UKR Report from the Field: TCCC in the multidomain battlespace

John Quinn, MD, PhD, MPH, EMT-P
Prague Center for Global Health
Institute of Hygiene and Epidemiology
First Faculty of Medicine
Charles University
john.quinn@lf1.cuni.cz

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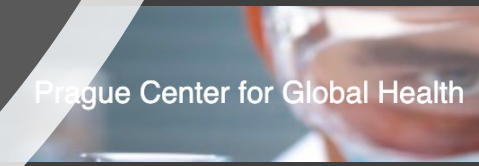
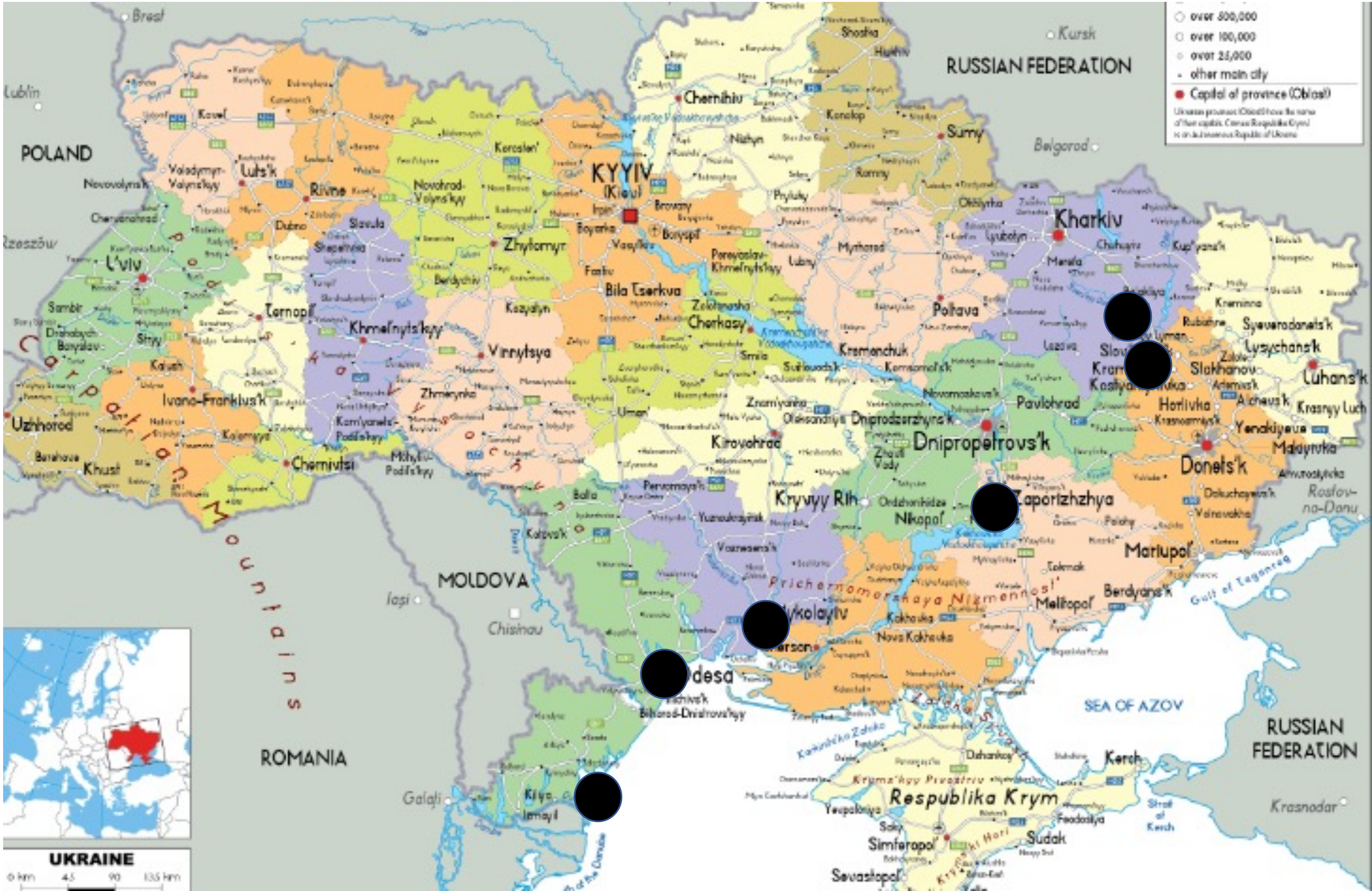


Overview and Objectives

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

- Setting the scene: 2014 to February 2022
- Lessons learned: a walk through
- Summary and conclusion


RUSSIAN FEDERATION
POLAND
MOLDOVA
ROMANIA
RUSSIAN FEDERATION
SEA OF AZOV
Gulf of Taganrog
Carpathian Mountains
Respublika Krym
KYYIV
(Kiev)
Kharkiv
Dnipropetrovs'k
Donets'k
Zaporizhzhya
Odesa
Kherson
Mykolayiv
Chernihiv
Sumy
Poltava
Cherkasy
Kirovohrad
Kryvyy Rih
Vinnytsya
Zhytomyr
Rivne
Luts'k
L'viv
Ternopil'
Khmel'nyts'kyy
Ivano-Frankivs'k
Uzhhorod
Chernivtsi
Luhans'k
Mariupol'
Melitopol'
Berdyans'k
Simferopol'
Sevastopol'
Kerch
Izmayil
Kursk
Belgorod
Lublin
Chisinau
Iasi
Galați
Krasnodar
Rostov-na-Donu
over 500,000
over 100,000
over 25,000
other main city
Capital of province (Oblast)
UKRAINE

Morbidity and Mortality Data to date

- 12 to 14 million people displaced
- 6-30,000+ civilians dead
- 11 to 14,000 Ukrainian soldiers dead
- 30 to 60,000 Russian soldiers and mercenaries likely dead
- Healthcare infrastructure decimated
- Anecdotally, 20 to 40% of Ukrainian warfighters die from preventable injuries / complications
- Civilian death count grows daily – vulnerable communities at high risk

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- Limited access to appropriate tourniquets, training
- Ukraine: TXA IM
- Limited access to calcium replacement therapy
- Widespread crystalloid use
- 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.

Ditzel RM Jr, Anderson JL, Eisenhart WJ, et al. A review of transfusion- and trauma-induced hypocalcemia: Is it time to change the lethal triad to the lethal diamond?. J Trauma Acute Care Surg. 2020;88(3):434-439. doi:10.1097/TA.0000000000002570

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

Challenges

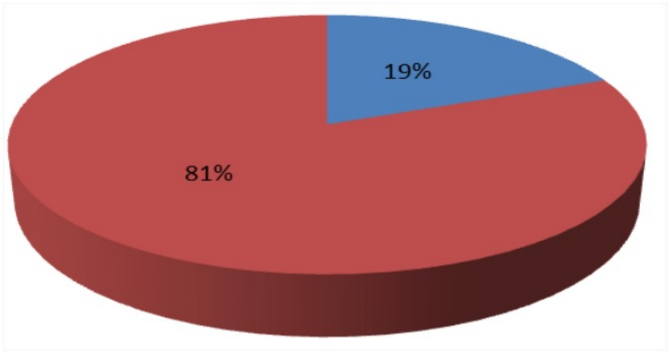
- **Onset**: no standardized TCCC, no standardized tourniquet, no legal access to blood or blood products in the prehospital environment
- Limited fit for purpose medical evacuations vehicles, no operational / deployable mobile Role 1 / 2
- Contested air: rotary and fix wing limited
- Prolonged field care

