

Prehospital lessons learned from the War in Ukraine: anecdotal DCR/DCS experience from point of injury to Role 2 (*briefing run-through*)

Run-through Briefing ***LL Update NOVEMBER 2023*** ***Prague, UVN***

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Prehospital Lessons From the War in Ukraine: Damage Control Resuscitation and Surgery Experiences From Point of Injury to Role 2

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Affiliations + expand

PMID: 37647607 DOI: [10.1093/milmed/usad253](https://doi.org/10.1093/milmed/usad253)

Abstract

The ongoing war in Ukraine presents unique challenges to prehospital medical care for wounded combatants and civilians. The purpose of this article is to identify, describe, and address gaps in prehospital care, casualty evacuation, and medical evacuation throughout Ukraine to share lessons for other providers. Observations and experiences of medical personnel were collected and analyzed, focusing on pain management, antibiotic use, patient assessment, mass casualty triage, blood loss, hypothermia, transport immobilization, and clinical governance. Gaps identified include

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Published: 30 August 2023 [Article history ▾](#)

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ABSTRACT

The ongoing war in Ukraine presents unique challenges to prehospital medical care for wounded combatants and civilians. The purpose of this article is to identify, describe, and address gaps in prehospital care, casualty evacuation, and medical evacuation throughout Ukraine to share lessons for other providers. Observations and experiences of medical personnel were collected and analyzed, focusing on pain management, antibiotic use, patient assessment, mass casualty triage, blood loss, hypothermia, transport immobilization, and clinical governance. Gaps identified include limited access to pain management, lack of antibiotic guidance, inadequate patient assessment and triage, access to damage control resuscitation and blood, challenged transport immobilization practices, and challenges with clinical governance for both local and foreign providers. Improved prehospital care and casualty and medical evacuation in Ukraine are required, through increased use of empiric pain management, focused antibiotic guidance, enhanced patient

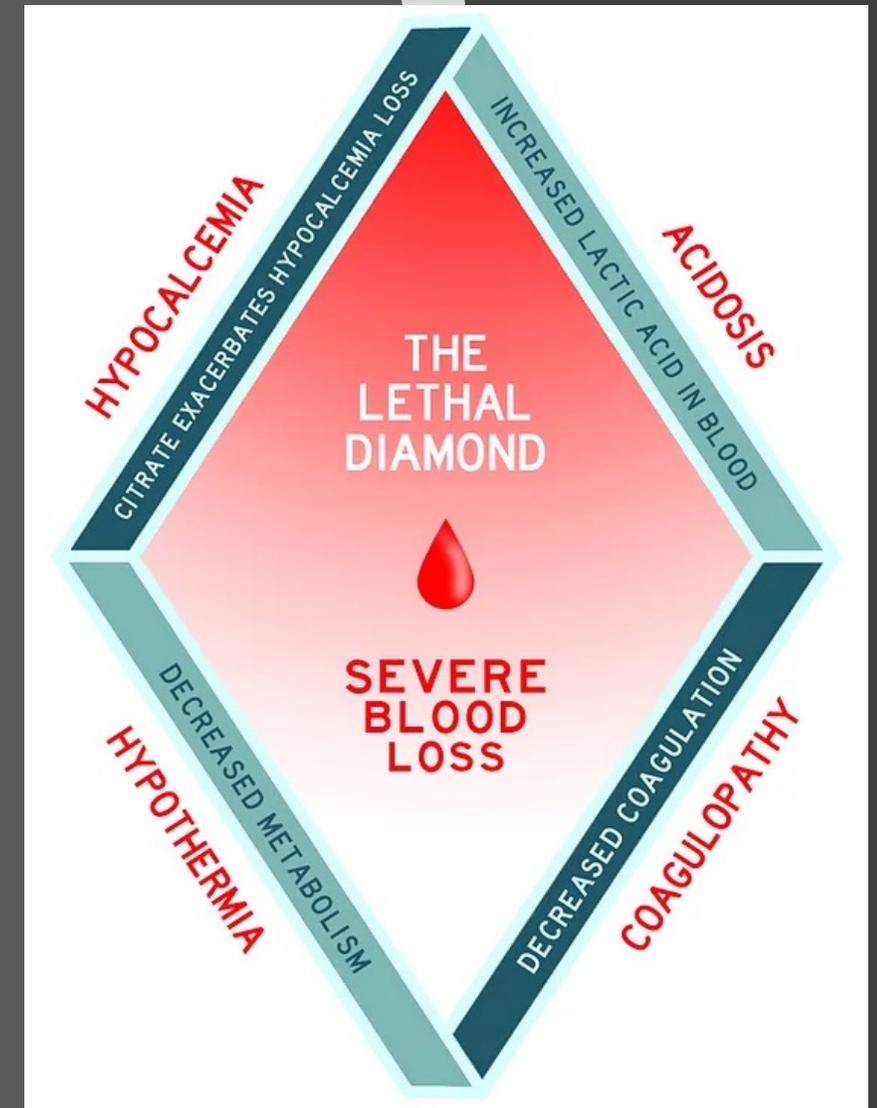
Affiliations, locations, media, operational security

