



DEPARTMENT OF THE AIR FORCE
59TH MEDICAL WING (AETC)
JOINT BASE SAN ANTONIO - LACKLAND TEXAS



2 AUGUST 2017

MEMORANDUM FOR SGVT

ATTN: CAPT ALYSSA R DICKEY

FROM: 59 MDW/SGVU

SUBJECT: Professional Presentation Approval

1. Your paper, entitled **Continuous Intrathecal Morphine Infusion for Pain Management in a Patient with Burn Injury** presented at/published to **Military Health Services Research Symposium (MHSRS), Kissimmee FL 27-30 Aug 2017** in accordance with MDWI 41-108, has been approved and assigned local file #**17303**.
2. Pertinent biographic information (name of author(s) title, etc.) has been entered into our computer file. Please advise us (by phone or mail) that your presentation was given. At that time, we will need the date (month, day and year) along with the location of your presentation. It is important to update this information so that we can provide quality support for you, your department, and the Medical Center commander. This information is used to document the scholarly activities of our professional staff and students, which is an essential component of Wilford Hall Ambulatory Surgical Center (WHASC) internship and residency programs.
3. Please know that if you are a Graduate Health Sciences Education student and your department has told you they cannot fund your publication, the 59th Clinical Research Division may pay for your basic journal publishing charges (to include costs for tables and black and white photos). We cannot pay for reprints. If you are a 59 MDW staff member, we can forward your request for funds to the designated Wing POC at the Chief Scientist's Office, Ms. Alice Houy, office phone: 210-292-8029; email address: alice.houy.civ@mail.mil.
4. Congratulations, and thank you for your efforts and time. Your contributions are vital to the medical mission. We look forward to assisting you in your future publication/presentation efforts.

Linda Steel-Goodwin

LINDA STEEL-GOODWIN, Col, USAF, BSC
Director, Clinical Investigations & Research Support

PROCESSING OF PROFESSIONAL MEDICAL RESEARCH/TECHNICAL PUBLICATIONS/PRESENTATIONS

INSTRUCTIONS

USE ONLY THE MOST CURRENT 59 MDW FORM 3039 LOCATED ON AF E-PUBLISHING

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11. The Joint Ethics Regulation (JER) DoD 5500.07-R, *Standards of Conduct*, provides standards of ethical conduct for all DoD personnel and their interactions with other non-DoD entities, organizations, societies, conferences, etc. Part of the Form 3039 review and approval process includes a legal ethics review to address any potential conflicts related to DoD personnel participating in non-DoD sponsored conferences, professional meetings, publication/presentation disclosures to domestic and foreign audiences, DoD personnel accepting non-DoD contributions, awards, honoraria, gifts, etc. The specific circumstances for your presentation will determine whether a legal review is necessary. **If you (as the author) or your supervisor check "NO" in block 17 of the Form 3039, your research or technical documents will not be forwarded to the 502 ISG/JAC legal office for an ethics review.** To assist you in making this decision about whether to request a legal review, the following examples are provided as a guideline:

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Continuous Intrathecal Morphine Infusion for Pain Management in a Patient with Burn Injury

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Introduction

- Patients with burn injury requiring admission to the intensive care unit are at increased risk for delirium due to exposure to opioids and other intravenous infusions needed for pain management and sedation.
- The incidence of delirium in the intensive care unit (ICU) ranges from 45-87%.¹
- Despite the attempt to limit total dosages with a multimodal approach, the amount of medication required for analgesia and sedation hinders the patient's ability to be awake and calm, participate in physical therapy and be liberated from mechanical ventilation.
- This case report details the first reported placement of an intrathecal (IT) catheter for delivery of IT morphine in a effort to limit the use of opioids and sedatives in a patient with burn injury.
- Since IT delivery is within the cerebrospinal fluid (CSF), approximately 1mg of IT morphine is equivalent to 100 mg intravenous morphine.²

Case Presentation

- A 55 year old female sustained 45% TBSA burn injury to the face, anterior torso and extremities after falling into a brush fire pit. Her burn injury was a combination of deep partial thickness and full thickness burns.
- On hospital day six, a Braun epidural kit was used to introduce a 20 gauge multi-orifice catheter 7 cm into the IT space.
- A 2 mg bolus of preservative-free morphine was administered via the catheter.
- The site was covered with a sterile chlorhexidine-impregnated dressing and the catheter was connected to an infusion pump which delivered 0.2 mg/hr of preservative-free morphine.
- Daily catheter maintenance and dressing changes were performed by the Burn Intensive Care Unit (BICU) attending physician a board certified Anesthesiologist
- Surveillance CSF analysis and Gram stain were performed every three days.
- The IT catheter remained in use for a total of eight days and was removed following a fever of 39.5C, which was later attributed to ventilator associated pneumonia.

