Infections Complicating the Care of Combat Casualties during Operations Iraqi Freedom and Enduring Freedom

The Quadruple Aim: Working Together, Achieving Success

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**Abstract:**

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**Subject Terms:**

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Vietnam Combat Hospitals - Mortality

132,996 admissions
1,253 deaths

- Head Injury: 43%
- Hemorrhagic Shock: 24%
- Infection/Sepsis/MSOF: 12%

6,927 admissions
121 deaths

- Hemorrhage: 1st 24 hours
- Infection/Sepsis/MSOF: 1st 24 hours
- Pulmonary embolus: 2nd 24 hours

Arnold. Military Medicine. 1978
Infectious Complications

- Infections due to
  - *Acinetobacter*
  - *Pseudomonas*
  - *Klebsiella*
  - *Staphylococcus aureus*

- Complications
  - Kidney
  - Bone marrow

Injured
8 April 2006

Retired
27 March 2010

2011 MHS Conference
Pictures with permission
Objective

- Assess infectious complications and their risk factors among combat casualties to mitigate excess morbidity and mortality

75% body surface area burn patient
Ar Ramadi, Iraq
Methodology

- Joint Theater Trauma Registry (JTTR)
  - Deployment-related injuries with completed records between 19 March 2003-13 April 2009
  - ICD-9 codes for infections defined by
    - Anatomical/clinical syndromes
    - Infecting pathogens
  - Risk factors included
    - Mechanisms of injury
    - Injury severity
    - Transfusion
Results

- 16,742 patients
  - 15,021 from Iraq (90%)
  - 10,973 battle injuries (67%) - 36% explosions
  - 97% male, 78% enlisted, 78% Army

Infections
- 921 (6%) had one or more infections
  - Anatomical/clinical syndromes - skin/wounds
  - Infecting pathogens - gram negative bacteria
  - Higher rates - explosions, injury severity and site, but not transfusions
Conclusions

- Casualties from Iraq and Afghanistan face substantial risk of infectious complications.
- Improved diagnostic platforms and treatment modalities are needed from near the point of injury through long-term rehabilitative care.
- Focus on standardized treatment guidelines and infection control and prevention strategies.
Limitations

**Issues**

- ICD-9 code diagnosis
- Retrospective chart review
- Inadequate infectious disease specific granularity
- Inadequate long-term follow up
- Poor correlation of infection with bacterial isolates over time and facilities

**Solutions**

- JTTR ID module
- Trauma ID Outcome Study (TIDOS)
- Multidrug-resistant Organism Repository and Surveillance Network (MRSN)

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Combat Related Infections

- Recognized since the earliest recording of battlefield morbidities
- A dynamic and ever evolving threat
  - Establishment of improved body armor, well equipped ICUs, relatively rapid evacuation of wounded
  - Continued evolution of microbial resistance
    - NDM (New Delhi metallo-beta-lactamase)
- The uniqueness of the military medical care system and the requirement for US Military to advance the understanding of the ever changing dynamics of combat associated infections and lead the progress in improved care and treatment of combat related infections requires a longstanding commitment to a comprehensive focused research mission
  - Joint Theater Trauma System (JTTS) and Joint Theater Trauma Registry (JTTR)