Emergency War Surgery Course
Joint Trauma System

Mass Casualty and Triage

Joint Trauma System Battlefield Trauma Educational Program
EWS Mass Casualty, Triage

Scenario

You are in a small operative team consisting of a general surgeon, orthopedic surgeon, medical administrative officer, nurse and technician. You have two operative beds and limited supplies. Ten casualties of varying severities will be arriving in 10 minutes.

1. What are your initial thoughts?

2. What will you do in the next 10 minutes until arrival?
Define mass casualty.

Review triage principles: triage set-up, staff support, triage constraints

Apply triage to a series of patients.

Conduct a mass casualty and triage exercise.
Mass Casualty: An event that overwhelms immediately available medical capabilities to include personnel, supplies, and or equipment.

Mass casualties may occur at military treatment facilities with little or no advance notice.
Effective mass casualty response is founded on the principle of **triage**.

Triage is the system of sorting and prioritizing casualties based on:
- the tactical situation,
- the mission, and
- the available resources.

**Ultimate goals of combat medicine are:**
- the preservation of life, limb, and eyesight,
- the return of the greatest possible number of warfighters to that battlefield, and
- preserve the capacity for the U.S. to maintain an all voluntary military by caring for its wounded warriors.
Triage is a fluid process.

Triage will change based on limitations of:

- Situation
- Mission
- Available resources

Triage must be reproducible and adaptable.

- This occurs only if rehearsals occur
- Rehearsals should include varied patients and injuries.
- Rehearsals should include planned adaptation and contingencies.
Immediate Triage: TX needed within minutes to 2 hours

- Patients with a chance of survival dependent on immediate intervention
- Some of these patients will change categories after the initial intervention
- Injuries include:
  - Airway obstruction/compromise
  - Tension pneumothorax
  - Uncontrolled hemorrhage
  - Torso, neck, or pelvis injuries with shock
  - Head injury requiring emergent decompression
  - Retrobulbar hematoma
  - Multiple extremity amputations
**Delayed Triage:** Includes those who are in need of surgery, but whose general condition permits delay in treatment without unduly endangering life, limb, or eyesight

- Sustaining treatment is required (e.g., blood/fluid resuscitation, stabilization of fractures, and administration of antibiotics, bladder catheterization, gastric decompression, relief of pain)

- Injuries include:
  - Blunt or penetrating torso injuries without signs of shock
  - Fractures
  - Facial fractures without airway compromise
  - Soft-tissue injuries without significant bleeding
  - Globe injuries
  - Survivable burns without immediate threat to life (airway, respiratory)
Minor Triage: Can effectively care for themselves or with minimal medical care

- These casualties may provide manpower resource to assist with movement or potentially even care of the injured.
- When a mass casualty incident occurs in close proximity to a medical treatment facility (MTF), it is likely that these will be the first casualties to arrive, bypassing or circumventing the casualty evacuation chain.
- Injuries include:
  - Lacerations
  - Abrasions
  - Fractures of small bones
  - Minor burns, etc
Expectant Triage: Injuries that overwhelm current medical resources and compromise the treatment of salvageable patients

- Should not be abandoned, but should be separated and reassessed
- Require staff capable of monitoring and providing comfort measures
- Injuries include:
  - Any casualty arriving without vital signs or signs of life, regardless of mechanism of injury
  - Transcranial gunshot wound (GSW)
  - High spinal cord injuries
  - Open pelvic injuries with uncontrolled bleeding and class IV shock
  - Burns without reasonable chance for survival or recovery
Contaminated (CBRNE): Must be decontaminated prior to entry

Retained unexploded ordinance: Must be segregated immediately

Non-U.S. military personnel
- Noncombatants, 3rd party nationals, enemy prisoners of war, contractors
- Medical necessity dictates care, but pre-arrival medical issues may affect morbidity. Threats such as suicide bombers must be considered and vetted.

Combat stress: Segregation immediately will improve odds of recovery.
- Do not send them out of the area; however, this may worsen stress reactions.
Basic triage set-up principles

- All casualties should flow through a single triage area and undergo rapid evaluation by the initial triage officer.
- Direct casualties to separate treatment areas, each with its own triage team leader.
- Send the deceased to the morgue; separate from other casualties.
- Unidirectional flow of patients is important to prevent clogging the system; reverse patient flow in any treatment area is discouraged.

