Principles of combat surgical care in a staged evacuation system

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Principles of combat surgical care in a staged evacuation system

Goal: to raise questions regarding the indications for surgery during evacuation

• History of the current system
• 2010/2011 data from Southern Afghanistan
• Illustrate the issues by reviewing care of dismounted IED victims
• Evidence required to improve the system
HOSPITAL ON RAILS EVACUATES WOUNDED FROM CONGESTED AREAS

Function of the hospital train is to move wounded from the nearest available railhead to points outside the combat area. It is designed to give them all necessary care while they are in transit.
JN-4H Jenny, Ambulance conversion, assigned to World War I training base.
Theater Aeromedical Evacuation System (TAES)

- Current system defined by NATO in 1980s recognizing the strategic importance of Europe
  - A flexible system for movement of patients from forward to rear echelons for more definitive care
    (Capt PA Miller USAF. 1997 Op JOINT ENDEAVOR/GUARD and beyond)

- Critical Care Air Transport teams added in 1996
Figure 1. Combat-injured evacuation route.
Joint Theater Trauma System

JTTS Standard Report
June 2011

CAPT Eric J. Kuncir, MC USN
CENTCOM JTTS Director
Presented on behalf of the in-theater JTTS team
OEF
US Military, Coalition, All Others

Total Admissions (N=7809)

- US Military: 3399 (43.5%)
- All Others: 3486 (44.6%)
- Coalition: 924 (11.8%)

Rolling 12 months: Jun 10 – May 11

All Others = Contractors, LN, AP/AA and Enemy POW

Right Patient, Right Care, Right Place, Right Time
Cause of Injury May 2011

- Bullet/GSW/Firearm: 150
- Burn: 8
- Fall: 40
- Hand Grenade: 38
- IED: 17
- Knife/Other Sharp Object: 11
- Machinery/Equipment: 7
- Mine/Landmine: 12
- Mortar/Rocket/Artillery Shell: 7
- MVC: 5
- RPG: 46
- Other: 5

Includes both battle and non-battle injury

11/15/11
OEF Mode of Arrival
Jun 10 – May 11

Mode of Arrival

- Civ. Ambulance (60)
- CASEVAC (34)
- Non-MEDEVAC Ground (113)
- Non-MEDEVAC Air (91)
- MEDEVAC Ground (164)
- MEDEVAC Air (4772)
Massive Transfusion Component Therapy

Total Units FWB: 12
Doses of Factor VII: 1
(Level III Only)

May 2011 MT Patients (N= 34)

- PRBC: 16.8
- FFP: 15.5
- Platelets: 3.5
- Cryo: 4.5
- Platelets: 22.3

Platelets:
1 unit = 6 pk plts

Mean # units transfused
Mean RBC Age
Red Cell Age in Massive Transfusion

![Graph showing the average red cell age (days) for different locations (Bagram, Kandahar, Bastion, Dwyer) from June 2010 to May 2011. The graph indicates fluctuations in red cell age over time, with peaks and troughs at various points.](image_url)
Number of US Military Battle Injury Casualties with Traumatic Amputations by Mounted/Dismounted Status
OEF Jan 2009 - June 2011

Date
Mounted
Dismounted
Anti-personnel IED

• Review of last 100 consecutive serious injuries
  – Defined as IED dismounted victim with an amputation
  – Jan 2010 – July 2011
  – Role 3 Multinational Medical Unit
  – 99% male age 25 (18 – 44)
  – 21 Afghan; 79 USA and coalition
  – Mortality 18%: KIA 11; Died of wounds 7

Cdr J Taddeo (USN), Maj V McAlister (CF) FOUO
Anti-personnel IED: review of 100 consecutive injuries 2010 - 2011

Extremeties amputated

- Single: 43
- Double: 41
- Triple: 3
- Quadruple: 3
Antipersonnel IED: associated injuries

• Perineal-genital-gluteal  34
• Severe soft tissue  33
• Pelvic fracture  11
• Eye  11

– Less than 5: head, spine, TM, chest, abdomen
Potential for rear echelon criticism

• Completeness of debridement
  – potential for infection; level of amputation

• Need for procedures: laparotomy; splenectomy; colostomy; external fixation; fasciotomy; escharotomy; external ventricular drain or craniectomy

• Interval between operations; need to repeat operations

• Inappropriate attempts at definitive surgery
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In-theatre surgery

- Damage control to save life and limb
- Reiterative surgery should plan for duration of each evacuation stage and potential for surgery down the line
- Definitive surgery if:
  - delay may harm a patient
  - potential for return to duty within a command specified time
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• **Definitive surgery**
  – Destination surgeon should be the most responsible physician even if care is started before arrival of the patient
  – Definitive surgery in one body system must account for care required by other systems
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• Research
  – What is the best interval for reiterative surgery?
  – What is the best surgical strategy to counter bacterial contamination?
  – Do the number of stages in evacuation affect outcome?
  – Do home country stages before destination affect outcome?
  – Is it possible to develop a single surgical plan from the point of injury to complete rehabilitation?
Abbreviated operation military level II

Military level II resuscitation

Helicopter evacuation

Level III Preoperative Resuscitation

Definitive or second look operation  Level III

Postoperative resuscitation Level III

Fix Wing Evacuation to Level IV

Definitive operation or ICU care Level IV

Fix winged Evacuation to Level V (U.S.A.)

Definitive Operation/Intensive Care