Department of Defense Mortality Reviews

NAME Annual Meeting
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"Medically Ready Force…Ready Medical Force"

Disclaimer

The opinions or assertions presented hereafter are the private views of the speaker and should not be construed as official or as reflecting the views of the Department of Defense, its branches, the Defense Health Agency or the Armed Forces Medical Examiner System.

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AFMES

Mission:

Investigate deaths, Identify the fallen, Improve readiness.

Vision:

Be the global leader in comprehensive and innovative medicolegal services enhancing the readiness, sustainability, and survivability of those we serve.

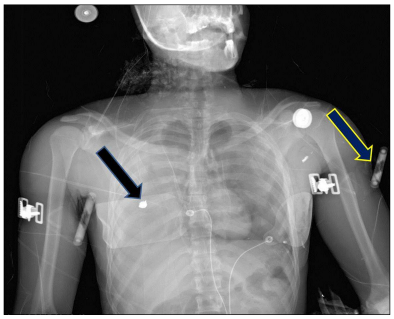
Post 9/11

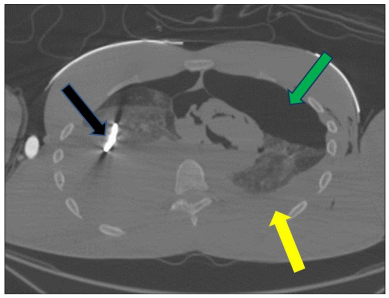
- AFME directs complete forensic pathology investigations on all individuals that die in support of an overseas contingency operation
  - Scientific identification of all individuals/remains
  - Postmortem examination (complete autopsy) to determine cause and manner of death
- Results of investigation provided to families, investigative agencies, and commanders



Computed Tomography

- Increased documentation and characterization of injuries sustained including pneumothorax and **axial skeleton fractures**
- Precise location of foreign bodies, including ballistic projectiles
- Visualization of resuscitative devices such as airway devices, intraosseous devices, needle decompression devices and tourniquets

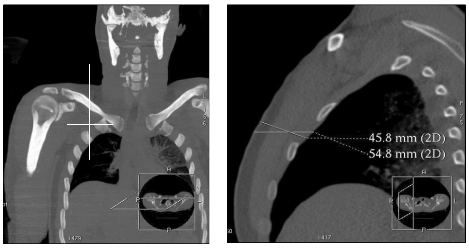




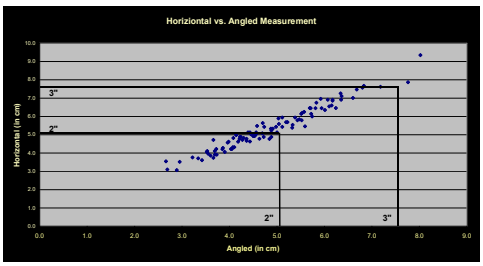
Assessment of Resuscitative Medical Intervention

- All items resuscitative interventions should be left in place for review by the forensic pathologist
- Presence and placement of the following resuscitative devices can be assessed by postmortem CT:
  - Angiocatheters and intraosseous needles
  - Airway devices
  - Tourniquets and stabilization devices

Needle Thoracentesis

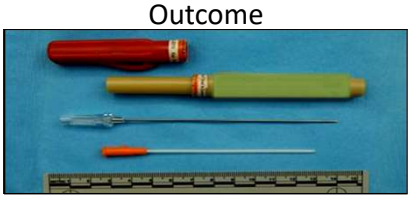


Chest Wall Thickness



- Conclusion: 5 cm needle provided but 8 cm needle needed

Outcome



Chest Wall Thickness in Military Personnel: Implications for Needle Thoracentesis in Tension Pneumothorax
Military Medicine 2007;172(12):1260-3

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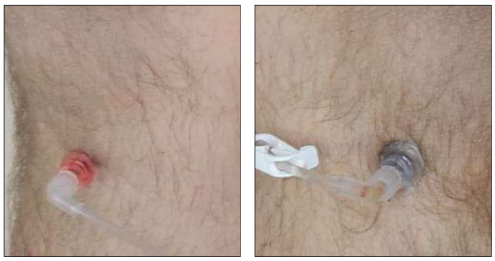
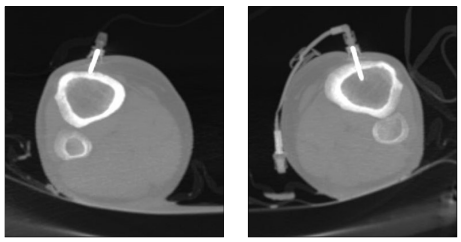
Tibial IO-IV