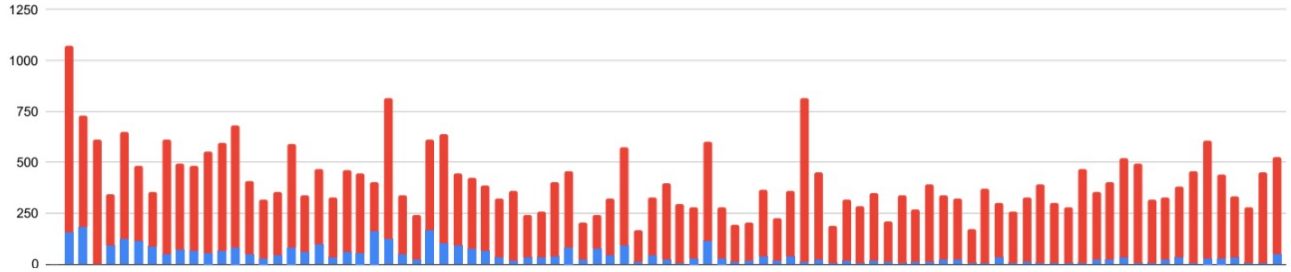
Assets and available resources

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

MEDICAL FORCES COMMAND
ARMED FORCES OF UKRAINE

TOTAL LOSES



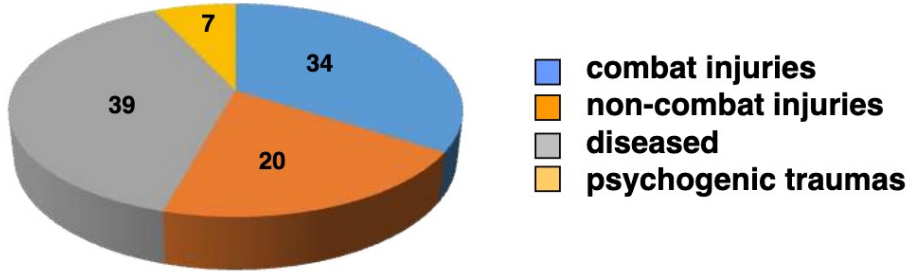


from 24/02/2022 till today

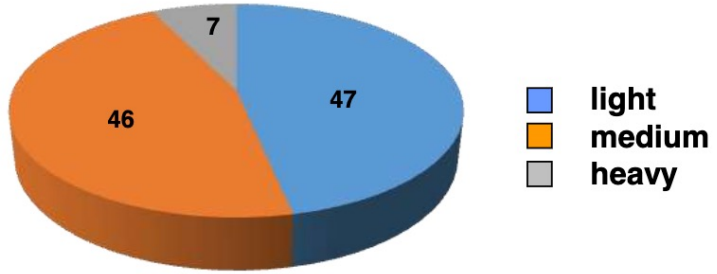
MEDICAL FORCES COMMAND
ARMED FORCES OF UKRAINE

SANITARY LOSES

Categories

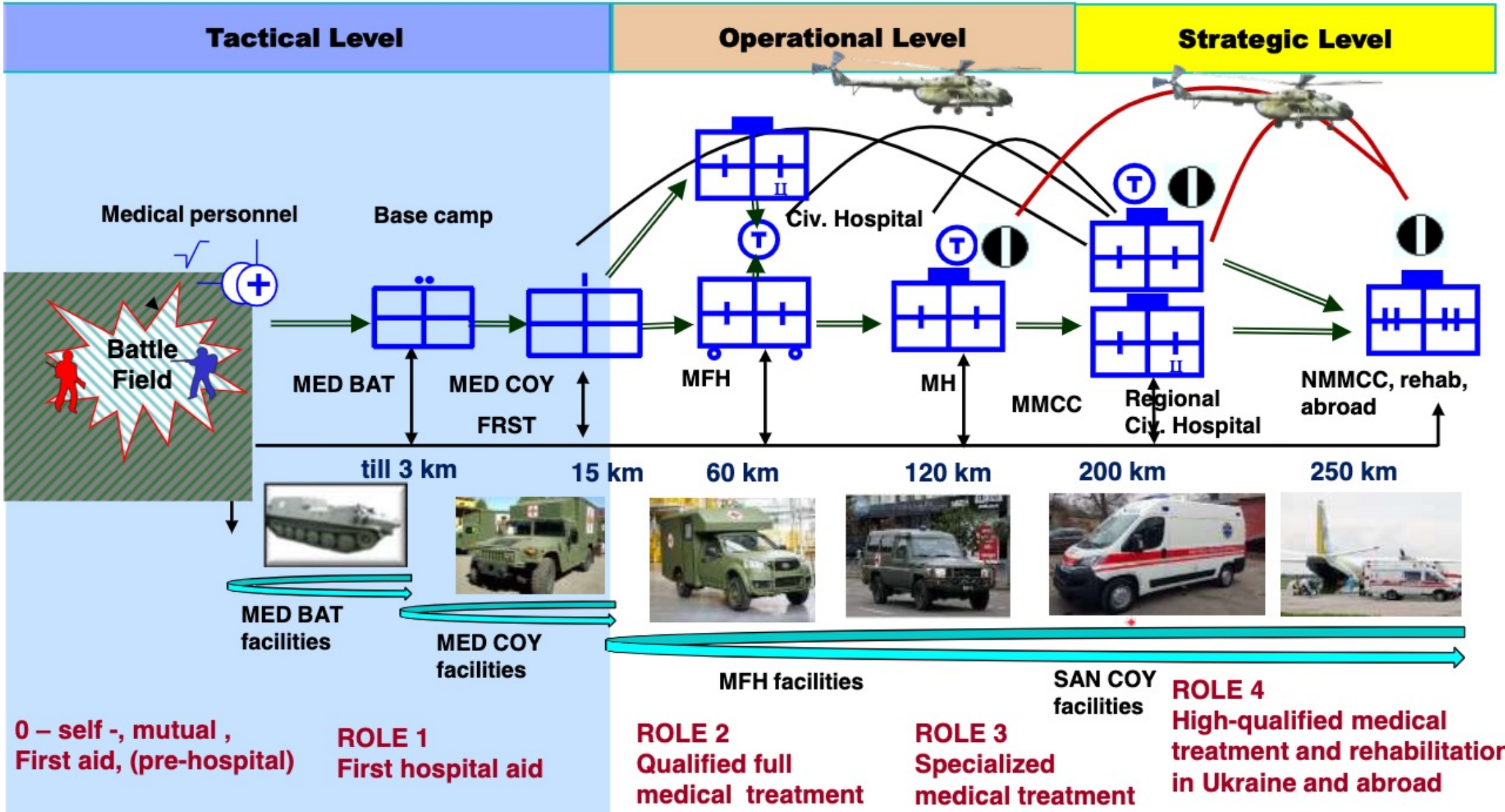


Injury severity



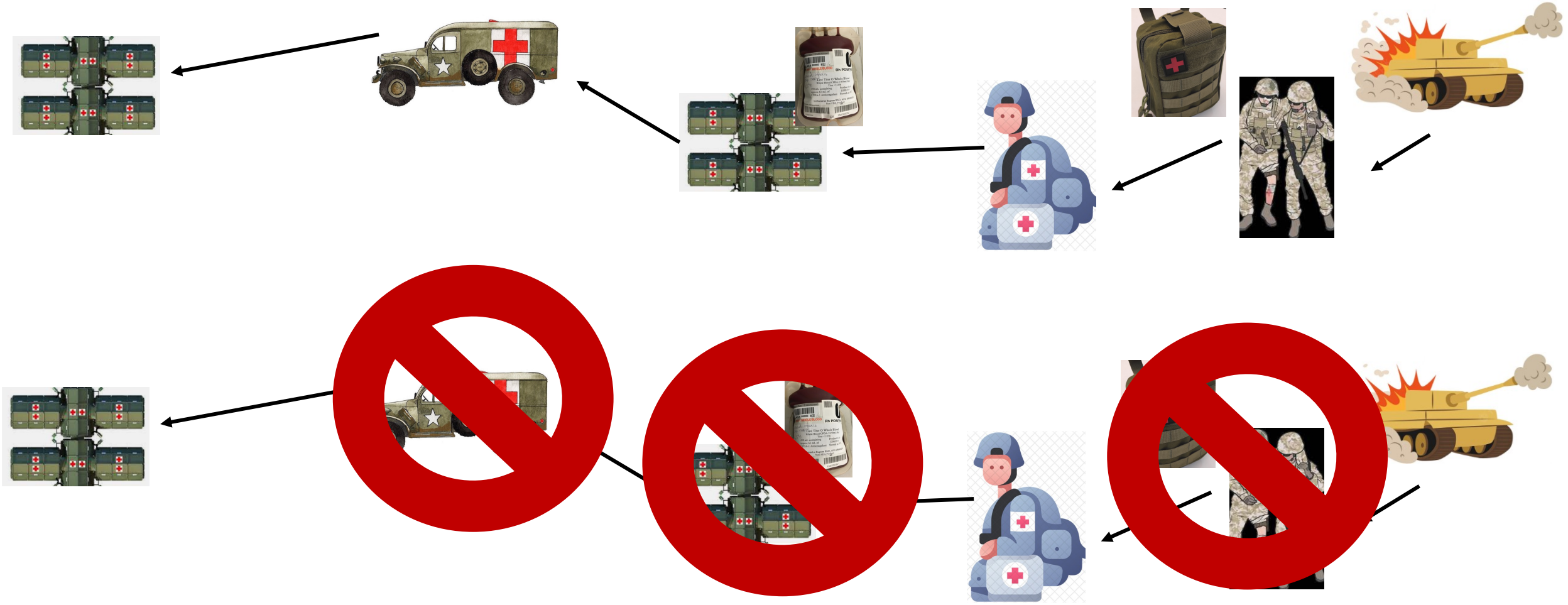
Content credit: Commander of the Medical Forces, Armed Forces of Ukraine, July 20 22, Brussels Belgium

