Toward a National Standard in Primary Mass Casualty Triage

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Out of intense complexities, intense simplicities emerge
—Winston Churchill

Triage, or “to sort,” had its genesis in war. In battles marked by frontal assault tactics, fields were covered with the wounded and the dead during and after the battle. Until the Napoleonic wars, however, there was no triage: medical care was not routinely offered on the battlefield, and the survivors self-identified through the test of time. Separating the living from the dead then occurred in the days after the battle ended.1

Baron Dominique Jean Larrey, Napoleon’s chief surgeon, changed the approach to the wounded by practicing triage, treatment, and evacuation on the battlefield during combat. His guiding triage principle was that “It is necessary to always begin with the most dangerously injured.”2 Using his “flying ambulance,” he saw medical evacuation as “the salvation of the injured and the conservation of the morale of the soldier.”2

Field triage evolved over the conflicts of the next century from the prioritization of the most severely injured to a focus on achieving the greatest good for the greatest number as a way to conserve fighting strength. The wounded were thus categorized in a way to separate the living and salvageable from the dead and unsalvageable, within the overarching circumstances of resource availability. In the 20th century, advances included the development of rapid aeromedical evacuation to full-service field hospitals through the conflicts in Korea and Vietnam.3 In the current global war on terrorism, the scope and scale of conflict have changed from producing historical intermittent mass casualties in the thousands to daily “limited mass casualties” in the tens to low hundreds.

Wartime lessons contributed domestically to the creation of trauma centers, use of aeromedical transport from the injury scene, and the development of standardized trauma evaluation and resuscitation, such as the Advanced Trauma Life Support program. With plentiful resources in the homeland, field triage was reframed to match individual patient injuries to trauma system resources to gain the best outcome for each individual patient. Such an approach is highlighted in an updated field triage decision scheme from the American College of Surgeons Committee on Trauma in 4 steps across physiology, anatomy, mechanism, and special considerations, with the goal to determine which patient needs a trauma or other specialty center.4

In a mass casualty event, the temptation exists to do what we do everyday, just more of it. We tend to focus on the familiar individual casualty characteristics without appreciating that the application of triage in mass casualties varies by casualty load and resource availability. When we use the word “triage” to describe a decision-making process, we forget the different frames of reference (individual patient or mass casualties) and variable contexts (full or scarce resources) that must be specified (Fig. 1). This misunderstanding is then translated into mass casualty triage instruments: Although mass casualty triage is different from the daily triage of individual trauma patients, triage instruments retain a focus on casualties as individual patients.

The goal in the management of a mass casualty event is to achieve the greatest good for the greatest number of casualties. Nonbiological mechanisms of mass casualty produce the polar opposite outcomes of death or “the walking wounded,” leaving up to 20% of living casualties critically injured and requiring immediate attention. These casualties are different from the usual trauma patients: they have multiple injury mechanisms producing complex, multidimensional injuries. The outcome that best reflects the medical care system in a mass casualty event is the critical mortality rate, or the percentage of deaths among the salvageable critically injured.5 These critically injured individuals have an injury severity score >15 as an index of injury severity that correlates with mortality. Triage is a population-based systemic process that integrates care in phases across sequential settings (scene, prehospital, hospital, region facilities)6 and must be designed to identify people who are critically injured amidst the sea of the walking wounded. Toward this end, each setting has a twist on the triage process.

Five adult and 2 pediatric primary triage instruments have been developed for field management of civilian mass casualties. All of the instruments assess physiology and mentation at the scene, although the specific means for these assessments vary. These instruments have proliferated based on preference and politics, and have led to a patchwork of mass...
casualty triage systems in the United States and around the
[Image 35x21 to 564x36]
[Image 41x495 to 283x656]globe.7,8 A consistent lesson from the world of disasters is
[Image 35x21 to 564x36]that the lack of an interoperable and consistent system of
[Image 41x495 to 283x656]communication produces poor outcomes. Triage, as a com-
[Image 386]munication system, falls under this lesson.

What are the key performance characteristics by which triage
instruments should be examined to determine a standard
guideline for triage?

• Simplicity, for execution in chaos
• Time efficiency, when time equals lives
• Predictive validity, so that the assessment relates to the
intended outcome, namely, the identification of the crit-
cally injured from the mass of walking wounded
• Reliability, in that it is reproducible (with both the same
rater and between raters) across all hazards
• Accuracy, to minimize over- and undertriage

Looking at the existing “mass casualty triage” instruments,
and adding US military triage, the MASS triage training
paradigm from the National Disaster Life Support program,
and the French Red and White global response plans to the
list, no instrument or plan has a strong evidence base, and
studies of effectiveness in mass casualty situations are absent.
So how do we achieve a common language in triage, a
national standard for clinical and public health preparedness,
in the existing potpourri of triage instruments that exist
across jurisdictions and agencies?