Tibial IO-IV



Mortality Studies

- Holcomb JB et al. *Causes of Death in U.S. Special Operations Forces in the Global War on Terrorism 2001-2004 (*2007)
- Kelly JF et al. *Injury Severity and Causes of Death From Operation Iraqi Freedom and Operation Enduring Freedom: 2003-2004 Versus 2006* (2008)
- Eastridge BJ et al. *Died of Wounds on the Battlefield: Causation and Implications for Improving Combat Casualty Care* (2011)
- Kotwal RS et al. *Eliminating Preventable Death on the Battlefield* (2011)
- Eastridge BJ et al. *Death on the Battlefield (2001-2011): Implications for the future of combat casualty care* (2012)

Mortality Conferences

- Established in 2009, bi-weekly conferences with deployed physicians and medical providers
- Formal AFMES-JTS monthly conference
  - Emphasis on injuries sustained and resuscitative treatment observed
  - Identify any opportunities for improvement
  - Survivability or potential survivability based on injuries sustained

Mortality Conference

- What caused them to die?
- What was the cause of death?
- Did they die of hemorrhage?
- Did they die of a tension pneumothorax?
- Would device X or treatment Y been beneficial?

Mechanism of Injury (MoI)

- Firearm
- Explosion
- Motor vehicle collision
- Fall
- Knife
- Water
- Rope

MoI to Cause of Death (CoD)

- Firearm → GSW to the head
- Explosion → Blast injuries
- MVC → Head injuries
- Fall → Blunt force injury of the pelvis
- Knife → Stab wound to the chest
- Water → Drowning
- Rope → Hanging

Mechanism of Death

The physiological derangement produced by the cause of death that results in death

(DiMaio 2001)

Mechanism of Death vs CoD

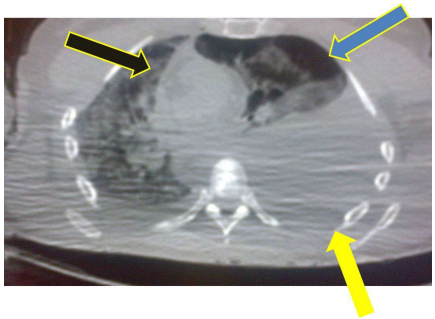
Pericardial tamponade

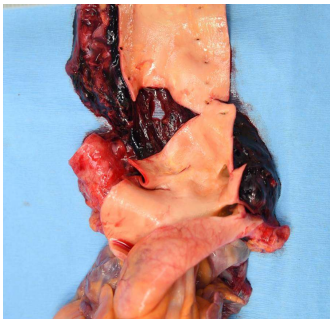
- GSW to the chest
- Stab wound to the chest
- Blunt force injuries
- ASCVD

CoD vs Mechanism of Death

GSW to the Chest

- Hemothorax due to transection of aorta
- Pericardial tamponade due to heart defects
- Pneumothorax
- Hemothorax due to laceration of subclavian





Description of Injuries

- Near complete transection of the aorta
- Left hemothorax and hemopericardium

vs.

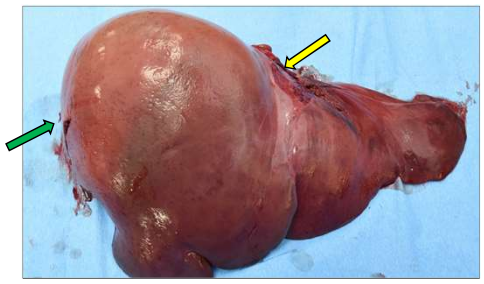
- Left hemothorax due to near complete transection of the aorta

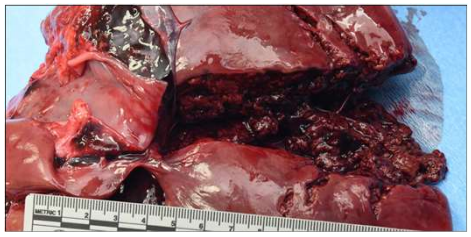
Abbreviated Injury Scale (2008)

- 420206.4 – Aortic laceration, perforation, puncture
- 442201.4 – Thoracic injury, hemothorax >1000cc in at least one chest cavity
  - ISS = 16 and NISS = 32

vs.

- 420218.6 – Aorta, thoracic, laceration, perforation, puncture, major; transection with hemorrhage not confined to mediastinum
  - NISS and ISS = 75





Abbreviated Injury Scale (2008)

- 541820.2 – liver laceration; not further specified (NFS)
- 541822.2 – simple capsular tears; <3cm parenchymal depth; < 10cm long; minor
- 541824.3 - >3cm depth; major duct involvement; moderate
- 541824.4 – parenchymal disruption <75% hepatic lobe; multiple lacerations >3cm deep; "burst" injury; major
- 541828.5 – parenchymal disruption >75% of hepatic lobe or >3 Couinard's segments within single lobe; or involving retrohepatic vena cava/central hepatic veins; massive; complex

Conclusions

- Complete forensic pathology investigations
- Incorporation of advanced radiologic techniques, such as CT, for documentation of injuries sustained and medical therapy
- Accurate description of injuries = accurate anatomic coding of injuries
- Collaboration with pre-hospital and trauma providers

Questions?

"Make Good from the Bad"

- Harcke 2005