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# Patients with Extremity Compartment Syndrome: A Descriptive Study of 238 Patients Aeromedically **Evacuated From Theater**

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### Background

Patients with extremity injuries are at high risk for the development of compartment syndrome. Once compartment syndrome is confirmed, a fasciotomy should be performed as soon as possible (within 6-12 hours). A delay in diagnosis and treatment may lead to loss of function, limb or mortality.

Patients are at the highest risk for development of extremity compartment syndrome in the first 24 to 48 hours after injury and/or orthopedic procedure. Common practice is to monitor the patient closely for signs of compartment syndrome for 48 to 72 hours post injury/procedure.

### Objective

To determine if there is an optimal time to transport combat casualties that develop extremity compartment syndrome



### **Methods**

We performed a query of patient records within the Department of Defense Trauma Registry (DoDTR) that had ICD-9/10 or CPT codes reflective of compartment syndrome during January 2007 to May 2014. We reviewed the CCATT medical records of transports out of the theater of operations to Landstuhl Regional Medical Center.

Data collected included demographics, injury description, clinical parameters, laboratory measures, and patient disposition. We obtained injury severity score (ISS) and outcome data from DoDTR.

Subjects were categorized based on when the compartment syndrome was documented (Pre-Flight or Post-Flight).

Statistics. Continuous data compared using Student's t-tests or Wilcoxon tests and reported as median [Interquartile Range (IQR)]. We used chi-square or Fisher's exact tests for categorical data and reported as percentages (95% CI).

- **Development of Compartment Syndrome (CS)** • Prior to flight out of theater (Pre-Flight CS): 112 (47%)
- After flight out of theater (Post-Flight CS): 126 (53%)

		Dre Flight	Deet Elistet	
	CS	CS	CS	
	median [IQR] or % (95% CI) n=238	median [IQR] or % (95% CI) n=112	median [IQR] or % (95% CI) n=123	p-value
Age	23 [21-28]	23 [21-28]	24 [21-28]	0.6561
Gender (% male)	98 (96-99)	98 (94-100)	98 (94-100)	1.0000
Injury Description				
Upper Extremities	14 (10-20)	14 (7-25)	15 (10-22)	0.8127
Lower Extremities	87 (9-18)	88 (77-94)	87 (80-92)	0.7966
ISS	13 [9-18]	11 [6-17]	14 [10-20]	0.0121
Mechanism of Injury				
Explosive Device	69 (63-74)	68 (59-76)	70 (61-77)	0.7414
Gunshot Wounds	18 (14-23) 18 (12-26		18 (12-26)	0.9367
Injury Type				
Penetrating	72 (66-77)	72 (63-80)	71 (63-79)	0.8785
Blunt	26 (21-32)	27 (19-36)	25 (19-34)	0.8075
Burn	2 (1-5)	1 (0.2-5)	3 (1-8)	0.3741
Fasciotomy	91 (86-94)	97 (92-99)	85 (78-90)	0.0012
Figure 1: LRMC Arriva	al Day Follow	ving Injury		
	■ Pre-Flight C			
NO -	<mark>46</mark> 44		Post-Fliq	ght CS
30 -				
29		<b>28</b> 21		
10 - 17			10	4
0   Day 1	Day 2	Day 3	Dav 4+	

This study was conducted under a protocol reviewed and approved by the Medical Research and Materiel Command (MRMC) Institutional Review Board and in accordance with the approved protocol. The opinions or assertions contained herein are the private views of the author and are not to be construed as official or as reflecting the views of the Department of the Army, the Department of the Air Force, or Department of Defense





Results

We identified a total of 238 records with compartment syndrome.

### Table 1. Demographics and Injury Description



- Casualties documented with Post-Flight CS were more LRMC within one day of injury (p=0.0386).
- When adjusting for location of military operation (Iraq or syndrome in theater versus out of theater (p=0.0579).
- incidence of coagulopathy or thrombosis.
- In this study sample, only three patients did not survive.



## Limitations

- Data was collected retrospectively
- Subjectivity despite trained abstractors
- Data missing or unavailable

## Conclusions

From 2007 to May 2014, we documented 238 casualties that developed compartment syndrome. Regardless of injury type, fasciotomy, and transport type, compartment syndrome developed within two days following injury. However, casualties at risk to develop extremity compartment syndrome may benefit from expeditious evacuation out of the combat setting to a definitive level of care.

### Acknowledgements

DoD-Joint Program Committee (JPC6) CCATT Pilot Unit Joint Trauma System – Department of Defense Trauma Registry

• Pre-Flight CS group was associated with a greater number of days from injury to arrival at LRMC (p=0.0310).

likely to be evacuated out of Iraq (p=0.0076) and arrive at

Afghanistan), there was no association between number of days to transport to LRMC and developing compartment

• There was a 19% incidence of sepsis or infection and 15%

Difficulty discerning dates of CS diagnosis and fasciotomy

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