ECHO Summary, 27/March/2026
Session Title: Life-Saving Strategies for Blast and Ballistic Injuries

Summary Author: Makenna Hittner

Edited by: Amy Bridges, MD

Disclaimer:
The information presented in this summary is based on the presentation given by the panelists and is intended for general informational purposes only. The authors and collaborating partners do not accept responsibility for any outcomes resulting from the implementation of treatments outlined in this document. It is strongly recommended that individuals verify the information against their national guidelines and seek professional advice before making any decisions related to the content presented herein.

Areas Covered
- Key history in a patient with blast/ballistic injuries
- On-scene assessment, triage, care, and transportation of a patient with blast/ballistic injuries
- ED handover, assessment, and investigations for a patient with blast/ballistic injuries
- Nursing care for a patient with blast/ballistic injuries
- ED management and disposition plan for a patient with blast/ballistic injuries

ECHO Session Panelists:
- Experts: Dr. Prisca Kizito, Lt. Jackson Gutagwa, Mr. Okiror Andrew, Dr. Obwapus Robert
- Patient Case Presenter: Dr. Paul Sekate
- Moderator: Dr. Anna Meridah Kaguna

Epidemiology:
- Approximately 130 armed conflicts are currently taking place around the world, putting millions at risk for ballistic and blast injuries.[1]
- Additionally, and unfortunately, acts of terrorism, interpersonal violence, and self-inflicted injuries that involve ballistics or blasts are all too common.

Risk Factors:

- Living in a country affected by armed conflict dramatically increases the risk for blast and ballistic injuries.
    - Civilians, including women, children, and the elderly, are increasingly at risk due to the nature of modern warfare.

Clinical features:

- **AIRWAY**:
    - Assess airway patency and secure airway if necessary.
    - Be aware of possible inhalation burns (visible soot around mouth and nares) which carry the risk of airway obstruction secondary to airway edema.
        - Secure the airway immediately - do NOT wait until edema sets in or else securing the airway will be much more difficult.
- **BREATHING**:
    - Check for bilateral breath sounds, chest asymmetry, and tracheal deviation.
        - Immediate needle and/or finger thoracostomy for tension pneumothorax.
    - Assess SpO2, respiratory rate, and work of breathing.
        - High flow O2 if SpO2 below 92%.
- **CIRCULATION**:
    - Address any catastrophic bleeding first by applying tourniquets and/or pressure dressings.
    - Prepare for blood transfusion.
- **DISABILITY:**
    - AVPU or GCS
    - Pupil size and reactivity
    - Focal neuro deficits
    - Random blood sugar
- **EXPOSURE**:
    - Assess for burns, shrapnel injuries, and any other signs of trauma.

Tactical Combat Casualty Care (TCCC) treatment of trauma injuries in the field: MARCH[2]

- Massive hemorrhage - apply tourniquets, pressure dressings, and/or wound packing
- Airway management - open and/or secure the airway
- Respiration - seal open chest wounds; decompress tension pneumothoraces; support ventilation/oxygenation as necessary
- Circulation - prioritize hemorrhage control; TXA for hemorrhagic shock
- Head injury/Hypothermia - AVPU; keep patient warm

Diagnostics:

- EFAST to assess for internal bleeding and pneumothorax
- Otoscopy to assess for tympanic membrane rupture or blood behind TM
- Blood grouping and cross matching
- Point of care labs: random blood sugar, hemoglobin
- CT scan - trauma series

- ECG to assess heart rhythm after blunt force trauma to the chest
- ABG, CBC, LFTs, RFTs, extended electrolytes
- 5 categories of blast injuries:
    - Primary (blast wave affecting air-filled organs) - blast lung, ruptured tympanic membrane, bowel perforations
    - Secondary (flying debris) - penetrating trauma and lacerations
    - Tertiary (body displacement from blast wind or collapse) - blunt force trauma and fractures
    - Quaternary (other explosion-related effects) - burns, asphyxiation, and toxic substances
    - Quinary (contaminants from explosion environment) - chemical burns, radiation, and infection

Treatment:

- Treatment for the patient with blast/ballistic injuries will depend on what types of injuries they sustain.
- For pneumothorax:
    - Oxygen therapy targeting SpO2 > 94%
    - Needle decompression (2nd intercostal space, midclavicular line)
    - Chest tube
- For hemorrhagic shock:
    - Tourniquets and/or pressure dressings depending on wound type and location
    - Massive transfusion protocol (1:1:1 FFP:PRBCs:Platelets)
    - TXA - 1g IV then 1g infusion over next 8 hours
    - Permissive hypotension (up to SBP 90mmHg)
    - IV fluids, consider early vasopressor use
    - Surgical consult
- For traumatic amputations:
    - Keep tourniquets in place, dress stumps with saline soaked gauze and occlusive plastic wrap, elevate stumps
    - Surgical consult
    - Tetanus shot
    - Antibiotics
- For blast lung:
    - Use lung-protective ventilation (ARDS-type); avoid high pressures and monitor frequently for delayed compromise
- For traumatic brain injuries:
    - Monitor GCS
    - Elevate head of bed
- In general:
    - Analgesia - IV paracetamol, IV fentanyl, and/or nerve blocks
    - Keep the patient warm!

