Acute Care in Mass Casualty Incident

World Congress of Pediatric Critical Care
Session: Transport of the Critically Ill
26th June 2007

ORG PY 2 1010 - 1030

Chula Goonasekera
Professor and Head
Department of Anesthesiology
Faculty of Medicine, Peradeniya, Sri Lanka.
MD PhD FCARCSI FRCP (UK) MRCPCH M Phil DCH
Mass Casualty Incident (MCI)

- An incident that produces a large number of injured victims more than available resources can manage using routine procedures
  - Thus linked to
    - System capacity
    - Operational procedures
Goal – Optimize care for the maximum number of salvageable patients

Basic principle
- Immediate care
- Delayed Care
- Unsalvageable
MCI – Goals (Field)

- **Find & START**
  - Simple Triage and Rapid Treatment
    - Trained rescue team
- **Minimize further injury**
  - External factors
    - Smoke, fire, hypothermia (Evacuate)
  - Internal factors
    - Hypoxia, hypotension, hypovolemia (Oxygen, IV fluids etc)
- **Transport safely**
  - Technical expertise
    - Trained rescue teams, adequate ambulances, equipment etc

Whilst maintaining your safety
The Time - Matters

- Alerting Mechanism
  - 24 hour Call centre
- Preparedness
  - 24 hours
- Fast access
  - Road, Air
- Transport
  - Capable hospital
PARAMEDICS
THE COMPREHENSIVE APPROACH

“PPRR”

Courtesy – Ken Kurtz Australian Paramedics
PPRR

- **PREVENTION (OR MITIGATION)**
  - Reduce the severity of hazard impact

- **PREPAREDNESS**
  - Staff, Equipment, Community

- **RESPONSE**
  - Providing and effective response immediately

- **RECOVERY**
  - Providing for recovery of the community affected
Pre-Hospital Care (In terms of ambulance practice)

Patient Assessment

- Primary Survey
- DRABCDE
- Secondary Survey
- Vital Signs
DRABCDE

DANGER (you, public, patient)

RESPONSE (patient alert/no)

AIRWAY (protect C-spine)

BREATHING (look, listen, feel)

CIRCULATION (Control H’ge)

DISABILITY (neurological)

EXPOSE (log roll see back)
Secondary Survey

- History Taking
- Vital Signs survey
- Physical Examination

Vital signs
Survey & recording

- Blood Pressure
- Capillary Refill
- Respirations
- Conscious state
- Pupil size and response
- Pulse Oximetry
Systematic Patient Assessment

Central Nervous System
- Is patient conscious?
- Is spinal injury probable?
- A.V.P.U / G.C.S.
- Consider spine
- Pupillary responses
- Motor responses
equality of grip
gait, hemiparesis etc.
- Sensory responses
local / generalized
- Blood Sugar Level

Respiratory System
Consider:
- Is airway clear?
- Is patient breathing?
- Colour
- Respiratory rate
- Respiratory effort
- Equality of air entry
- Speech
- Breath sounds
- Pulse oximetry
- Inspiratory / Expiratory rhythm

Cardiovascular System
- Is there a pulse / adequate perfusion
- Is there any major haemorrhage?
- Perfusion
Pulse rate
Blood pressure / pulse pressure
Skin condition
Level of consciousness
- E.C.G.
- Ankle oedema / ascites
- Jugular Venous distension
- Skin Turgor.

Treat as Needed
Treat as Needed
Treat as Needed
Treat as Needed

Head to Toe
(Expose body as needed and appropriate)

Head
Neck
Chest
Abdo
Pelvis
Back
Limbs

This system is not rigid and must be adapted to specific circumstances. Transport is a component of treatment and should be prioritised appropriately. History should be gathered concurrently with patient assessment.
Triage Categories

Field

- **Red: Immediate/emergency**
  - Tension pneumothorax, hemorrhage, femur fracture, asthma, rib fractures, airway obstruction

- **Yellow: Urgent**
  - Humerus fracture, scalp laceration, shoulder dislocation

- **Green: Non urgent**
  - Walking wounded, small laceration, angle sprain, orphaned child

- **Black: dead expected to die**
  - Cardiopulmonary arrest, open head injury
Arrange Triage team to assess
A - airway, B - breathing, C - circulation & Level of consciousness

ABC OK
Conscious & Well Oriented
Green tag
Send to Gen. Surgery ward for care

ABC OK
Unconscious & Confused
Yellow tag
Send to Gen. Medical ward for care

ABC not OK
Unconscious & Confused
Red tag
Send to Resuscitation room / ICU / OT

DEAD
Black tag
Send to Mortuary

EMERGENCY MEDICINE
**TRIAGE**

**Emergency Units (UK)**

**Hospital**

- **Immediate resuscitation (Red)**
  - See doctor immediately
- **Very urgent (orange)**
  - See doctor within 5-10 minutes
- **Urgent (Yellow)**
  - See doctor within 1 hour
- **Standard (green)**
  - See doctor within 2 hours
- **Non urgent (Blue)**
  - See doctor within 4 hours
Children