No significant treatment should occur in the triage area.
Rapidly send casualties to the appropriate treatment areas for care.
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Emergent Treatment Area

- Close proximity to initial triage area with direct access
  - A display board or a computer should be used to record patient identity, location, and disposition
  - Typically includes a series of resuscitation bays (number depends on available resources/personnel)
    - Allow sufficient room for three-person team to work
    - Easy access in and out of bay
    - Availability of equipment needed for ATLS-style resuscitation.
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Triage Set Up

Left: Triage set up. Proper set up facilitates effective flow of treatment

Right: Resuscitation station

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Initial Triage Area

Initial triage area should include:

- **Proximity** to the receiving area for casualties—landing zone, ground evacuation, or decontamination area.

- **One-way flow** both into and out of the triage area through separate routes to easily identified, marked (signs, colors, chemical lights, etc) treatment areas.

- **Well-lit, covered, climate-controlled** (if possible) area with sufficient space for easy access, evaluation, and transport of casualties in and out.

- Dedicated **casualty recorders** to identify, tag, register, and record initial triage/disposition.
Initial Triage Officer

- Ideally, a surgeon experienced in dealing with combat trauma should be used in this capacity.

- It is essential that another physician with clinical experience be trained to assume this function (i.e. Emergency Medicine physician).

- Using mass casualty exercises or limited mass casualty situations is one way to train/identify the right person to fill this role in the absence of a surgeon.
Role 1. The most experienced healthcare provider should serve as the **Mass Casualty Team Leader**.

Role 2–4. The **Chief of Trauma** (most trauma-experienced surgeon) is responsible for overarching clinical management of the mass casualty response.

The Chief of Trauma or a designated surgeon serves as the **Chief Surgical Triage Officer** at Role 2–4 facilities.

- Determine priority for operative interventions.
- Identify patients who require early evacuation.
- Maintain close communication with the operating surgeon(s).
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Staff Responsibilities

- **Administrative person**: Responsible for registering and tracking flow of patients through unit.

- **Resuscitation team**: A physician or physician extender, nurse, and medical technician, ideally.

- Each *individual resuscitation treatment team* will coordinate movement of its patients with the Chief Surgical Triage Officer.

- **Reassess patients awaiting surgery or evacuation**.

- In the emergent treatment area, the surgeon must make decisions about needed surgery, the timing of surgery, and the priority of surgical patients.
Initial vital signs: Pulse (rate and quality), mentation, and difficulty breathing

Pattern of injury: Historical perspective aids the triage decision-maker in understanding the distribution of wounds encountered and the likely associated mortality.

The majority of combat wounded will suffer nonfatal extremity injuries. In general, these will be triaged as non-emergent.

Response to initial intervention: Does the shock state improve, remain unchanged, or worsen with initial resuscitative efforts?

A patient who fails to respond rapidly to initial resuscitation should be triaged ahead of a patient with a good response; alternatively, the non-responder in a mass casualty situation may need to be placed in the expectant category.
Manpower/litter team delivers patient.

Chief Surgical Triage Officer triages patient and assigns resuscitation team to patient.

Resuscitation team treats patient and coordinates required disposition (radiography, surgery, ICU, ward, and air evacuation).

Resuscitation team communicates to Chief Surgical Triage Officer the recommended disposition.

Chief Surgical Triage Officer coordinates movement of patient to next stop.

Administrative person assigns patient ID and records disposition.
Using an indelible marker to place numbers on the casualty’s forehead is an easy, fast way to track patients. Use any method that is reproducible and simple.

If resources allow, casualty tracking may include stationing administrative personnel at every entry/exit.

Sufficient, organized, litter bearers ensure continuous casualty flow is essential.
Use an empty ward, a cleared out supply area, or other similar space.

Appropriate medical and surgical supplies should be stockpiled and easily identifiable.

A team consisting of a physician or physician extender and several nurses and medical technicians can form the nucleus of the treatment team.

Lacerations can be sutured, fractures splinted, IVs placed, and radiographs taken.

MUST be alert to changing vital signs, mental status changes, and non-responders to treatment.

Any evidence of deterioration should prompt a re-triage and a possible transfer to the emergent treatment area.
Ideally, expectant area should be kept in an area away from all other treatment areas.