- Emergency Medicine Doctor, paramedic and PhD
- Humanitarian NGOs
 - Medsanbat, MOAS, CUF, HEAL Corp. etc
- Academics, Institutions
- Prague Center for Global Health
- East Surrey Hospital
- OSCE Special Monitoring Mission for Ukraine (SMM)
- NATO Military Medical Center of Excellence (“MilMed CoE”)
- George C. Marshal European Center for Security Studies

Highlighted Themes

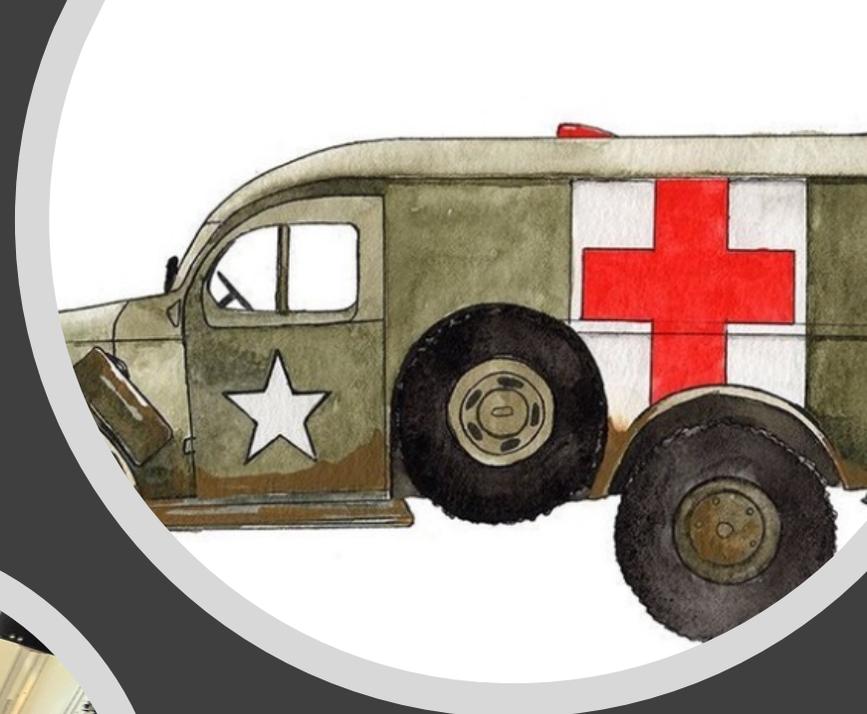
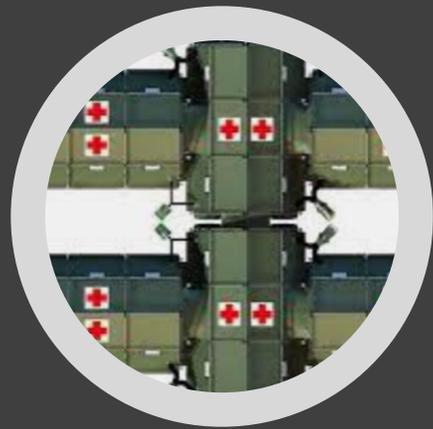
Reduction of preventable morbidity and mortality through lessons learned and lesson shared

- Describe the threat and challenges in wounding patterns and Pol, DCR and DCS from Russian conventional weapons systems.
- Analyze what changes and adjustments may be required within your own system to be able to provide best practices for your warfighter.
- Discuss the lessons learned from anecdotal evidence from Ukraine.