This is the starting point for the work, in this issue, of Lerner
and colleagues, who formed a consensus committee of repre-
sentatives from the public and private sectors in emergency
medicine, surgery, public health, and emergency medical
services and worked to find an existing solution from the
available triage instruments for primary field triage in mass
casualty situations.9 The committee confirmed that valida-
tion efforts of existing triage instruments used paper exercises
related to training; “retrospactive triage” of individual, se-
quential trauma patients who were then grouped for analysis;
simulation with outcomes defined by expert consensus; or
prospective triage assessments of individual trauma patients
over months in an emergency room. The instruments them-
selves missed the scale of the mass casualty, used an approach
of serial rather than parallel casualty assessment, and mistook
efficacy for effectiveness by using data collection in settings
and situations that do not compare to mass casualty events
and expert opinion to define reference standards. Collect-
ively, the evidence for existing triage instruments in mass
casualty events was no better than level V (expert opinion).10

Not finding an off-the-shelf solution, the committee designed
a new instrument by incorporating elements from existing
instruments to find a common denominator. Enter SALT:
sort, assess, lifesaving interventions, treatment and/or trans-
port. Picture a field with hundreds of casualties, akin to the
traditional battlefield. What does SALT do that other triage
instruments do not?

• Focuses first on the mass of casualties by voice command
sorting. Hearing loss and self-transport of the walking
wounded to the nearest hospital11 may limit controlled
casualty distribution from the scene.
• Assesses casualties briefly for explicitly defined lifesaving
interventions with applicability in chemical and radia-
tion hazards. Controlling hemorrhage, opening airway,
decompressing the chest (for tension pneumothorax),
and autoinjection for chemical injury are actions trig-
gered by brief sensory observations.
• Separates expectant from dead with a new color, gray.
SALT emphasizes the relative nature of the expectant
category based on available resources and the need for
comfort care. Those casualties who are absolutely unsal-
vageable are unlikely to move out of the expectant cat-
[Image 312x726]egory.
• Includes all ages; this instrument applies to adults and
children, adding simplicity.

SALT seems to be simple to remember. Such clarity should
facilitate standardized interdisciplinary training to compe-
tency in primary triage.12 Yet this proposal has the same
limitations as the other triage instruments from which it is
derived: it is level V evidence that needs study, through
full-scale exercises and computer modeling, for validation
and assessment of reliability, accuracy, and effectiveness.
How will it stand up to reality?

One reality that bears emphasis is that scenes are inherently
dangerous. Thus, the first priority of responders must be to
move the living away from the scene to safety. Lifesaving
interventions precede further classification through primary
triage, which would then occur at the casualty collection
point adjacent to the scene. Triage is not treatment, and the
FIGURE 1
Spectrum of triage scenarios as the situation moves
from the individual patient to the casualty population
and resources vary from plentiful to scarce.
Toward a National Triage Standard

L-T part of SALT must only include those treatments that do not absorb time away from other casualties. Prehospital triage must initially sort casualties into 2 groups, the living and the dead, and then sort the living into those who need hospital care (and transport) and those who do not. The efficiency of SALT (or any triage instrument) to reorganize the scene is important for outcomes, given the Israeli experience that 5 minutes of chaos requires 30 minutes to restore order.13

It is also important to put any primary triage instrument into the context of the triage system. Certainly, the primary triage decision sets conditions for success downstream in the response. Yet without a defined care pathway of sequential re-triage (secondary, tertiary, and beyond) of casualties, initial triage errors will fester and worsen population outcomes. The primary triage instrument does not work in a vacuum and must be linked in the triage system to the follow-on instruments. Furthermore, fractionating outcome to a particular triage instrument misses the point regarding the need for an error-tolerant triage system5 to overcome human error, changing casualty status, and resource fluctuations. Maintaining a consistent tempo through triage decisions—identifying who needs higher levels of care and who does not—supports a coherent triage system.

Gaps in triage knowledge persist. Benchmarks for triage accuracy do not exist. Communication across care settings is flawed—adequate documentation “provides the developing story to the next caregivers in line,”14 yet triage is too often seen as colored tags that are inviolate and indestructable. Confusion and discomfort persist regarding what “expectant” means, and guidelines for identifying absolute nonsalvageability are missing. Who should perform mass casualty triage across settings and how these multidisciplinary professionals should be trained as triage officers remain ripe for investigation.

There is no pretense among the authors that SALT is perfect or novel. This work adds urgency to do something to reach a national consensus on a unified approach to primary triage. SALT is a reasonable place to begin and overcomes the stasis preserved by latent parochialism. We should remember that sometimes the enemy of good is better. Perhaps we will then see the simplicity of getting to “yes” in consensus as a better way to prepare for the complexity of mass casualties.

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REFERENCES