The Boston Marathon Terrorist Bombings: Lessons Learned

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Threat of Terrorism

- The spectrum of potential terrorist threats is limitless.
- Explosive devices are the weapons of choice in over 70% of terrorist incidents.
Terrorist Threats

- Terrorists do not have to kill people to achieve their goals.
- Terrorists just have to create a climate of fear and panic to overwhelm the healthcare system.
Key Challenge

- With increasing frequency, terrorists are targeting disaster responders in order to hamper rescue efforts and increase casualties.
Lessons learned from the response to the Boston Marathon terrorist bombings illustrate important key priorities of disaster preparedness and response for today’s complex disasters, regardless of etiology.
The Boston Marathon, Monday, April 15, 2013

- 117th Boston Marathon
- 26.2 miles
- 6,839 runners
- Over 500,000 spectators
- Coincides with a Red Sox baseball home game
Explosions
Improvised Explosive Device
Improvised Explosive Device: PRESSURE COOKER
Fatal Injuries: 3
Primary Blast Injuries
Non-Fatal Injuries: 281
Non-Fatal Injuries

- Multiple below and above the knee amputations
- 2\textsuperscript{nd} and 3\textsuperscript{rd} degree burns
- Open fractures, open wounds, lacerations, embedded shrapnel with tissue injury
- Closed fractures with contusions, sprains and strains
- Head injuries, post-concussion syndrome
- Hearing loss with tympanic membrane injury
Key Priority

- Disaster responders can **NOT** utilize traditional command structures when participating in disaster response.
Key Priority

- The Incident Command System/Incident Management System is the accepted standard for all disaster response, including terrorist incidents.
Incident Command System

- Functional requirements, **NOT TITLES**, determine the organizational hierarchy of the ICS structure.
ICS Structure and Hierarchy

- Incident Commander (IC)
  - Liaison Officer
  - Public Information Officer
  - Safety Officer
  - IC Staff
  - ***Operations
  - Planning
  - Logistics
  - Finance/Admin.
Boston Marathon Bombing Notification

- At 2:50 pm two explosive devices were detonated near the finish line of the Boston Marathon.

- At 2:55 pm Boston EMS (Incident Command) disaster radios transmitted notification of the explosion to all area hospitals. Additional notifications reported casualties.

- First patients arrived at hospitals 3:04 pm.
Advantages of the Incident Command System

- All disaster assets effectively utilized to meet the challenges of today’s complex disasters.
Disasters without Incident Command

- Injury or death of personnel due to lack of training
- Lack of adequate personnel, equipment and supplies to provide care
- Staff working beyond their training or certification
- Lack of coordination

*Hurricane Katrina, New Orleans (2005)*
Key Priority

- Disaster medical care is NOT the same as conventional medical care
Objective of Conventional Medical Care

- Greatest good for the INDIVIDUAL PATIENT
Conventional Medical Care

- **Severity** of injury/disease is major determinant for medical care.
Objective of Disaster Medical Care

- Greatest good for the GREATEST NUMBER OF PATIENTS.
Determinants of Medical Care in Mass Casualty Incidents

- **Severity** of injury
- **Likelihood** of survival
- **Available resources** (personnel, logistics, evacuation assets)
Disaster medical care requires a fundamental change in the approach to the care of victims.

“CRISIS MANAGEMENT CARE”
Crisis Management Care

- Minimally acceptable, NOT maximally acceptable, care in the acute phase of the disaster due to large number of victims.
Key Priority

- Disaster triage is **NOT** the same as conventional medical triage.
- Disaster triage is the most important, and **psychologically most difficult**, mission of disaster medical response.
In a mass casualty event, the **critical patients** with the **greatest chance of survival** with the **least expenditure of time and resources** (equipment, supplies and personnel) are prioritized to be treated first.
Disaster Triage

- A dynamic decision-making process of matching patients’ needs with available resources.

- Many mass casualty incidents will have multiple levels of triage as patients move from the disaster scene to definitive medical care.
3 Levels of Disaster Triage

- **Field** triage (Level 1)
- **Medical** triage (Level 2)
- **Evacuation** triage (Level 3)
The level of disaster triage will depend on the ratio of **CASUALTIES** to **CAPABILITIES**.
Field Triage (Level 1)

- Victims designated as “acute” or “non-acute” (usually first level of triage in mass casualty incident).

- Color coding may be used:
  - Acute = RED
  - Non-acute = GREEN
Boston Marathon

- Effective field triage by EMS resulted in equal distribution of “acute” victims to all Boston trauma centers.
Boston Marathon Bombing

- 127/281 “acute” victims treated at 5 Trauma Centers.
- No Trauma Center overwhelmed with casualties due to effective field triage by EMS.
Medical Triage (Level 2)

- **Secondary triage**
- Field or fixed hospital facilities

*Deli used as triage station by disaster teams at Ground Zero*
Key Priority

- Better hemostatic agents and tourniquets needed for all pre-hospital personnel. (emergency medical, fire, police)
Field Tourniquets

- Effective for venous bleeding
- Ineffective for arterial bleeding
Combat Application Tourniquets
Hemostatic Agents
Key Priority: All Hazards Approach

- A single emergency operations plan for many different situations is more effective than multiple separate disaster plans.
Goal of Disaster Response

- Reduce the **critical mortality** associated with the disaster.

- **CRITICAL MORTALITY** is defined as the percentage of survivors who subsequently die.
Determinants of Critical Mortality

- **Triage accuracy**, particularly incidence of over-triage

- **Rapid movement** of patients to definitive medical care facility (fixed or mobile)

- **Coordination** of regional disaster preparedness and response.
Boston Marathon Bombing:
3 killed, 281 injured
Over 66 limb injuries
17 traumatic amputations
Critical Mortality = 0
THANK YOU!
谢谢！