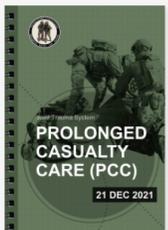
Point of Injury

- Tactical Combat Casualty Care (TCCC)
 - Self-aid / buddy-aid
- (remote) Damage Control Resuscitation (RDCR/DCR)
- Damage Control Surgery (DCS)
- NATO echelons of care: *Role 1-4*

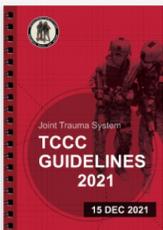




STANDARDIZED TRAINING ACROSS ENTIRE U.S. MILITARY



Prolonged Casualty Care Guidelines
by JTS / DCoT / PCC WG



TCCC Guidelines 2021
by JTS / CoTCCC



Journal for Tactical Combat Casualty Care
by JTS



JTS Mission

The mission of the Joint Trauma System (JTS) is to improve readiness and outcomes evidence-driven performance improvement. The JTS provides care for every Soldier, Sailor, Airman, and Marine injured on the battlefield in any theater of operations, ensuring they are provided with the optimum care for survival and maximum performance functional recovery.

[Read more](#)



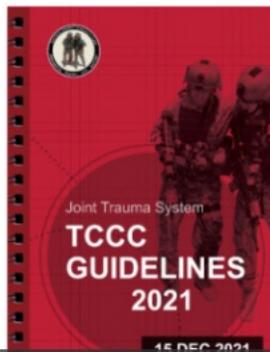
TACTICAL COMBAT CASUALTY CARE

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Стандартизоване навчання TCCC для військових



Collections



Clinical guidelines 2021



Course for Medical Personnel (MP)



Combat Lifeguard Course (CLS)



КУРС ДЛЯ ВСІХ ВІЙСЬКОВОСЛУЖБОВЦІВ



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КЛІНІЧНІ

Conventional warfare: February 24th to present day

Graphic Content Warning



Setting the scene: Point of Injury (PoI) to Role 1 / Role 2

Challenges

Onset: no standardized TCCC, no standardized tourniquet, no legal access to blood or blood products in the prehospital environment



Limited fit for purpose medical evacuations vehicles, no operational / deployable mobile Role 1 / 2



Contested air: rotary and fix wing limited



Prolonged field care

Assets and available resources

- European infrastructure: roads, bridges, hospitals/clinics
- Anesthesiologists, surgeons, nurses and ancillary medical staff – significant clinical expertise
- Over 9 years of fighting Russia in hybrid war (LL/LL)
- Diaspora + the international community





Limited access to appropriate tourniquets, training

Ukraine: TXA IM

Limited access to calcium replacement therapy

crystalloid use – broader access to blood (July 2023)