Team leader can be anyone capable of giving parenteral pain medications and monitoring.

The patient must be kept comfortable.

After all other patients have been stabilized, a re-triage of these patients should be done and treatment instituted if appropriate.
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Internal Resource Constraints

- **Medical supplies:** Blood, equipment, drugs, oxygen, dressings, sutures, sterilization capability, etc.
  - Immediate liaison with the logistics system in theater of operation is essential to ensure availability and timely resupply--- as well as “surge” capabilities and local resource availability.
  - Expeditionary medical units must have a system in place for effective and expedient execution of a fresh whole blood drive and should be included in the response to a mass casualty.

- **Space/capability:** Number of OR tables, ventilators, and ICU beds (holding capacity and ward capacity), the available diagnostic equipment—ultrasound, X-ray, CT—and laboratory tests
Personnel: Number and experience of treating team members and the emotional stability, sleep status, etc., of your personnel.

- Robust and practical plans for personnel recall must be a component of the mass casualty response plan.

Stress: Soldiers, including medical personnel, are affected by the consequences of war.

- Individual and unit capabilities are degraded during sustained operations.

- The personal impact of military triage on the medical team cannot be overemphasized. It is extremely emotional. Take measures to minimize these effects.
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External Resource Constraints (1)

- Limited knowledge of and no control over external issues.
- **Tactical situation and mission**: Commitment to scarce resources cannot be based on current tactical/medical/logistical situation alone.
  - One severely wounded, resource-consuming casualty may deplete available supplies and thus prevent future, less seriously injured casualties from receiving optimal care.
  - Liaison with the tactical force operating in your area is essential to making sound triage decisions.
  - Operational security may make this kind of information difficult to obtain in a timely fashion.
  - **Education of, and communication with, line commanders about the critical nature of this information is essential.**
Resupply: Having a sense of how and when expended internal resources will be resupplied may prove critical to making the decision to treat or not treat the casualty.

Time and Evacuation to the MTF: The shorter the time and distance interval from injury to arrival will increase the volume and complexity of triage decisions and increase the risk of the facility to be overwhelmed by the walking wounded.

- Securing the facility and strictly controlling points of entry are key steps in the execution of a mass casualty response.
- Longer intervals will result in the opposite, with “autotriage” of the sicker patients from the emergent category to the expectant.
Time spent with the individual casualty: In a mass casualty situation, time itself is a resource that must be carefully managed. All patients receive an evaluation, but only some receive immediate or operative interventions.

- Time on the OR table is usually the choke point. Apply the concepts of damage control to minimize the time casualties are required to spend in surgery.

- On-table triage to the expectant category may be necessary due to deteriorating casualty physiological response and/or the pattern of injury (aorta-vena cava GSW, dual exsanguination sites, extensive pancreatic-duodenal injury, etc).

Evacuation out: Casualties must move expeditiously to the next level of care, otherwise valuable local resources will be consumed in maintaining patients, thereby preventing additional patients from receiving care.
Diversion/transfer of casualties to another facility should be considered early. Sometimes this is done at scene, LZ, initial triage site, or resuscitation bay, but must be considered during a MASCAL.

If at an inpatient/holding facility, triage of inpatients should be done to identify patients who may be discharged or transferred to predetermined facilities.

Considerations for MASCAL associated with diversion and transfer:

- Given current military operations, Can diverting/transferring of patients occur?
- Can the helicopter/ground crews coming for transport bring resupply to you?
As casualties finally clear the OR suites, ICU and ward care will supplant operative procedures.

Casualties initially under-triaged (~10%) will be discovered and will require care.

The recovery room and ICUs will become crowded, nursing shifts will have to be extended, and fatigue will rapidly become a hospital-wide factor.

A new rotation must be established to sustain a modified, but continuous, effort.

Once the acute phase is over, personnel must be required to rest.
Each mass casualty event or exercise requires debriefing, with evaluation of process and action plan to improve future response.

Given the rotational nature of expeditionary medicine, lessons learned and after-action reports should be reviewed with incoming staff.

Triage remains our most constant and effective method of establishing order in overwhelming chaos.

The organic integration of triage principles in tactical, logistical, and clinical decision-making remains the best hope for providing the greatest good to the greatest number.
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Reference


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