Results

- The retrospective review of morphine equivalents from systemically delivered medications revealed the peak morphine equivalent of 1370mg was given on hospital day 2.
- Following the addition of a ketamine infusion and enteral methadone, the morphine equivalent was 350mg on the day prior to IT catheter placement.
- After placement of the IT catheter, the morphine equivalent of systemically administered medications trended to zero as seen in Figure 1.
- Since the exact analgesic equivalency of ketamine and methadone are unknown, these medications were not included in the morphine equivalency total
- The ketamine and propofol infusions and enteral methadone were discontinued while the IT catheter was in use as seen in Figure 2.
- The continuous infusion of IT morphine eliminated this patient's requirement for intravenous pain and sedative infusions thus removing a known risk factor for delirium.¹

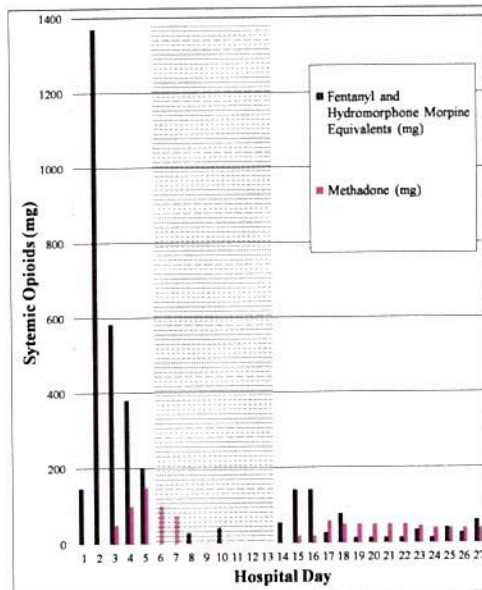


Figure 1: Total morphine equivalents of intravenous fentanyl and hydromorphone administered. Methadone is plotted separately due to the unknown analgesia equipotency. Shaded area represents time period when the IT catheter was in use. IT opioids are not represented on this graph.

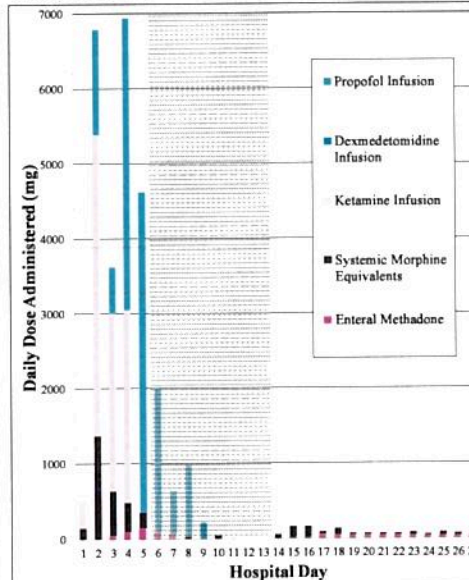


Figure 2: Total infusions, morphine equivalents of intravenous fentanyl and hydromorphone and enteral methadone administered. Shaded area represents time period when the IT catheter was in use. IT opioids are not represented on this graph.

Conclusions

- Administration of medication near the effective site and at the lowest possible dose may be a viable technique to prevent delirium in the acutely injured ICU patient.
- There is no prior documentation of the use of IT catheters to manage pain in patients with burn injury.
- There is no patient population to directly compare so any data on infusion dosage, complications or infectious risk must be extrapolated from patients with different disease processes but similar interventions.
- Patients with burn injury are prone to infections however de novo CNS infections remain extremely rare even though these patients may endure multiple bloodstream infections.³
- Not all patients with burn injury are good candidates for continuous IT analgesia. Patients with burns to the lower back at the insertion site and patients with small TBSA should probably be excluded as the risk of intervention may outweigh the benefits.
- The infectious risk of having a catheter in the intrathecal space is unknown for patients with burn injury. Based on data from literature on patients with extraventricular drains, management of these catheters should involve minimizing access to the catheter, using sterile techniques when access is required and limitation of catheter duration to mitigate the risk of infection.⁴
- Future directions for this research include increasing the study sample size with the overall goal of treating pain associated with early excision and grafting.

References

1. Jackson P, Khan A. Delirium in critically ill patients. *Crit Care Clin* 2015;31:589-603.
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4. Hoefnagel D, Dammers R, Ter Laak-Poort MP, Avezaat CJ. Risk factors for infections related to external ventricular drainage. *Acta Neurochir (Wien)* 2008;150(3):209-14.