Recent focus on hypothermia

No access to TEG, ABG

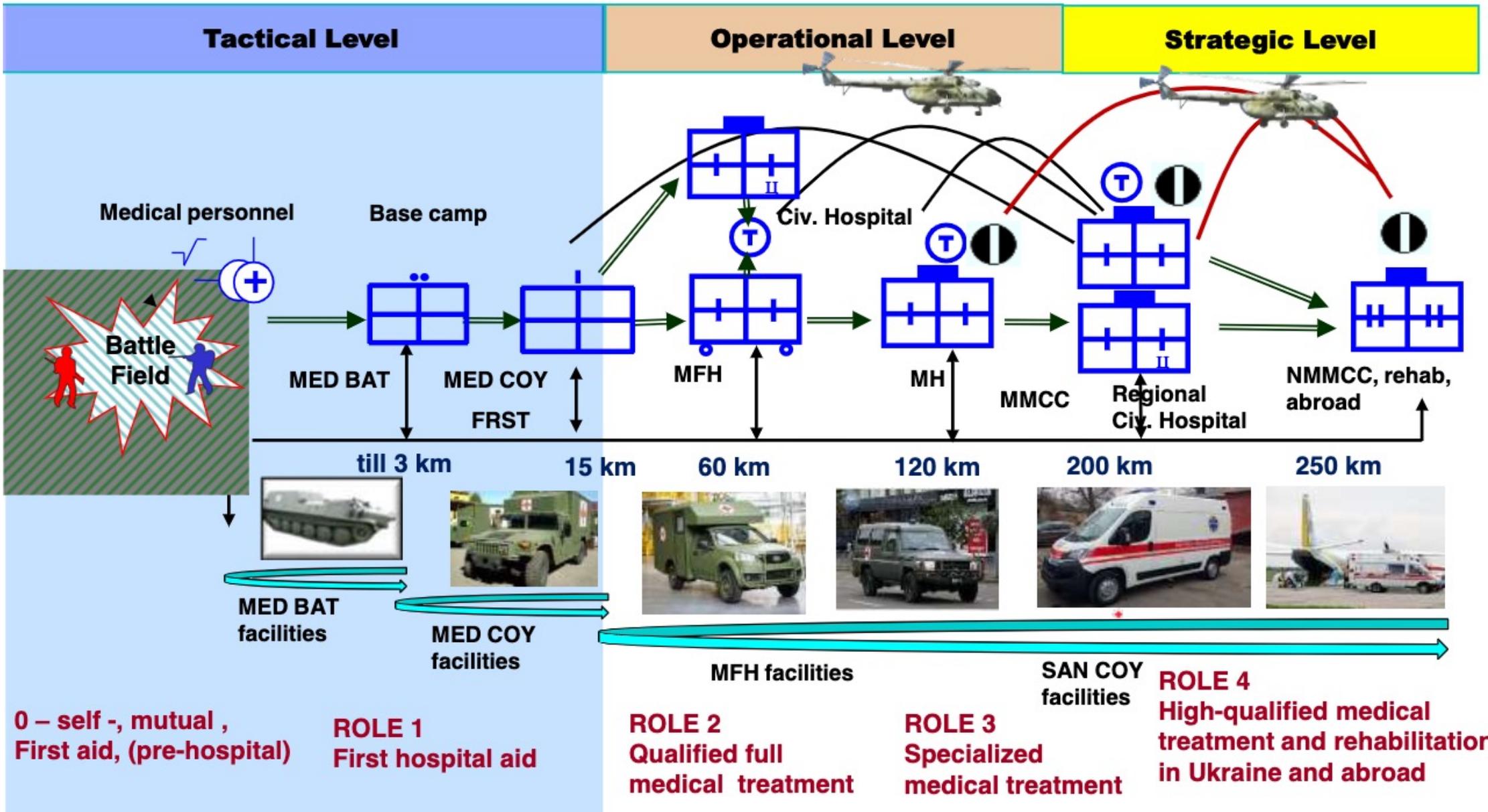
Thromboelastography (TEG) assesses coagulation throughout all phases of clot formation and is the most commonly used viscoelastic assay in the United States.

Morbidity and Mortality Data to date

- 12 to 14 million people displaced
- 20-55,000+ civilians dead
- 35 to 55,000 Ukrainian soldiers dead
- 180,000 to 320,000 Russian soldiers and mercenaries likely dead
- Healthcare infrastructure decimated
- Anecdotally, 20 to 40% of Ukrainian warfighters die from preventable injuries / complications
- Fatality rate – vulnerable communities at high risk

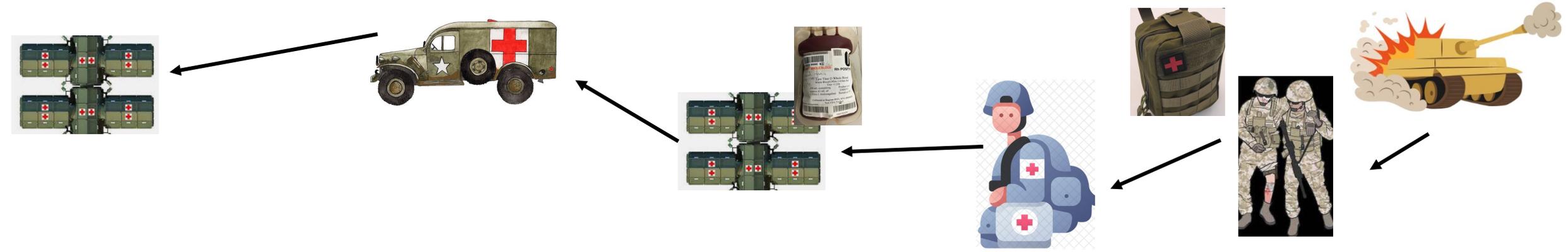


C2



Content credit: Commander of the Medical Forces, Armed Forces of Ukraine, July 20 22, Brussels Belgium

Anecdotal experience, different fields of fire



Preventable morbidity ↑ and mortality ↑



Current Questions:

- **Do Clinical Practice Guidelines (TCCC/TECC, RDCR/DCR/DCS) hold true in the presence of conventional weapon systems fired by design against a peer adversary?**
- **What data is needed to best answer adjustments to DoD/JTS CPGs?**
- **Evac Chain: Pushing Role 2 capabilities to Role 1, en route casualty care and critical care rate limiting step - DCR/DCS patient requiring transport in multi-domain battle, what next?**

**BRIEFING
RUNTHROUGH:
Lessons Shared
must become
Lessons Learned**



Lesson Shared (1): safety and incoming

- Scene safety
- Healthy respect for the enemy
- PPE
- Contingency
- Comms
- Mental health
- Are you a shooter or a medic?
- Basic PPE may not be enough



Lesson Shared (2): tourniquets

- Training
- Timing
- Conversion
- Quality
- Preventative (*en route casualty care*)
- DCR/DCS – LTOWB, FWB and blood product













- Land mine: partial foot amputation, fragmentation small entrance no exit, pelvic involvement. Access to TXA, tourniquet, DCR/DCS 4 hours from injury.



Lesson Shared (3): pain management

- Have it, know it, use it, be safe
- Opiate agonist-antagonist
- Gamma-hydroxybuterate
- Ketamine
- Fentanyl: training and access
- Induction: Sedative-hypnotics, adjuvants and Paralytics
- Antiemetics?
- En route casualty care





Lesson Shared (4): antibiotics

- Biogram
- Death in 18 hours
- IFAK
- Allergies, types
- Prolonged field care:
continuum of care
- Dirty wounds





Lesson Shared (5): triage, CCPs, mass casualty and interoperability

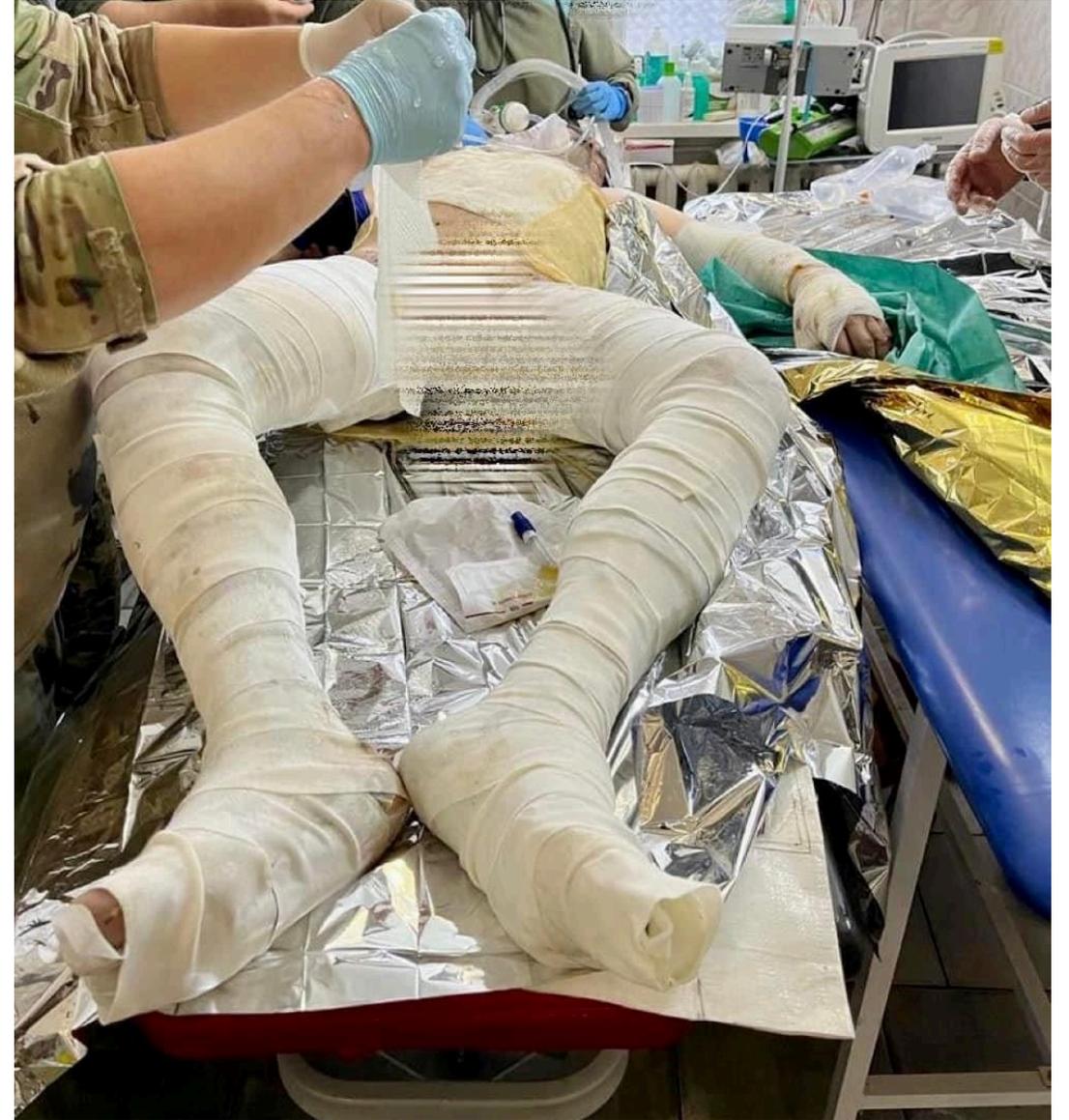
- MASCAL triage
- Logistics: location, supplies, level of care, evacuation chain
- Inadequate transport vehicles
- Serial requirement to triage kit/blood
- Unknowns and moral injury
- Mental health resiliency
- Stabilization Points vs CCPs
- Patient packaging: basics, good, better and best
- Patient data transfer (SIGNAL+TCCC cards)