C2



	vehicles	train	helicopters
Evacuated	43,1%	55,6%	1,3%

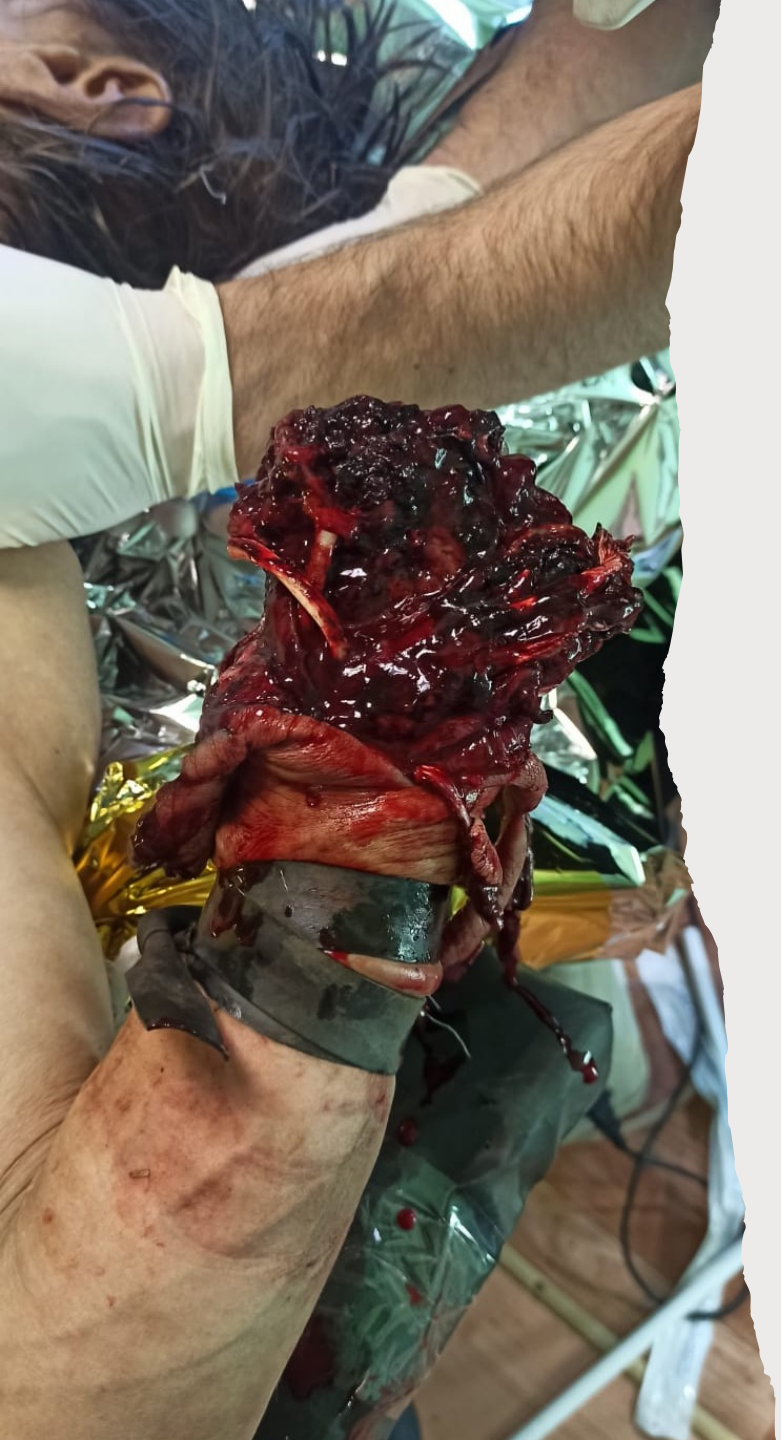
Anecdotal experience, different fields of fire



Preventable morbidity ⇑ and mortality ⇑

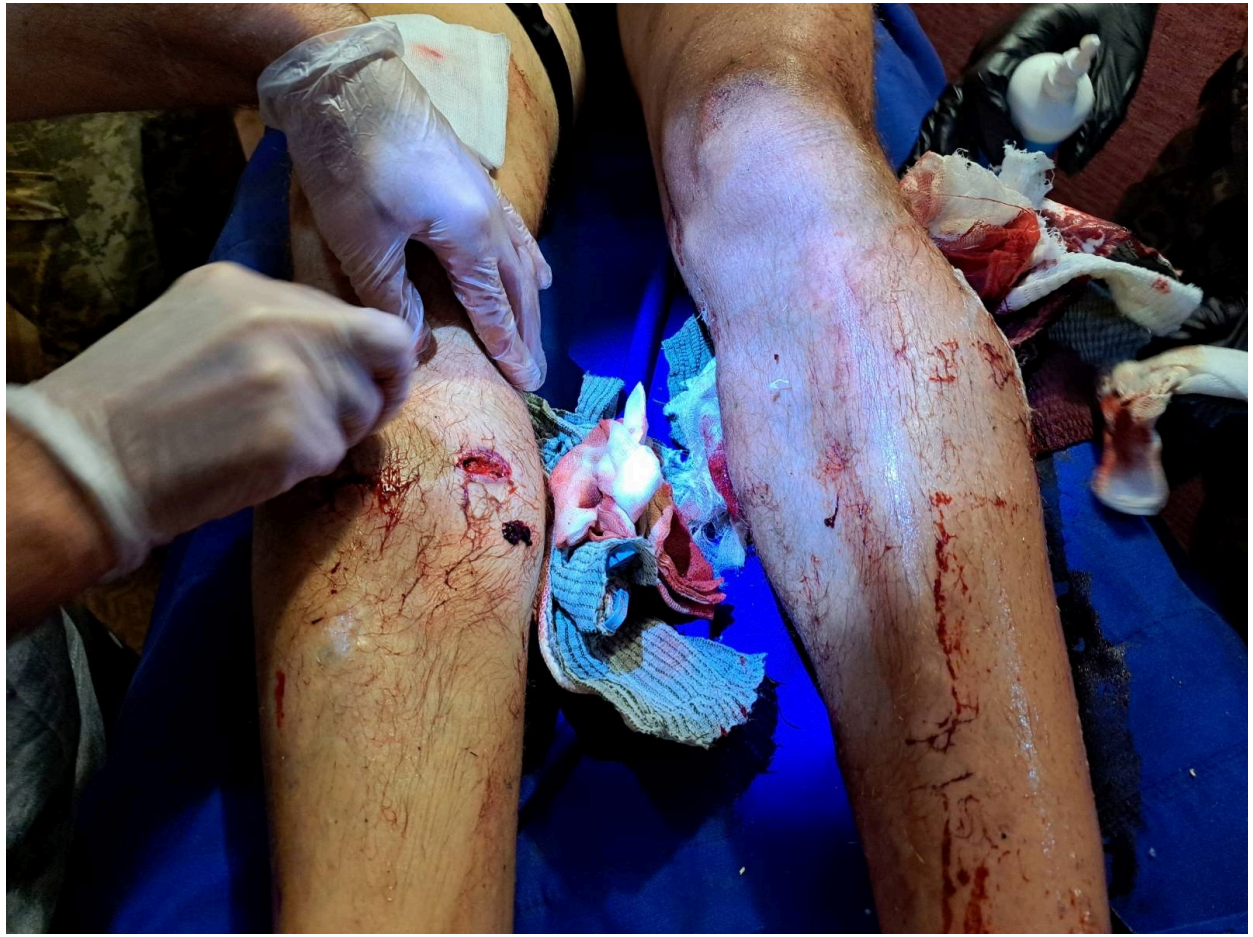
Lesson Learned (1): safety and incoming

- 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 Learned (2): tourniquets

- Training
- Timing
- Conversion
- Quality
- Precautionary (*en route casualty care*)
- DCR/DCS



