Surgical response to mass casualty incident

An Essay

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List of Abbreviation

ABS	The American Board of Surgery
ACSCOT	American College of Surgeons Committee on Trauma
AIS	The Abbreviated Injury Scale
ATLS	Advanced Trauma Life Support
CDC	Center of diseas control
CPR	Cardiopulmonary resuscitation
DAI	diffuse axonal injury
DPL	Diagnostic Peritoneal Lavage
EAST	East Association for the Surgery of Trauma
EMS	emergency medical services
EMT-P	Emergency Medical Technician-Paramedic
FAST	focused assessment with sonography for truma
FCI	Functional Capacity Index
GCS	Glasgow Coma Scale
HEICS	Hospital Emergency Incident Command System
ICD	International Classification of Diseases
MCIs	mass casualty incidents
NAEMSP	The National Association of EMS Physicians
NFPA	National Fire Protection Association
NTDB	national Trauma Data Base
PASG	The pneumatic antishock garment
PCS	post concussion syndrome
PEEP	positive end-expiratory pressure

PSAP	Public Safety Answering Point
PTA	posttraumatic amnesia
PTV	Percutaneous transtracheal ventilation
RN	a registered nurse
SCIWORA	spinal cord injury without radiographic abnormality
TBI	Traumatic brain injury
TBSA	total body surface area

INTRODUCTION

The medical aspects of mass casualty care are so different from the routine approaches to medical care of emergency patients that substantial education and training of medical personnel must be provided. Many principles of a disaster medical response are counterintuitive, and even morally antithetical to the precepts and ethics of patient care that are enshrined in standard medical education ***(Flint et al., 2008).***

In addition to offering suggestions for a framework for the development of plans to respond to a mass casualty event, the expert panel also articulated five principles that should steer the development of such sidelines. Incorporating these five principles will ensure that standards of care are altered sufficiently to respond to issues arising from a mass casualty event. (1) In planning for a mass casualty event, the aim should be to kept o health care systems functioning and to deliver acceptable quality of care to preserve as many lives as possible. (2) Planning a health and medical response to a mass casually event must be comprehensive, community based, and coordinated at the regional level. (3) There must be an adequate legal framework for providing health and medical care in a mass casualty event. (4) The rights of individuals

must be protected to the extent possible and reasonable under the circumstances. (5) Clear communication with the public is essential before, during, and after a mass casualty event ***(Murray et al., 2004).***

For operational purposes, the World Health Organization defines a disaster as a sudden ecological phenomenon of sufficient magnitude to require external assistance. Another operational definition says that a disaster is any event that causes destruction and distress resulting in demands that exceed the response capacity of the affected community ***(Biswas, 2008).***

There are many classification schemes for disasters that should be understood. The most useful of these is based on the level of resources needed to manage the property damage and casualties, which correlates closely with the overall magnitude of the event ***(Flint et al., 2008).***

Disaster can be classified according to their etiology (natural vs. manmade), duration, location, frequency, and other characteristics. The magnitude of an incident can be defined by the level of emergency response required to cope with it rather than the absolute number of casualties. A level I incident requires only local resources, whereas level II and III incidents require regional or state/federal

resources, respectively, representing ascending levels of magnitude. This classification is retrospective, and therefore is more useful for analysis of past incidents than for real-time response to an evolving disaster ***(Feliciano et al., 2008).***

The initial focus of a disaster response is at the scene of the event, where the nature and extent of the damage must be assessed, further damage minimized, and plans for dealing with the destruction and injured casualties formulated and implemented. Some forms of disasters do not have a specific scene or prehospital phase, such as disease pandemics or bioterrorist attacks, which evolve over long periods of time without a clear beginning or end. However, most disasters do have a readily identifiable scene, although it can vary quite extensively in size ***(Flint et al., 2008).***

