CHAPTER 31

Prehospital triage for mass casualties

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Introduction

The term *triage* means to sort or select. EMS personnel and other health care providers use the principle of triage at different times for a variety of reasons during the provision of emergency care. Examples range from determining whether an injured patient needs the resources of a trauma center to identifying which emergency department patient needs to be placed in a treatment room first. During a mass casualty incident, triage decisions must be made more rapidly; EMS providers have less time to gather information and decide who to treat first. Further, the emphasis shifts during a mass casualty incident from ensuring the best possible outcome for each patient to ensuring the best possible outcomes for the greatest number of patients. Military organizations were the first to develop the concept of mass casualty triage and these concepts have been adopted for use in the civilian setting [1–3].

Mass casualty triage occurs when there is more than one casualty and the available resources require a provider to initiate care for one patient over another. In a synthesis of available evidence, Frykberg found that during mass casualty incidents there is an almost linear relationship between overtriage and poor patient outcome [4]. This finding indicates that the methods used to prioritize victims of a multicasualty event for treatment and transport may have a significant effect on patient outcome.

Triage systems

There are many triage schemes that are used around the world. In the United States, the decision of which triage system to use has typically been made at the local agency level. However, this could lead to poor interoperability in situations where multiple agencies must respond to the same incident and are using different triage systems. In an effort to correct for this issue and to encourage evidence-based practices, the Model Uniform Core Criteria (MUCC) were developed [5,6]. The criteria lay out a list of minimum standards that triage systems should incorporate to ensure interoperability, and they identify the evidence that is available to support each criterion. In July 2013 the Federal Interagency Committee on EMS approved an implementation plan for establishing the MUCC as a national guideline [7]. This document recommends that state and local EMS agencies use triage systems that comply with the MUCC, and allows for the use of federal funds for the transition. There has not been sufficient time since this plan was published to describe the results. Further, it is currently a transition period so each medical director and EMS physician should be familiar with all the mass casualty triage systems that may currently be in use [8].

A review of existing triage systems was conducted by a multidisciplinary panel sponsored by the Centers for Disease Control and Prevention (CDC) prior to publication of the MUCC, and they identified nine existing mass casualty triage systems, including two pediatric-specific systems [8,9]. These systems include Simple Triage and Rapid Treatment (START) [10], JumpSTART [11], Homebush [12], Triage Sieve [13,14], Pediatric Triage Tape (PTT) [15], CareFlight [14], Sacco Triage Method (STM), military triage [16], and the Italian CESIRA (Coscienza, Emorragie, Shock, Insufficienza respiratia, Rottureossee, Altro) protocol. These systems have been described in detail in other works [8,9],and are relatively similar in that most use a four- or five-category scheme that is grounded on basic physiological criteria. A notable exception is the STM, which uses a proprietary computer-based algorithm to generate a numeric treatment priority score based on physiological criteria and available community resources. Several secondary triage tools, such as Secondary Assessment of Victim Endpoint (SAVE) triage and System of Risk Triage (SORT), also exist. These systems allow responders to further prioritize patients once they have been placed in the four or five groups.

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Triage categories

The goal of mass casualty triage in the prehospital setting is to prioritize patients for treatment and/or transport. Most triage systems accomplish this by placing patients in one of five categories: immediate, delayed, minimal, dead, or expectant. Immediate casualties, designated by the color red, are those who need immediate medical attention due to an obvious threat to life or limb. Patients in this group can include those who are unresponsive or have altered mental status, respiratory distress, uncontrolled hemorrhage, amputations proximal to the elbow or knee, sucking chest wounds, unilateral absent breath sounds, cyanosis, or rapid weak pulses. Delayed casualties, designated by the color yellow, are those who are in need of definitive medical care but are not likely to decompensate rapidly if care is delayed. Examples of patients in this group include those with deep lacerations with controlled bleeding and good distal circulation, open fractures, abdominal injuries with stable vital signs, and head injuries with an intact airway. Minimal casualties are designated by the color green; these patients have self-limited injuries and can tolerate extended delays in treatment without increasing their risk of mortality. These patients have minor injuries such as abrasions, contusions, and small lacerations. Their vital signs are normal and stable, and while they require medical attention, it can be delayed for days if necessary without significant adverse effects. Dead casualties, designated by the color black, have no respirations following basic airway maneuvers. Expectant casualties, designated by the color gray, are still alive but have little or no chance for survival despite maximum therapy. Initially, resources should not be directed toward this group as they will be needed to care for patients who are more likely to survive. As the event progresses and resources become available, attempts should be made to resuscitate these casualties and/or provide them with comfort care. These five categories and specific color codes are recommended in the Model Uniform Core Criteria [5].