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

Lesson Learned (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

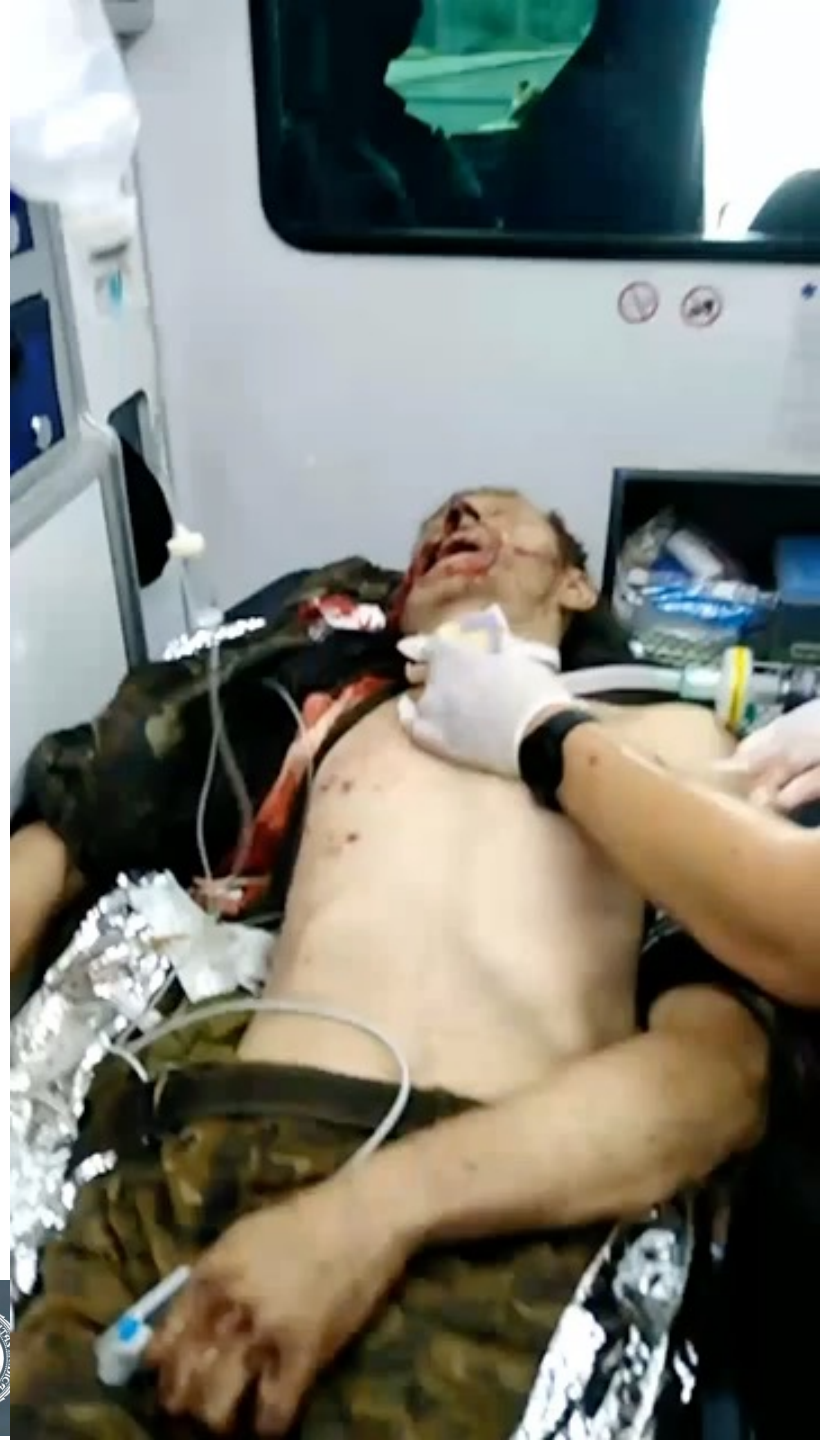
Lesson Learned (4): antibiotics

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

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

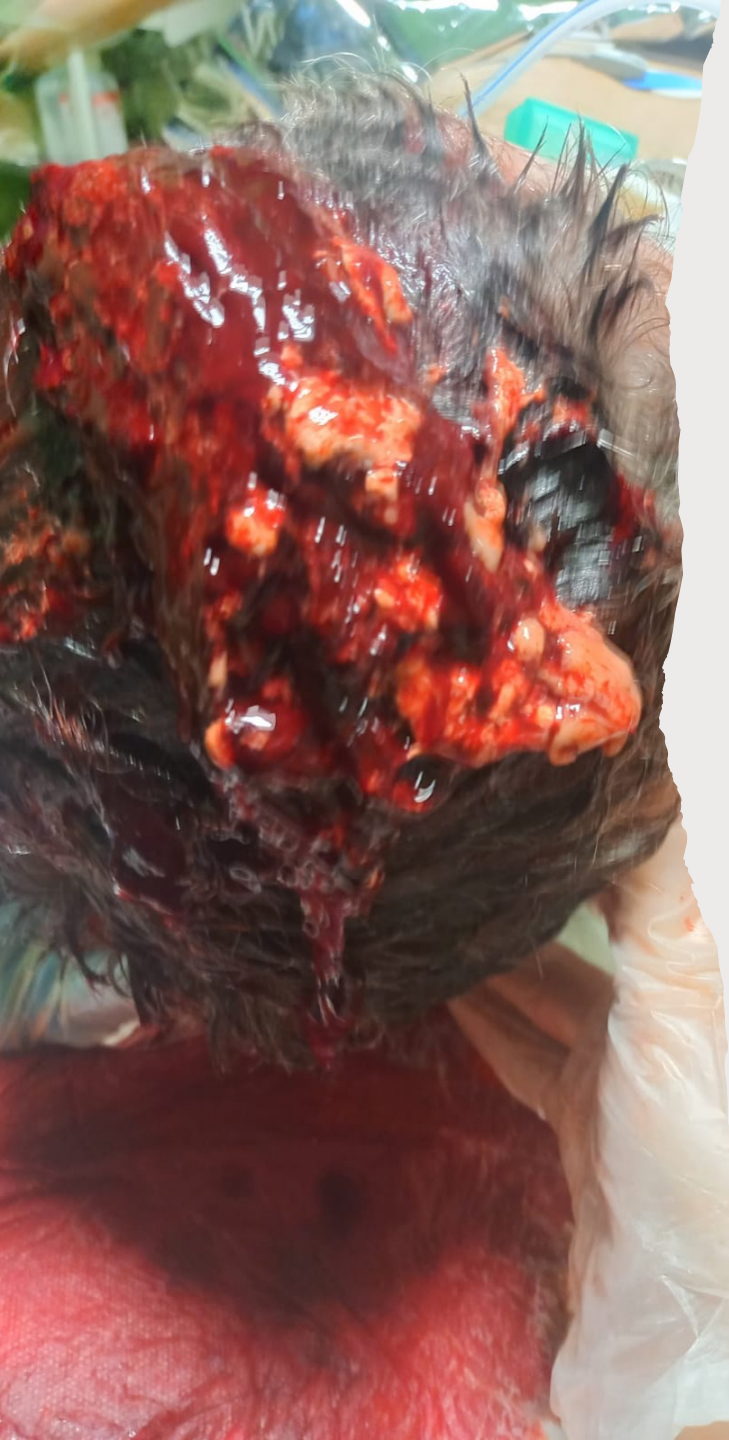
- MASCAL triage
- Logistics: location, supplies, level of care, evacuation chain
- Inadequate transport vehicles
- Serial requirement to triage kit/blood
- Unknowns and moral injury
- Mental health resiliency
- Ambulance transfer points vs CCPs
- Patient packaging: basics, good, better and best
- Patient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


6120 P5



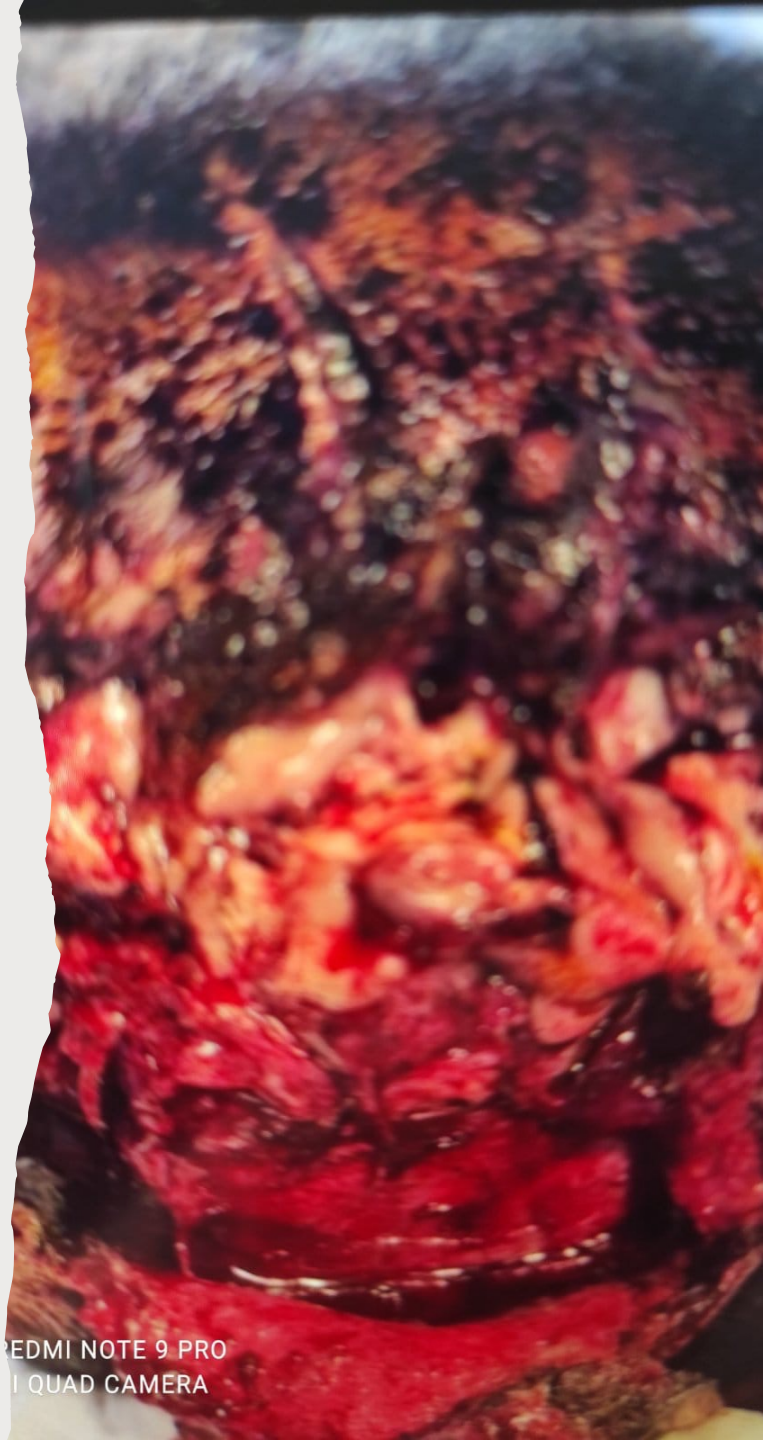
Interoperability

- Micro
- Macro
- TCCC cards, JTS+NATO
- CBRNE threat: Ukraine, neighboring countries and NATO reaction force
- Clinical governance
- Evacuation chain from POI to Role 4 / outside UKR



Lesson Learned (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



MACE 2
Military Acute Concussion Evaluation

Застосуйте MACE 2 як можна швидше після отримання травми.