The initial assessment begins with the ABCDEs of the primary survey (airway, breathing, circulation disability, exposure/ envorument) performed stimultaneously with resuscitation. Reevaluation is continuous and the primary survey may need to be repeated several times throughout the initial assessment of the patient. Following the primary survey and concomitant resuscitation, a secondary survey is performed, which is a

head-to-toe history and physical examination. Adjuncts to the secondary survey may incude complex diagnostic tests. The secondary survey may also need to be repeated to avoid missing injuries, sometimes referred to as a tertiary survey. The tertiary survey is particularly important in patients with multiple injuries and those taken for emergency operation. Following the primary and secondary survey with concurrent resuscitation ***(Feliciano et al., 2008).***

Addressing issues related to the transportation of patients during a mass casualty event is also important. Roads may be blocked and the emergency transport system will not be adequate to meet the need. Issues to consider include the following: Who will accompany patients, since health and medical personnel may be needed elsewhere? How should all available public and private transport, including public and school buses, taxis, and limousines, be mobilized? What kind of prior agreements can be established to ensure this mobilization can occur? ***(Murray et al., 2004).***

AIM OF THE WORK

This work aims at acquisition of a basic level of knowledge and skills that are necessary for a successful management of mass casualty incident.

Defintion of Disaster

WHO defines Disaster as "any occurrence, that causes damage, ecological disruption, loss of human life, deterioration of health and health services, on a scale sufficient to warrant an extraordinary response from outside the affected community or area" ***(WHO, 2008)***

(Disaster means sudden or great misfortune)

Although experts may differ in their definitions of disaster, many public health practitioners would characterize a disaster as a "sudden, calamity or catastrophe, which affects or threatens health" **(*Ryan JM., 2005).***

The common denominator of all mass casualty incidents (MCIs) and disasters is a discrepancy between a large number of casualties and the limited resources available to treat them. The underlying principle of disaster preparedness is “to do the greatest good for the greatest number of casualties ***(O'Neill, 2005).***

But it is important to understand the implications of this principle for trauma care. A key characteristic of MCIs is that the overwhelming majority of casualties sustain only minor injuries. Regardless of the etiology or magnitude of the

incident, only about 10-15% of survivors who presenting to trauma system are severely wounded. These patients obviously require the best possible trauma care immediately ***(Frykberg et al.,1988).***

For example, on11 March2004, ten bombs exploded almost simultaneously on four commuter trains and in four train stations in Madrid, Spain, resulting in 2062 casualties. **The Gregorio Marañón University General Hospital** received all casualties within approximately 3 hours, the most of them are mild to moderate injuris, but only 29 were in critical condition and only seven underwent emergency surgery***.(Gutierrez et al., 2005).***

Thus, from the trauma care perspective, a mass casualty incident is a “needle in a haystack” situation: a small group of severely injured patients who require immediate care is immersed within a much larger group of casualties who can tolerate delays and even some degree of suboptimal care. The ultimate goal of the disaster response is, therefore, to provide this small group of critically injured casualties with a level of care that approximates the care provided to similarly injured patients under normal circumstances. This goal has always been implicitly understood by trauma care providers and is certainly an expectation of the public, but it can only be

achieved by diverting trauma assets and resources from the mildly injured to the critically wounded. ***(Falkenrath.et al., 2001).***

MCIs can be classified according to their etiology (natural vs. manmade), duration, location, frequency, and other characteristics. The magnitude of an incident can be defined by the level of emergency response required to cope with it rather than the absolute number of casualties. A Level I incident requires only local resources, whereas Level II and III incidents require regional or state/federal resources, respectively, representing ascending levels of magnitude. This classification is retrospective, and therefore is more useful for analysis of past incidents than for real-time response to an evolving disaster". ***(Hammond et al., 2005).***

The quantitative definition of multiple and mass casualty incidents varies between institutions because it depends on local resources. While it is customary to point out that two severely injured patients arriving simultaneously can overwhelm a small community hospital, it is often forgotten that even in busy trauma centers the routine trauma response envelope duringz normal working hours extends to no more than 4-5 severely injured patients arriving together ***(Hirshberg et al., 2001).***