

**EN ROUTE CARE RESEARCH CENTER
EVIDENCE TO GUIDE PRACTICE**

**Characterization of long-range aeromedical transport and its
relationship to the development of traumatic extremity
compartment syndrome: A seven-year, retrospective study**

Gaps Addressed:

- 2015 ICL: AFMS (AMC) 25 - Epidemiology and Clinical Evaluation of Outcomes; AFMS 61 (AMC) Clinical and Functional Outcomes of Patient Movement
- 2016 AE RDD: CCA – Clinical En Route Care - 2. Epidemiology and Clinical Evaluation of Outcomes; 5. Clinical/Functional Outcomes of Patient Movement

Modified Abstract

Background: Musculoskeletal related injuries account for 10 of the top 15 diagnoses transported by CCATT. Patients with traumatic injuries of the extremities are at risk for the development of traumatic compartment syndrome of the extremities (tCSoE)—a common but emergent complication of trauma in which increased pressure due to injury induced bleeding or edema results in decreased blood flow to an extremity. Once tCSoE is diagnosed, a fasciotomy should be performed as soon as possible. A delay in diagnosis and treatment may increase morbidity and mortality. Aeromedical evacuation is associated with stressors such as hypobaria, hypoxia, and vibrations that could, in theory, increase the likelihood of compartment syndrome, or exacerbate elevated compartment pressures.

The goal of this retrospective study was to evaluate the impact of transport timing out of theater via Critical Care Air Transport Teams (CCATT) on the clinical outcomes of combat casualties with tCSoE.

Methods: We performed a retrospective record review of combat casualties who had documentation of traumatic compartment syndrome of the extremities (upper and/or lower) and were transferred via aeromedical transport from Iraq or Afghanistan to Landstuhl Regional Medical Center (LRMC) from January 2007 to May 2014. Data abstractors collected flight information, vital signs, procedures, in-flight assessments, and outcomes. Time to transport was defined as the time from injury to CCATT evacuation out of combat theater.

Results:

- 238 patients with confirmed tCSoE were identified. 216 (91%) had data available for the date and time of injury and, at a minimum, an approximated date for tCSoE diagnosis; and were included in this analysis.
- 98% were male, median age 23 (IQR 21-28).

- 24.7% of subjects had fasciotomies performed prior to tCSoE diagnosis. Of these, 9.4% had fasciotomy revisions or extensions. The rate of documented fasciotomy revision was 4.9% in those without documentation of fasciotomy procedure prior to tCSoE diagnosis (p=0.3157).
- In 80% of the study sample, documentation indicated tCSoE diagnosis within 1 day of injury.
- Documentation for the platform of transport to LRMC was available for 222 records (n=129; 58%, AE and n=93; 42%, CCATT).
- While the majority of casualties arrived at LRMC two days following injury (45%, n=107); 23% (n=55) arrived one day, 24% (n=58) three days, and 8% (n=18) more than 3 days following injury.
- A total of 113 (47%) casualties had a tCSoE diagnosis Pre-Flight and 123 casualties had the diagnosis made Post-Flight.
- The time of tCSoE diagnosis (Pre- or Post-flight) was not associated with the number of hours following injury that the patients arrived at LRMC: both Pre- and Post- flight groups had a similar proportion of patients who arrived at LRMC within 24, 48, 72, or 96+ hours.
- When comparing Pre-Flight versus Post-Flight groups there were no differences in the outcome measures.

Conclusions: We found no association between the timing of tCSoE and time of aeromedical transport. Based on the incidence of tCSoE diagnosis in our Pre- and Post-Flight groups, the greatest risk period for developing tCSoE is 1-3 days following injury and aeromedical transport does not increase the incidence. We can infer that aeromedical transport may not pose additional risks to patients as risk for or with tCSoE.

Evidence Based Recommendations:

- While current evidence does not indicate that aeromedical evacuation increases the risk of compartment syndrome, military medical personnel should monitor closely for evidence of compartment syndrome prior to, during, and after aeromedical evacuation, particularly 1-3 days following injury.

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