Ім'я військовослужбовця:_____

ID номер: _____ Відділення та підрозділ: _____

Дата травмування: _____Час травмування: _____

Оглядач: _____

Дата огляду: _____ Час огляду: _____

Ціль: MACE 2 — мультимодальний інструмент, який допомагає оцінити та діагностувати струс мозку. Оцінка, кодування та покроковість, які необхідно виконати після завершення, знаходяться наприкінці MACE 2.

Час: MACE 2 є найбільш ефективним, якщо його використовувати якомога ближче до моменту травми. MACE 2 можна повторити для оцінки одужання.

СИМПТОМАТИКА

Оцініть наявність симптомів у пацієнта за Шкалою коми Глазго (ШКГ) 13-15.

- Погіршення рівня свідомості
- Двоїться в очах
- Підвищена неспокійність, агресивна чи збуджена поведінка
- Постійне блювання
- Результати пристрою для виявлення структурної травми головного мозку (за наявності)
- Судоми
- Слабкість або поколювання в руках або ногах
- Сильний або наростаючий головний біль

Відкладіть MACE 2, якщо присутні будь-які симптоми. Негайно зверніться до вищого рівня надання допомоги та розгляньте термінову евакуацію відповідно до порядку евакуації/тактичної бойової допомоги пораненим (TCCC).

Негативний результат для всіх по всім вищезгаданим симптомам

Продовжуйте MACE 2 і спостерігайте за симптоматикою під час оцінювання.

MHS Military Health System
health.mil

MACE 2
Military Acute Concussion Evaluation

Use MACE 2 as close to time of injury as possible.

Service Member Name: _____

DoDI/EDIPI/SSN: _____ Branch of Service & Unit: _____

Date of Injury: _____ Time of Injury: _____

Examiner: _____

Date of Evaluation: _____ Time of Evaluation: _____

Purpose: MACE 2 is a multimodal tool that assists providers in the assessment and diagnosis of concussion. The scoring, coding and steps to take after completion are found at the end of the MACE 2.

Timing: MACE 2 is most effective when used as close to the time of injury as possible. The MACE 2 may be repeated to evaluate recovery.

RED FLAGS

Evaluate for red flags in patients with Glasgow Coma Scale (GCS) 13-15.

- ❑ Deteriorating level of consciousness
- ❑ Double vision
- ❑ Increased restlessness, combative or agitated behavior
- ❑ Repeat vomiting
- ❑ Results from a structural brain injury detection device (if available)
- ❑ Seizures
- ❑ Weakness or tingling in arms or legs
- ❑ Severe or worsening headache

Defer MACE 2 if any red flags are present. Immediately consult higher level of care and consider urgent evacuation according to evacuation precedence/Tactical Combat Casualty Care (TCCC).

- ❑ **Negative for all red flags**
  Continue MACE 2, and observe for red flags throughout evaluation.

