgesia (personal communication). This occurs usually just prior to and during combat deployment, and these medics are usually only issued morphine 10mg autoinjectors when on combat missions (unpublished data). Training of US Combat Medics, including both 68W and 18D, occurs over a limited time in which a very wide variety of topics must be covered. For the 68W, training is centered in an academic setting without clinical experience. Clinical experience must be obtained at their duty station under supervision. Among physicians, graduate medical education has recognized the need for supervised clinical experience to train physicians. A similar method of continued training of the medics is necessary to provide them with essential experience. Thus, a significant portion of training should occur under the supervision of their credentialed provider, who then imparts many of their practice patterns to their subordinates.
Another possible factor for low adherence is that the extent of evaluation and interventions applied to the combat casualty at the POI is dependent on estimated time of arrival of the MEDEVAC transport, usually air MEDEVAC. In theater, air MEDEVAC times have decreased significantly to an average of 43 minutes from nine-line transmission to patient arriving to the Role 3 (unpublished data). Additionally, the access to various medications differs between units (both CON and SOF) within the military. For example, the pharmacy formulary in Afghanistan lists OTFC lollipops as only available to SOF. The CENTCOM (US Central Command) waiver authorizes CON unit medics to order OTFC, but it is unclear why such a small number appear to be carrying OTFC in theater. All of these effects lead to a large variance in practice patterns, which will have effects on the treatments rendered on the battlefield.

Current Strategies

Table 1 outlines the analgesic options before and after the guideline change. Table 7 describes the pharmacodynamics for previous and current TCCC analgesia options. The ideal POI analgesic agent would have rapid onset through various administration routes that are easily used in tactical settings. The agent would promote neither hypotension nor respiratory depression; such improved safety would allow the medic to attend to more than one casualty at a time. The possibility for self-administration would allow for analgesia without consuming manpower.

Implementation

Changes to the TCCC guidelines happen when new evidence becomes available. Although the guidelines were changed in October 2013, they did not become the standard of training in theater (Afghanistan) until March 2014, a lag from change to implementation. This highlights the significant time delays from release of new revisions to dissemination to and implementation by the end user. Unit physicians are charged with training and equipping the medics functioning under their supervision. The practice patterns of the supervising provider and comfort or lack of experience with TCCC medications will likely affect the training provided to the medics. Last, the medics functioning through various military treatment facilities have opportunities to continue their training and gain new training while in garrison. It is at the discretion of the providers to control their scope of practice.

Recent memoranda by high-level command at MEDCOM have implored supervising providers to treat the garrison setting as an extension of the battlefield (personal communication). Education in the clinical setting at garrison hospitals may provide an opportunity to review and train medics based on current guidelines. Further research is desperately needed to determine the optimal methods for dissemination of guidelines and training to the medics. Methods for ensuring the medics have ongoing training opportunities must be sought.

www.elite-lhenice.cz

Jaroslav Duchoň