The Relationship of Ketamine in the First 10 Days After Injury and Post-Traumatic Stress Disorder Development In Burned Soldiers

Thomas Garza B.S, John Jones B.S., Christopher Maani, MD, Peter DeSocio, DO, Terry Slater B.S. Laura McGhee, PhD.

United States Army Institute of Surgical Research, Fort Sam Houston, TX 78234-6315

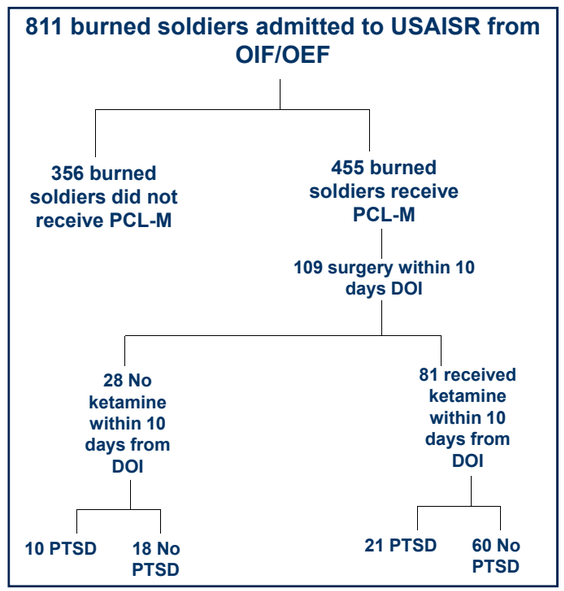
Introduction

- PTSD (Post Traumatic Stress Disorder), an anxiety disorder that arises after traumatic experience in which the participant is threatened with harm or death, is a growing concern for U.S soldiers returning from theater. Up to 17% of returning injured OIF/OEF (Operation Iraqi Freedom/Operation Enduring Freedom) reported symptoms consistent with PTSD [1].
- Soldiers burned in OIF/OEF are screened for PTSD using Post Traumatic Disorder Check List Military Version (PCL-M). A 17 question self-reported screening tool with scores ranging from 17-85. A score of 44 or greater is considered a positive screen for PTSD [2].
- Pain is a stressor that may contribute to PTSD development and frequently, pain is co-morbid with PTSD in veterans. Early pain control may offer a prophylactic option to decrease PTSD development.
- Ketamine is a non-competitive non-NMDA receptor antagonist that is used in multi-modal anesthetic regimens.
- Ketamine has dissociative properties that raised the concern that ketamine would acerbate PTSD symptoms in soldiers. Recent data has shown that intra-operative ketamine usage was not associated with increased PTSD development and was actually shown to be associated with decreased PTSD development. However, the role of timing in ketamine administration and PTSD development has not been examined.
- This is a retrospective study to determine the relationship of intra-operative ketamine within the first 10 days after injury and the prevalence of PTSD in burned service members.

Methods

- This is a retrospective study.
- Acquired IRB approval.
- Criteria for this study were burned soldiers who received PCL-M and ketamine in the burn OR within 10 days of date of injury.
- The U.S. Army uses a PCL-M score of 44 or higher for a positive screen of PTSD. In this instance the burned soldiers latest PCL-M score was utilized.
- 44 or higher as a positive screen for PTSD.
- A query through burned soldier medical records who received the PCL-M then were Identified as those patients who received ketamine and those who did not receive ketamine.
- In this study multiple factors were examined: prevalence of PTSD, TBSA, ISS, age, and number of surgical procedures.

Figure 1. Schematic representation of Patient population for this study. USAISR received approximately 811burned U.S. soldiers in OIF/OEF. Of those approximately 455 soldiers received the PCL-M. One hundred and nine soldiers underwent at least one surgery during the first 10 days. Of those, 81 received ketamine in the burn OR within the 10 days of date on injury.



Results

Table 1. The prevalence of PTSD was similar in soldiers who received intra operative ketamine in the 1st 10 days compared to this that did not. p-value 0.225 states there is no significant difference in the prevalence of PTSD in soldiers administered intra-operative with ketamine as compared to soldiers not receiving intra-operative ketamine within 10 days of DOI.

	ketamine n=81	No ketamine n=28	p-value
PTSD	26%	36%	0.225

Table 2. Demographics of patients. Patients who received ketamine were more injured. However had similar TBSA and underwent a similar number of surgeries.

	ketamine n=81	No ketamine n=28	p-value
AVERAGE TBSA	30.4 ±21.8	14.5 ±14	0.148
AVERAGE ISS	22.3 ±12.7	9.9 ±9.3	0.006
AVERAGE AGE	25.2 ±5.1	24.6 ±4.4	0.678
AVERAGE # SURGRIES	6.6 ±5.7	3.7 ±4.6	0.400

Conclusions/Discussion

- In this study, we found no significant difference in the prevalence of PTSD in soldiers administered intra-operative with ketamine as compared to soldiers not receiving intra-operative ketamine within 10 days of date of injury.
- Soldiers had similar demographics including, TBSA burned, age, and number of surgeries. However, the patients receiving ketamine had higher Injury Severity Scores and spent more time in the ICU. Previous work has demonstrated no association between PTSD and injury characteristics (TBSA and ISS) (3).
- Since this is a retrospective study with inherent flaws such as small sample size. Also the varying amounts of ketamine administered to patients may be a factor associated with altering PTSD prevalence along with time frame of ketamine administration from date of injury. Multiple other factors including social support have been shown to be important predictors of PTSD development.

References

1. Hoge CW, Castro CA, Messer SC, McGurk D, Cotting DI, Koffman RL. 2004. Combat duty in Iraq and Afghanistan, mental health problems, and barriers to care. *N Engl J Med*. Jul 1;351(1):13-22.
2. Blanchard, E.B., Jones-Alexander, J., Buckley, T.C., Forneris, C.A. 1996. Psychometric properties of the PTSD Checklist (PCL). *Behav Res Ther*. Aug;34(8):669-73.
3. McGhee LL, Maani CV, Garza TH, Gaylord KM, Black IH. 2008. The correlation between ketamine and posttraumatic stress disorder in burned service members. *J Trauma*. Feb;64(2 Suppl):S195-8; Discussion S197-8.