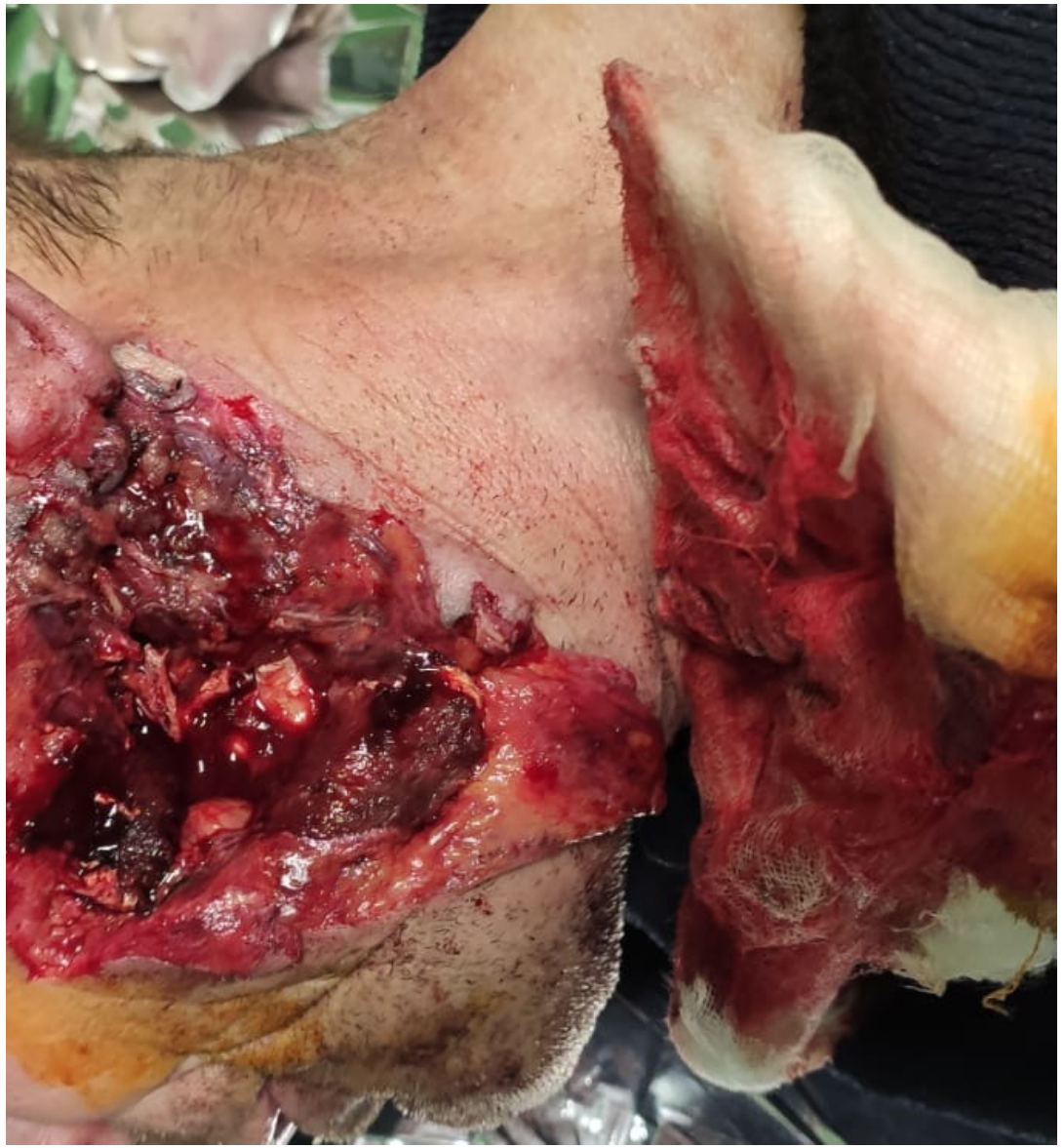
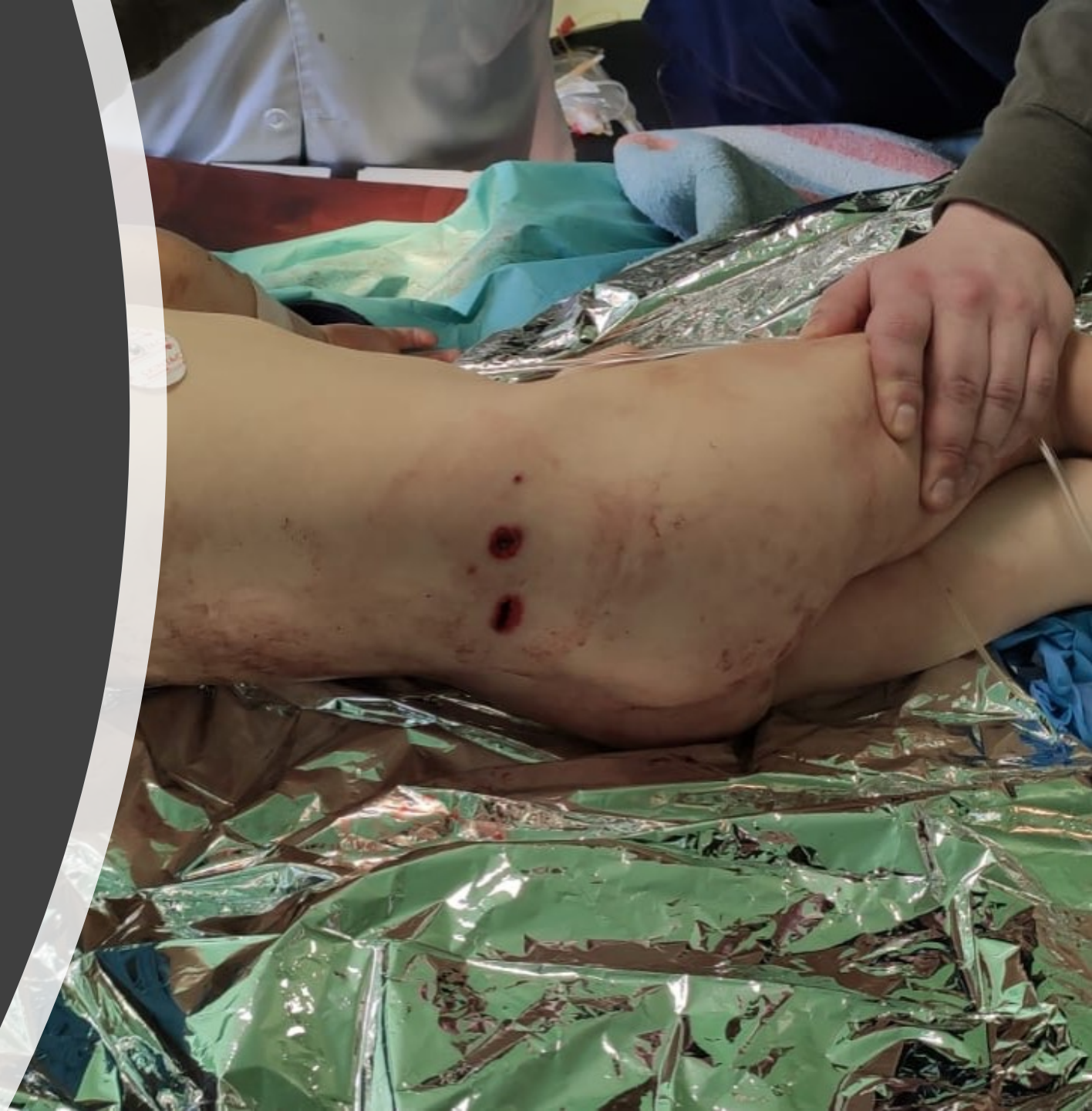
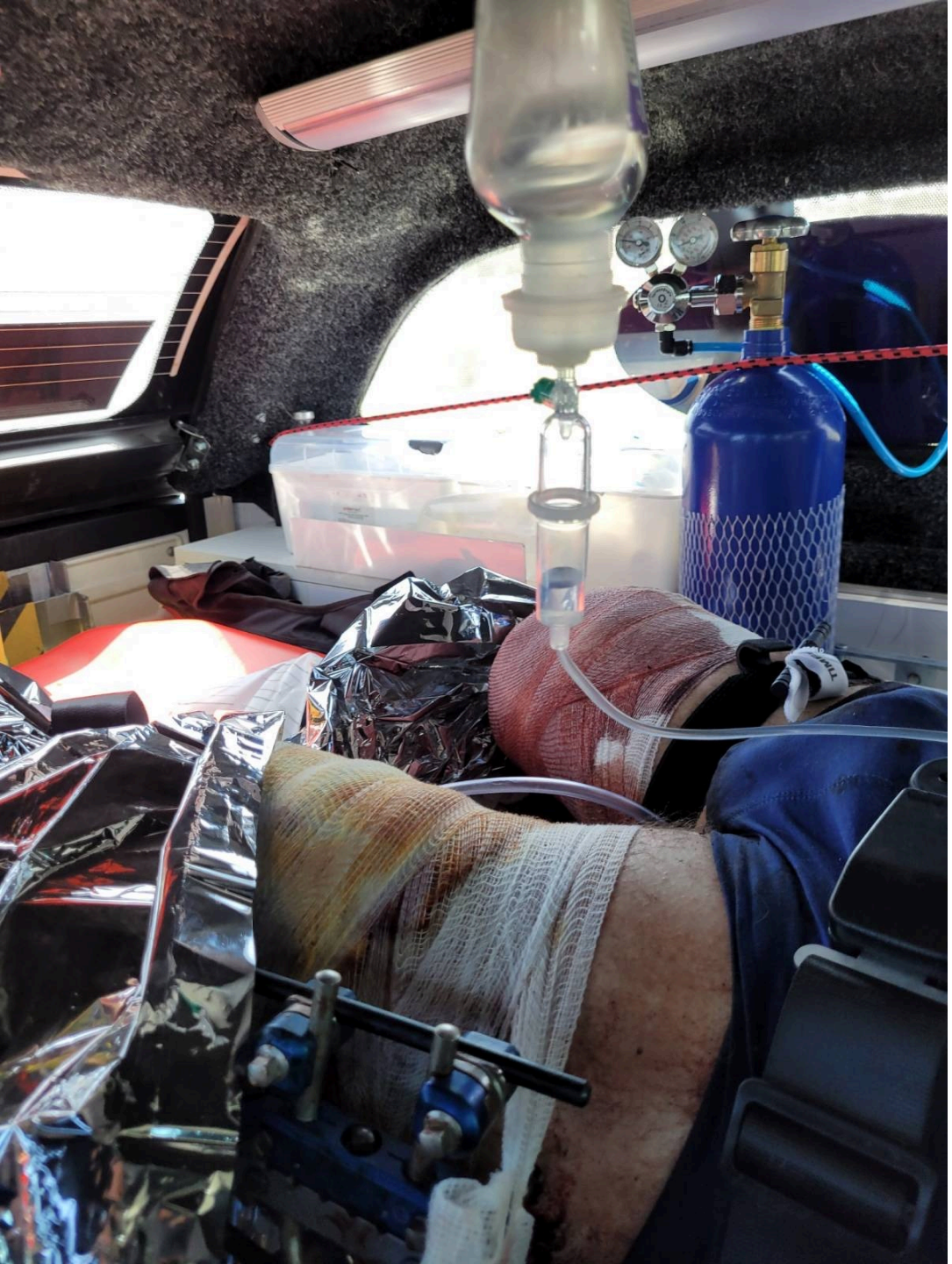


Photo credit: Dr Mykola Demyaniuk, TCCC instructor and anesthesia MD at forward stabilization point

Lesson Learned (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
- Casualty dump with no MOI -> the primacy of the primary survey
- TCCC card





Tight space

Compressed oxygen

Monitors that can’t be used on the road

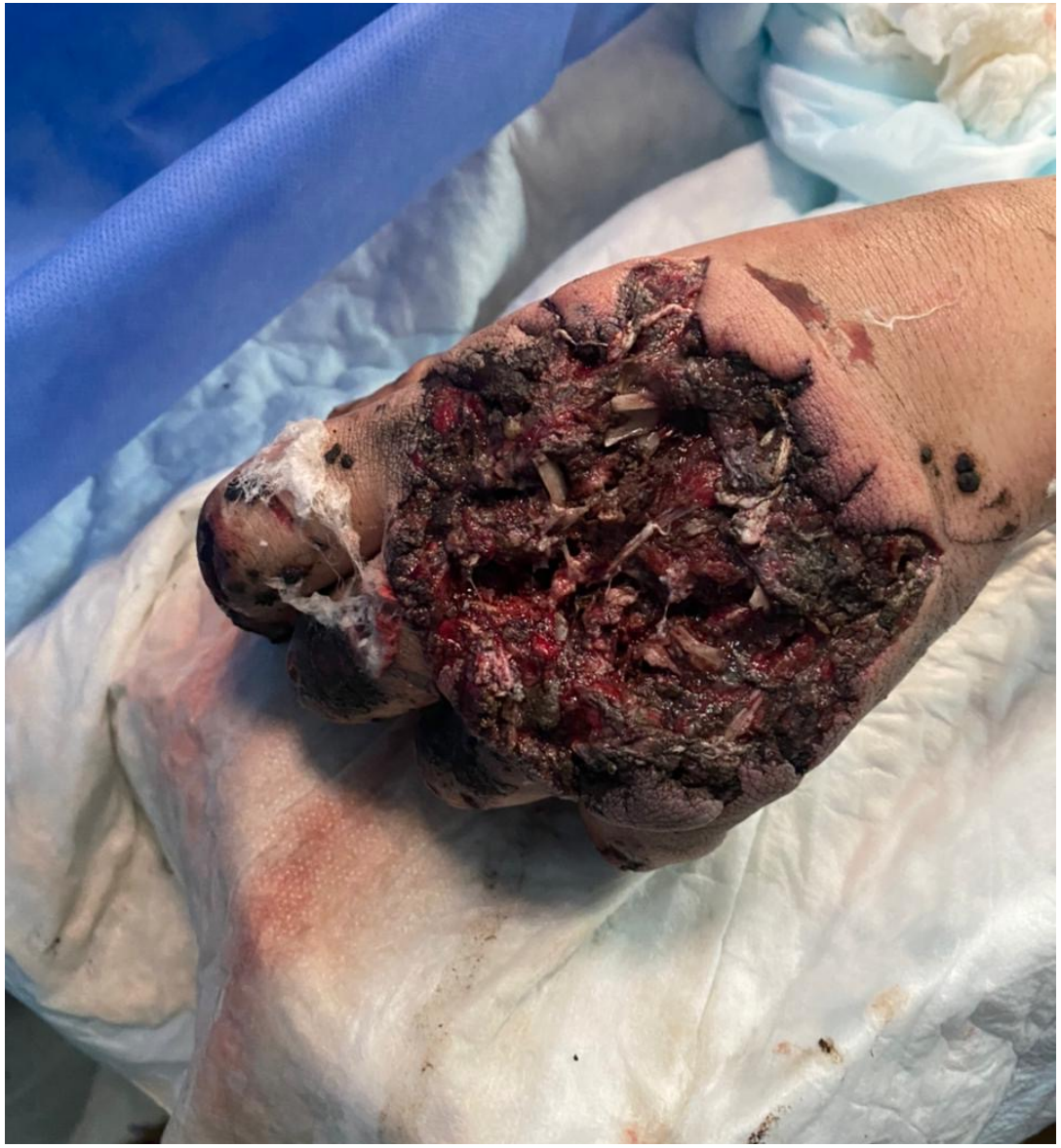
Post DCS, central line, intubation, propofol, GHB, fentanyl, ketamine, six units of blood, hypothermic, hypotensive, no access to pressers, external fixation, limited suction, antibiotics