SALT triage

A CDC-sponsored expert panel used aspects of existing mass casualty triage systems that were supported by the best available evidence and expert opinion to develop SALT (Sort, Assess, Life-saving interventions, Treatment and/or transport) triage (Figure 31.1). SALT triage was developed as an all-hazards mass casualty initial triage standard for all patients (adults, children, and special populations). SALT begins with a global sorting of patients to prioritize them for individual assessment. Patients who are capable are asked to walk to a designated area, and these patients are assigned last priority for individual assessment. Those who remain are told to wave and are observed for purposeful movement. Those who do not move and those with obvious life threats (e.g. uncontrolled hemorrhage) are assessed first since they are the most likely to need life-saving interventions.

Individual assessment begins with limited rapid life-saving interventions, which include the following.

- Controlling major hemorrhage through the use of tourniquets or direct pressure provided by devices or other patients.
- Opening the airway through positioning or basic airway adjuncts and, if the patient is a child, giving two rescue breaths.
- Chest decompression when indicated for suspected tension pneumothorax.
- Autoinjector antidotes when indicated.

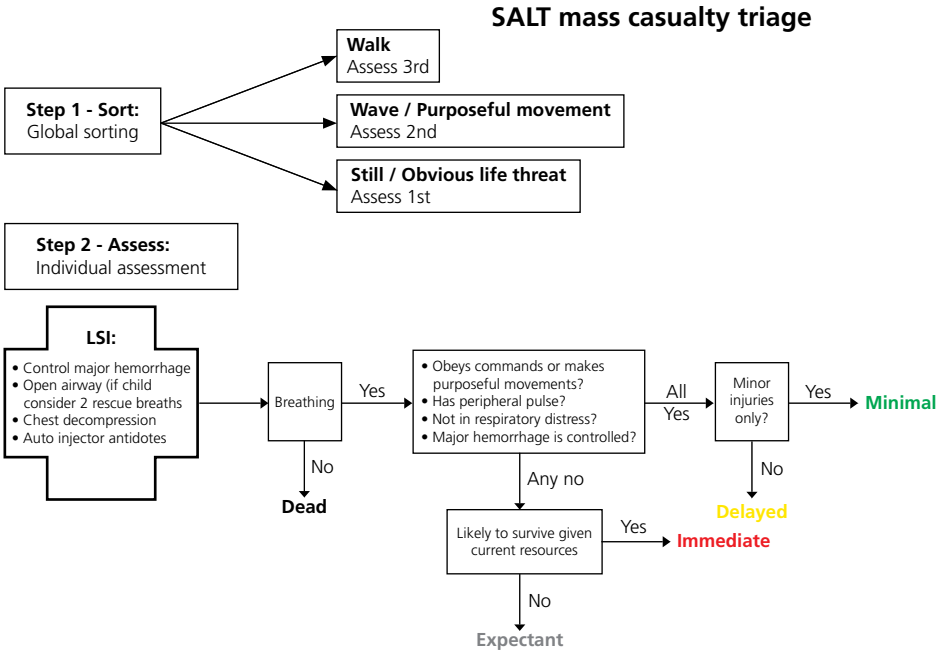

Figure 31.1 SALT triage scheme. LSI, life-saving interventions.

These interventions are performed only if they are within the scope of practice of the responder providing triage, and if necessary equipment is immediately available.

Next, patients are prioritized for treatment and/or transport by assigning them to one of five categories: immediate, delayed, minimal, expectant, or dead. The mnemonic ID-MED is a simple reminder of the triage categories. Patients with mild injuries that are self-limited if not treated and who can tolerate delays in care without increasing their risk of mortality are triaged as minimal. Patients who are not breathing even after attempted life-saving interventions are triaged as dead. Patients who do not obey commands, lack a peripheral pulse, are in respiratory distress, or have uncontrolled major hemorrhage are triaged as immediate. However, if any of the immediate patients have injuries that are likely to be incompatible with life given the currently available resources, they are instead triaged as expectant. The remaining patients are triaged as delayed. Currently, SALT triage is the only triage system that is known to be compliant with the MUCC.

START triage

The START triage method is currently the most widely used method of mass casualty triage among first responders in the United States. This algorithm, used for the triage of adult multicasualty patients, is based on respiratory function, quality of perfusion, and mental status (Figure 31.2).

JumpSTART is similar to START but it is intended to be used to triage child casualties [6] (Figure 31.3). Once patients are triaged and sorted using START, life-saving treatments are administered as needed. Casualties are loaded onto appropriate vehicles as they become available and transported to hospital facilities in the area.

Triage tags

Once a patient has been assessed and assigned a prioritization category, a means of rapidly identifying the patient's category is useful. This is traditionally done using commercially available triage tags, which come in a variety of designs. Regardless of the type of tag, it should allow for bidirectional changes in triage category as the patient's clinical condition changes (either worsens or improves). If tags are not available, a marking pen can be used to identify the assigned triage category on each patient's forehead. Alternatively, casualties can simply be physically placed in separate locations based on the triage categories to which they have been assigned.