Interoperability

- Micro/Macro
- JTS+NATO + patient data
- CBRNE threat
- Evacuation chain from POI to Role 4 / outside UKR







Lesson Shared (6): Traumatic Brain Injury (TBI)

- Managing TBI in this conventional war context + prolonged field care.
- Mental health and TBI
- Most of our IRQ/AFG experience is TBI with closed/confined blast and associated significant injuries
- Isolated TBI (thermobarics)
- ICP progression from walking wounded to not
- Hemostatic disruption (bleeds, re-bleeds, other coagulopathy)
- Relate to treatment for other injuries?
- Access to CT, MRI, POCUS







Photo credit: Dr Mykola Demyaniuk, TCCC instructor and anesthesia MD at forward stabilization point

Lesson Shared (7): patient assessment

- Conventional warfare and the primary survey
- UKR casualties being hit with shrapnel from blast without PPE
- Small wounds – big problems
- Burns
- Decompensation, patient changes and need for reassessment - PFC
- Casualty dump with no MOI -> the primacy of the primary survey
- TCCC card – DATA!





Tight space

Compressed oxygen

Monitors that can't be used on the road

Post DCS, central line, intubation, propofol, GHB, fentanyl, ketamine, six units of blood, hypothermic, hypotensive, no access to pressers, external fixation, limited suction, antibiotics