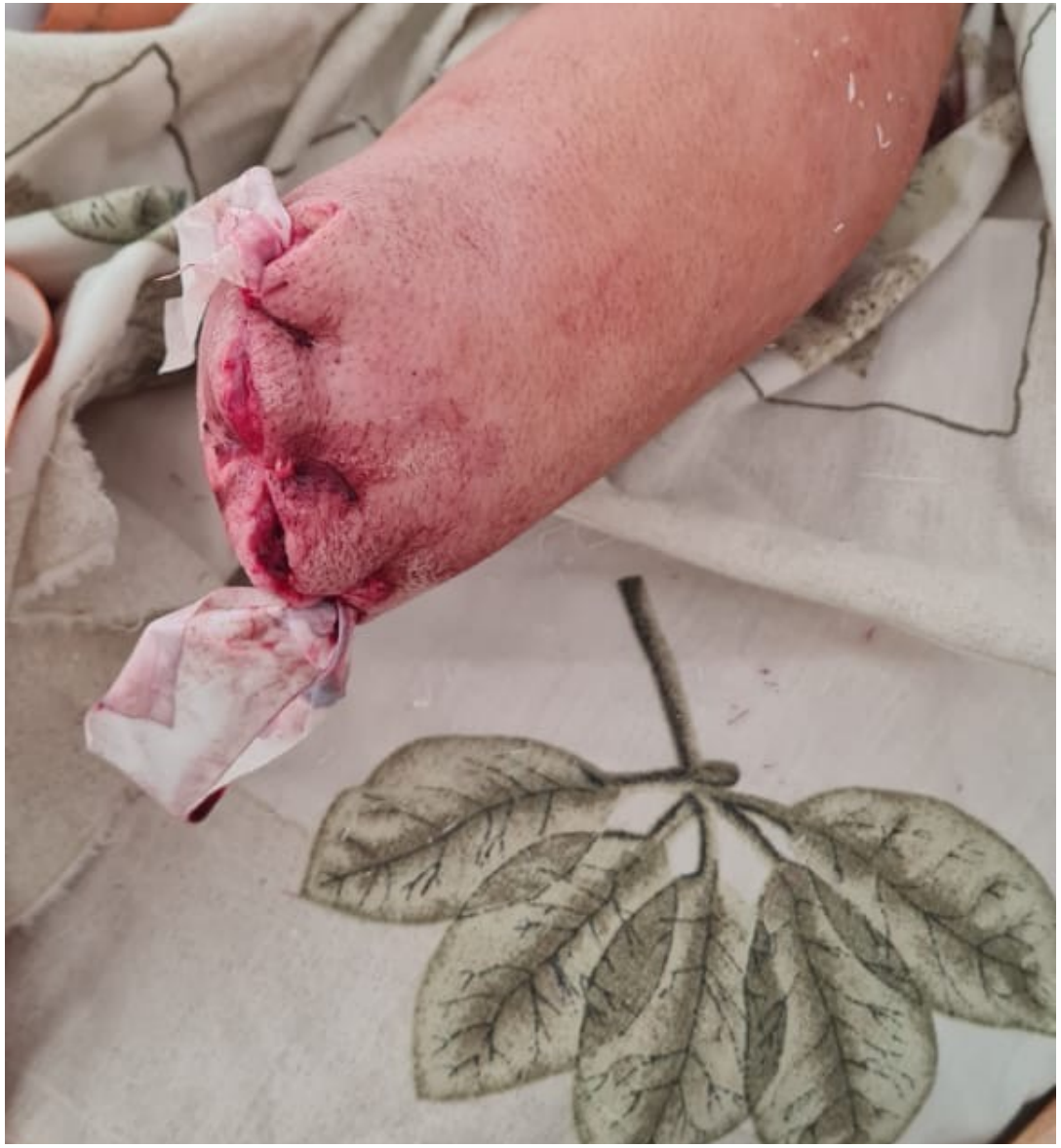
GRAD rocket fire

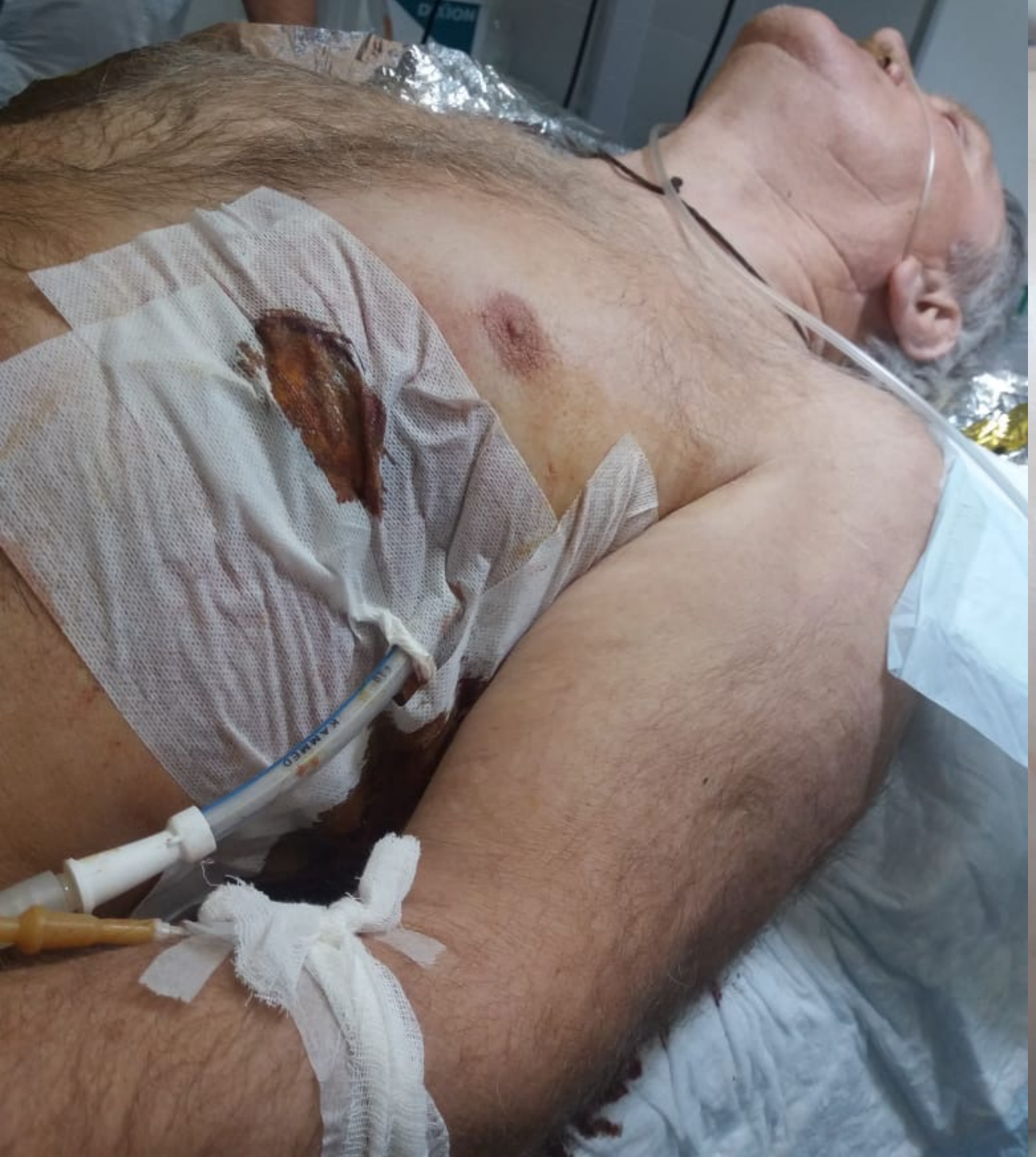
- Burns
- Exposure
- Fluids
- Patient data to higher echelons of care

Lesson Learned (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?