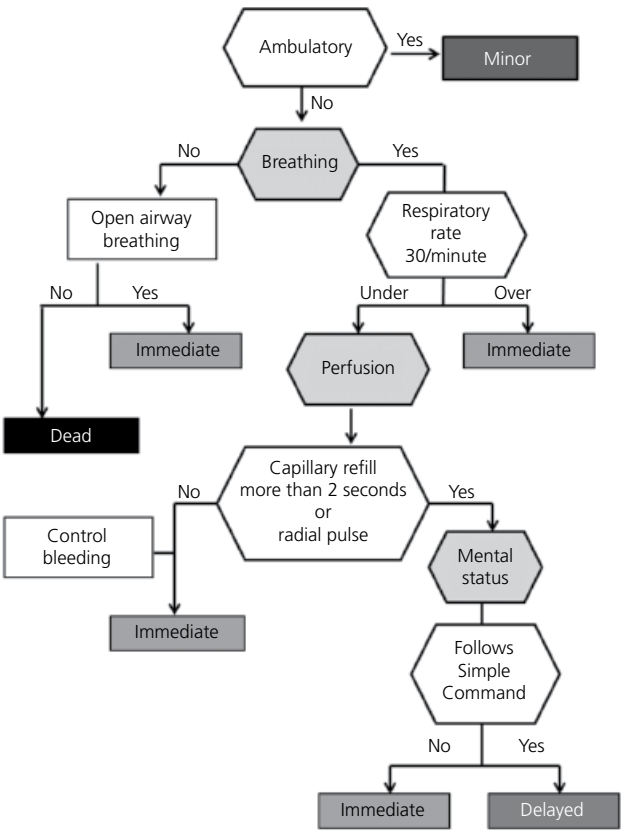

Figure 31.2 START triage algorithm.

JumpSTART Pediatric MCI triage

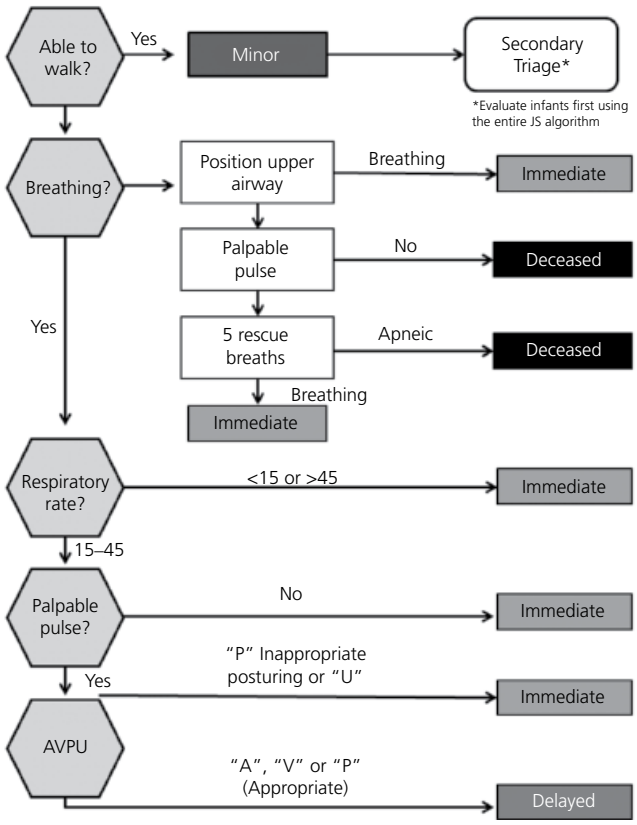

Figure 31.3 JumpSTART pediatric triage algorithm. AVPU scale: alert, voice, pain, unresponsive (used by EMS responder to determine patient's level of consciousness).

After initial triage

It is important that casualties be retriaged at each phase and level of care and whenever clinically and tactically allowable, because the initial triage category may change as clinical status changes. The prioritization process should be considered dynamic, and may be altered by changing patient conditions, resources, and scene safety. In general, treatment and/or transport should be provided for immediate patients first, followed by delayed patients, and then minimal patients. Expectant patients should be provided with treatment and/or transport when resources permit. Efficient use of transport assets may include mixing categories of casualties and using alternative forms of transport, so rules for transport order should not be unduly restrictive. A system for communicating with destination hospitals and dividing patient volume according to their capabilities is also critical.

Conclusion

Triage is an important aspect of scene management during a mass casualty incident that, if done properly, may have a positive effect on patient outcome. The Model Uniform Core Criteria are intended to standardize the mass casualty triage process across the United States. SALT triage was developed based on a systematic review of the literature and is compliant with the Model Uniform Core Criteria. As the body of scientific evidence continues to grow in the area of mass casualty triage, this evidence should be further integrated into triage methodology.

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