GRAD rocket fire









Burns

Exposure

Fluids

Patient data to higher echelons of care



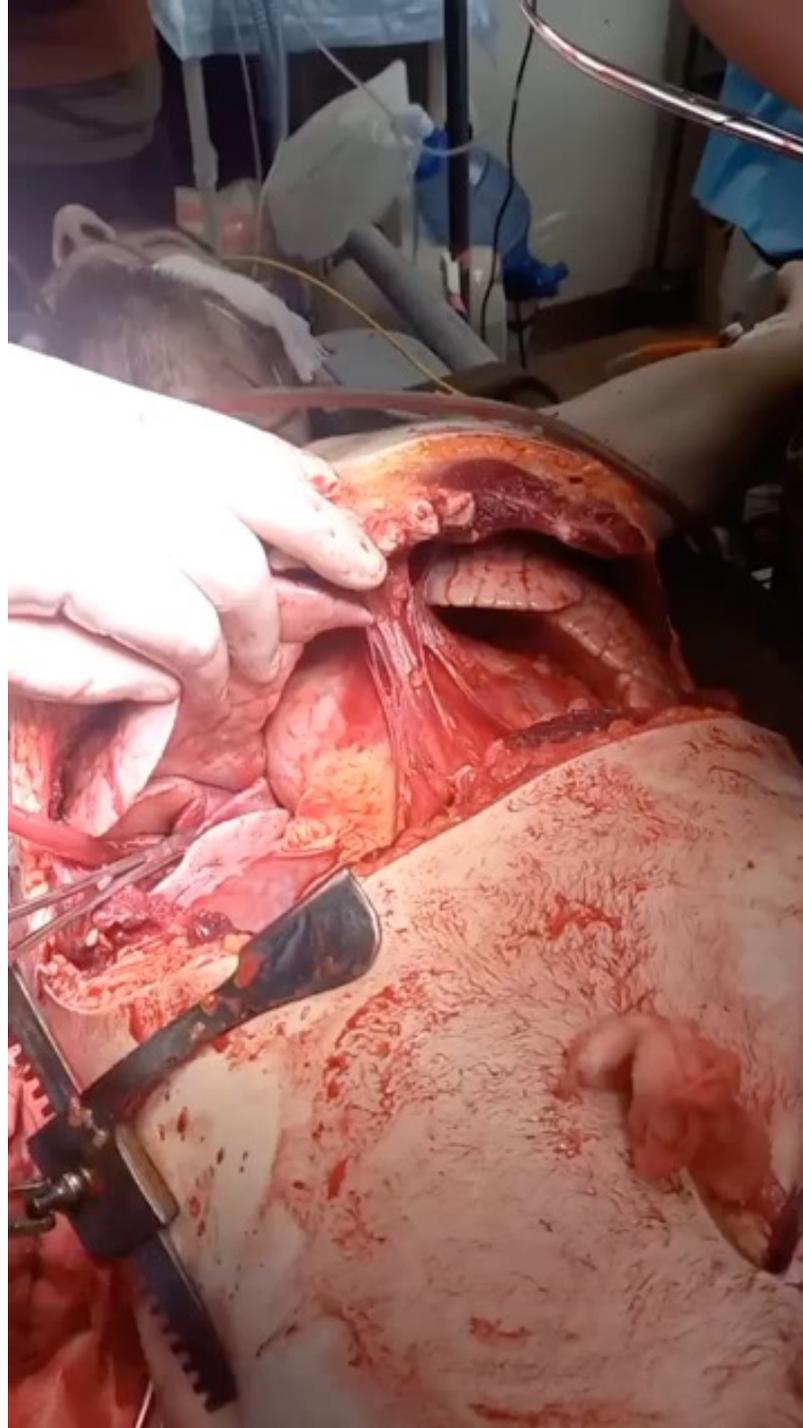
Lesson Shared (8): be ready for the gamut of patient demographics

- Newborns, infants, pediatrics, geriatrics and special needs patients
- high volume military trauma outside the typical “fit, healthy, 18-40ish” range
- NCD medications and abnormal physiology
- comorbidities, lethal diamond
- CPGs: for peds? For geriatrics? A special pathway or make doctrine more inclusive?









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Lesson Shared (9): clinical governance

- Nurses
- MDs
- Paramedics, EMTs, Medics, Feldishers
- Scope of practice
- What is your accountability and to whom?
- Letters, IDs, associations and security
- Freedom of movement
- NATO interoperability – governance





Welcome at NATO MILMED COE

Lesson Learned (N_x): lessons shared

- Lessons learned quickly become lessons lost unless they are constantly lessons shared
- Lessons learned sharing platforms:
<https://www.coemed.org/>
- Center for Global Health Engagement (DoD):
<https://cghe.usuhs.edu/home>
- Other NATO partners

The Enemy

- Are preparing
- Are adapting
- Are listening
- Are training
- Are not stopping
- Are multi-domain
- Peer adversary



Summary

- Lessons learned – lessons shared – lessons lost
- Disruption: CPGs and pushing Role 2 level of care to Role 1 – rate limiting step of critical care transport
- Evolution of warfare and growing security threats: is NATO ready for the future of warfare?



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- [tps://www.statista.com/statistics/530097/defence-budget-relative-to-gdp-finland/#:~:text=In%202022%2C%20the%20defense%20budget,early%20two%20percent%20in%202022.](https://www.statista.com/statistics/530097/defence-budget-relative-to-gdp-finland/#:~:text=In%202022%2C%20the%20defense%20budget,early%20two%20percent%20in%202022.)
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Additional Resources

- Joint Trauma System / DoD Clinical Practice guidelines: <https://jts.health.mil/> - https://jts.health.mil/index.cfm/PI_CPGs/cpgs
- Deployed Medicine: <https://deployedmedicine.com/>
- Joint Committee for Tactical Combat Casualty Care (JCoTCCC) <https://www.facebook.com/CoTCCC/>
- TCCC in Ukrainian – full complement of resources: <https://tccc.org.ua/collection/kurs-bojovih-ryatuvalnikiv>



Thank you

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