Lesson Learned (9): clinical governance

- Nurses
- MDs
- Medics
- Scope of practice
- What is your accountability and to whom?
- Letters, IDs, associations and security
- Freedom of movement

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

Key focus in Global Health Engagement (GHE): winter at war

- All health and health security related activities focused on: readiness, interoperability, lessons learned/lessons shared, and reduction of both morbidity and mortality of the NATO and NATO partner Warfighter
- Training is a two-way street: lessons learned (LL), lessons shared (LS), lessons lost (LL)
- Evacuation chain
- Training far forward – NATO/partners far forward
- Support with reaction force
- Protect the air?
- Preventative engagement?
- Deterrence and collective defense – drive the initiative

The Enemy

- Are preparing
- Are adapting
- Are listening
- Are training
- Peer adversary

Challenging questions to consider

- 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 CPGs? What data would be needed most to make the quickest and greatest impact?
- Evac Chain: Pushing Role 2 capabilities to Role 1, en route casualty care and critical care aspects of the post DCR/DCS patient requiring transport in multi-domain battle, what next?

Summary

- Lessons learned – lessons shared – lessons lost
- Disruption: CPGs and pushing Role 2 level of care to Role 1
- En route casualty care – critical care transport
- Mental health

Thank you

John Quinn, MD, PhD, MPH, EMT-P
Prague Center for Global Health
Institute of Hygiene and Epidemiology
First Faculty of Medicine
Charles University
www.pcgh.lf1.cuni.cz
+420608246032
john.quinn@lf1.cuni.cz
John.quinn5@nhs.net

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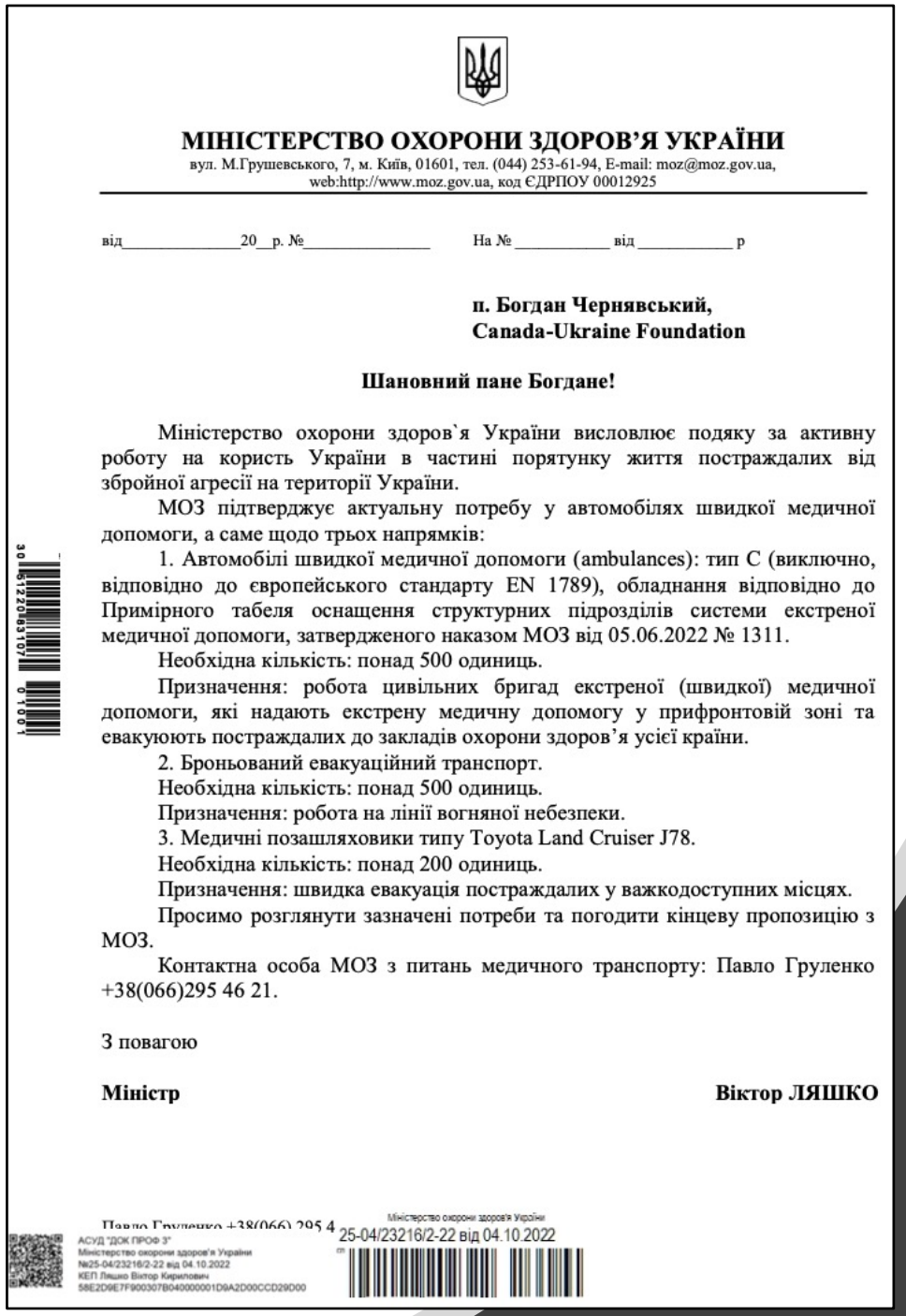
- Canada-Ukraine Foundation (CUF)

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



МІНІСТЕРСТВО ОХОРОНИ ЗДОРОВ'Я УКРАЇНИ

вул. М.Грушевського, 7, м. Київ, 01601, тел. (044) 253-61-94, E-mail: moz@moz.gov.ua,
web:http://www.moz.gov.ua, код ЄДРПОУ 00012925

від_____20__р. №_____ На № _____ від _____ р

п. Богдан Чернявський,
Canada-Ukraine Foundation

Шановний пане Богдане!

Міністерство охорони здоров`я України висловлює подяку за активну роботу на користь України в частині порятунку життя постраждалих від збройної агресії на території України.

МОЗ підтверджує актуальну потребу у автомобілях швидкої медичної допомоги, а саме щодо трьох напрямків:

1. Автомобілі швидкої медичної допомоги (ambulances): тип С (виключно, відповідно до європейського стандарту EN 1789), обладнання відповідно до Примірного табеля оснащення структурних підрозділів системи екстреної медичної допомоги, затвердженого наказом МОЗ від 05.06.2022 № 1311.

Необхідна кількість: понад 500 одиниць.

Призначення: робота цивільних бригад екстреної (швидкої) медичної допомоги, які надають екстрену медичну допомогу у прифронтовій зоні та евакуюють постраждалих до закладів охорони здоров'я усієї країни.

2. Броньований евакуаційний транспорт.

Необхідна кількість: понад 500 одиниць.

Призначення: робота на лінії вогняної небезпеки.

3. Медичні позашляховики типу Toyota Land Cruiser J78.

Необхідна кількість: понад 200 одиниць.

Призначення: швидка евакуація постраждалих у важкодоступних місцях.

Просимо розглянути зазначені потреби та погодити кінцеву пропозицію з МОЗ.

Контактна особа МОЗ з питань медичного транспорту: Павло Груленко +38(066)295 46 21.

З повагою

Міністр **Віктор ЛЯШКО**

Павло Груленко +38(066) 295 4

Міністерство охорони здоров'я України
25-04/23216/2-22 від 04.10.2022

АСУД "ДОК ПРОФ 3"
Міністерство охорони здоров'я України
№25-04/23216/2-22 від 04.10.2022
КЕП Ляшко Віктор Кирилович

Direct Ministry of Health Request: critical care ambulance needs (NOW)

- Critical care ambulances
- 500, 500, 200 (4X4s)
- Equipment, Training
- " … *the work of civilian emergency (ambulance) medical teams that provide emergency medical care in the near frontline areas and evacuate victims to health care institutions throughout the country*."

FIRST FACULTY OF MEDICINE
Charles University

Prague Center for Global Health

Affiliations, locations, media, operational security – "*this ain't about me*"

- Patriot Defense, Medsanbat / Viktor and Elena Pinchuk Foundation
- Canada-Ukraine Foundation (CUF)
- Migrant Offshore Aid Station (MOAS)
- GoDocs (2022/2023)
- Academics, LF1
- MoD / Armed Forces of Ukraine (AFU)
- OSCE Special Monitoring Mission for Ukraine (SMM)
- NATO Military Medical Center of Excellence ("MilMed CoE")

- Operational security: no photos, no videos, no waypoints.
- Locations
- Timeline iteration: February 15th – July 1st 2022