Complications:

- Complications for the patient with blast/ballistic injuries will depend on what types of injuries they sustain. But in general…
    - Cardiac arrest secondary to tension pneumothorax, hemorrhagic shock, respiratory collapse, etc.
    - Infection of penetrating trauma wounds or traumatic amputations.
    - Long-term mental health concerns from surviving a traumatizing event and/or from sustaining life-altering injuries.

Disposition:

- OR if bleeding, unstable, or peritonitis
- ICU if blast lung or polytrauma
- Observe if blast exposure risk
- Consult relevant specialists such as ENT

Special Notes

- Standard tourniquet time is 120 minutes, but sometimes you must exceed this time to save the patient.
- Pre-Hospital Care:
    - Scene safety → Initial assessment (CABCs) → Mechanism of injury? Generalized or unknown MOI = rapid trauma survey; Localized MOI = focused exam → Load and go situation? → Secondary survey and ongoing exam on the way to the hospital
    - Scene safety with blast injuries: allow the experts to clear the scene and facilitate zones (hot zone, warm zone, green zone)
    - Check for patients that might've been thrown elsewhere by the blast.
- Nursing Care:
    - Main objectives: Pain control and prevention of further injuries or complications until time of discharge or transfer
    - Balance pain relief and side effects of pain medications
    - Decontamination of patients who may have possible Chemical Biological Radiological and Nuclear (CBRN) exposure from explosives
    - Patient communication with a patient who cannot hear after a blast
    - Consider psychological needs of a patient who suffered from a traumatizing and life-altering experience such as a ballistic or blast injury
    - For hemorrhagic shock: Recheck tourniquet; apply counter tourniquet and pressure bandages if necessary. Secure large bore IVs for blood transfusion.
    - For hypoxia/respiratory distress: Assist into high fowler's position; attach pulse ox; cover patient with warm blankets
    - For life-altering injuries (e.g. bilateral traumatic lower limb amputation and hearing loss in both ears): allow patient to experience normal grief but avoid chronic sorrow; organized visiting from family and friends; routine counseling and referral for rehabilitation
- Ballistic injuries:
    - Check for entry AND exit wounds.

    - Don't forget to check folds of the body such as armpits and perineum.
    - Questions to ask:
        - Weapon type
        - Distance and angle of shot
        - Number of shots heard
        - Circumstances of injury (e.g. assault, self-inflicted, collateral in armed conflict, etc.)
- Summary of approach:

Feature	Primary Survey	Secondary Survey	Tertiary Survey
Primary Goal	Identify and treat life threats	Identify all injuries	Identify missed injuries
Timing	Immediate	After stabilization	Within 24 hours
Scope	ABCDE focus	Head to toe and SAMPLE history	Comprehensive re-evaluation with diagnostics
Key Output	Resuscitation	Definitive diagnosis	Completion of injury list

- Management using ATLS principles and MCI planning:
    - Safety: scene safety and personal safety; beware of secondary devices, contaminated patients, and terrorists as patients
    - Activate the hospital's external or internal disaster plan (ICS)
    - Clear the ED, cancel electives, clear the ICU
    - Notify blood bank, lab, and radiology units
    - Be ready for waves of patients: low acuity victims who arrive via private vehicles and most critical patients who arrive later via EMS
- Special considerations for blast injuries:
    - Hidden injuries are common so reassess frequently
    - Blast lung may deteriorate later
    - Multiple injuries are likely
- Most urgent actions to be taken in the ED:
    - Intubate inhalational injuries early
    - Oxygen, needle decompression
    - Bleeding control, early blood, TXA, permissive hypotension (NOT if there is head injury and increased ICP)
    - Appropriate antidotes, tetanus toxoid, reassess frequently
    - Antibiotic prophylaxis: Cefazolin 1g IV 8 hourly ideal
    - Surgical consult for damage control surgery
- Short-course antibiotics for uncomplicated civilian extremity GSWs < 24 hours - 1st gen cephalosporin

- MCI planning: update hospital disaster plans to reflect triage, surge capacity, and coordination with regional responders; have protocols for decontamination, PPE, and secondary surge capacity (ICU)
- Avoid MRIs because of metallic fragments!
- Pearls: control bleeding first; mechanism predicts injury; reassess often; use blood, limit fluids; suspect hidden injuries
- Pitfalls: missing internal bleeding; assuming entry = exit; premature discharge; fluid overload worsens lung injury; tunnel vision on obvious wounds; missing antibiotics

Collaborating Partners

1. Ministry of Health of the Republic of Uganda
2. Seed Global Health
3. Techies Without Borders

References

1. International Committee of the Red Cross. ICRC Humanitarian Outlook 2026: A World Succumbing to War. Published 12 November 2025. Accessed 24 April 2026. https://www.icrc.org/sites/default/files/2025-12/LR_4909_002_ICRC_Humanitarian_Outlook_2026_A_World_Succumbing_to_War.pdf
2. CALL Handbook. Tactical Combat Casualty Care: Lessons and Best Practices. Version 5, May 2017. Accessed 24 April 2026. https://api.army.mil/e2/c/downloads/2023/01/19/31e03488/17-13-tactical-casualty-combat-care-handbook-v5-may-17-distro-a.pdf

Please email Dr. Amy Bridges with comments or questions at bridgesa@umsystem.edu, or message via WhatsApp at +1 234 380 3635.