- Difficult to triage – few objective signs
  - Should be prioritized – controversial
- Israel – blue tag
**When children are involved**

Challenges to Emergency Departments

- **Having**
  - adequate number of pediatric supplies
  - pediatric decontamination equipment and protocols
  - an effective response plan to manage a large number of children
  - staff skilled in assessing young non-verbal children

- **Creating**
  - a system for identifying, tracking and reuniting children with their families

- **Identification**
  - of alternative sites to deal with children

- **Allocating**
  - resources to treat a second wave of patients
Psychological issues

Children

- Shelter and Security
- Children interpret disaster as a personal danger to themselves and those they care about
  - Result in severe anxiety
  - Pediatric mental health expertise needed to deal with fear, anxiety, post traumatic stress and depression
A uniform model to fit us all ??
Low-income countries

NO way to ADOPT
but
only
ADAPT
The Time - Matters

- Alerting Mechanism
- Call centre
- Preparedness
- 24 hours
- Fast access
- Road, Air
- Transport
- Capable hospital
Cheap patient transport
The ‘Tuk-Tuk”

Over 200,000 in the country
Accessed anywhere – within 5 minutes
Health Care facility – 2.2 miles
Free access to hospital

Bucking the time delay
Worst ever tragedy in Sri Lanka History

The most powerful earthquake in 40 years erupted under the Indian Ocean near Sumatra on Dec. 26, 2004. It caused giant, deadly waves to crash ashore in nearly a dozen countries, killing tens of thousands. A long stretch of Sri Lanka's coast was devastated by these killer waves, with more than 40,000 dead and staggering 2.5 million people displaced. Although 1,500km from the epicentre, the waves struck with huge force and swept inland as far as 5 kilometers. Waves as high as six meters had crashed into coastal villages, sweeping away people, cars and even a train with 1700 passengers. It was the worst human disaster in Sri Lanka history.

Lanka launches US$3.5 billion recovery drive

"Let the tsunami tragedy be the start of a new beginning to rebuild our nation."

See first 300 minutes of Tsunami in Animation
Health Emergency and Disaster Management Training: Post Tsunami initiative

Courtesy – South Australian Paramedics
Pre-hospital care
A change to save lives

At least in the capital cities

2004

2006
Director
Accident and Emergency
National Hospital Colombo

Largest Emergency Dept in Sri Lanka
Resuscitation area: NHSL A&E
1. Triage! (START)
2. One-way?
3. Chest/ Head CT only
Low-income countries
Trauma Care

Treatment or Prevention?
Global Mortality

- Non communicable disease: 63%
- Communicable disease: 25%
- Injuries: 12%
Worldwide, road traffic injuries are responsible for the highest injury mortality rates

(WHO)
Road Fatalities

Developing Countries

- 87% of the world's road fatalities occur in the developing countries

Asia and Pacific Region

- 44% of the world's road deaths occur in this region
- Yet only 16% of the world’s motor vehicles are found in this region
Annual fatalities per 10,000 registered motor vehicles
Road Traffic Accidents in Sri Lanka

Incidents

- 1990: 35,000
- 1995: 50,000
- 2002: 60,000
Prevention-focus

1. Driver discipline
2. Pedestrian discipline
3. Vehicle condition
4. Road conditions
5. Disproportionate speed
Pedestrian indiscipline
A typical Bus Stop!
(Only in Sri Lanka)
School children: Travel safety?
Mass Casualty Incident

- Road trauma/accident (soft tissue, bony injuries)
- Earthquake (crush)
- Floods (food, shelter, rescue)
- Fire (inhalational injury)
- Earth slips (crush)
- Explosions (burns, lung injury)
- Extreme temperatures
- Chemical Attack (poison)
- Radiation attack (poisonings)
- Food poisoning (Methyl alcohol)
BOMB BLAST

Vehicle wheeler deals: In parts or under cover

In a statement issued by its ministry here, Japan expressed sympathy to the relatives of those killed and wounded in the two blasts and said the attacks which deliberately targeted innocent common people must be condemned as cowardly acts of terrorism. "Such incidents must not be repeated in future," the statement said.

Blast adds to hoteliers’ woes

In the aftermath of yesterday’s bus bomb at Godawari in Hikkaduwa, hoteliers said the blast dealt another blow to the tottering tourism industry.

Industry sources said yesterday’s blast occurred at a time when the country had been experiencing low tourist arrivals in spite of the peak season.

Samantha Silva, who heads an association representing hoteliers in the south, said the numbers would further decrease in the face of recent escalation of violence.

"When tourists learn of incidents such as the Godawari blast, they will certainly think twice before coming to Sri Lanka. Besides road closures and security checks also discourage the tourists from visiting Sri Lanka," he said.

Many hoteliers said they did not inform the guests about the blast because they did not want to cause unnecessary panic.

"If they inquire about the situation we inform them very briefly. We do this to avoid worrying our guests unnecessarily," said a hotel official.

Passenger security: Busmen, Railways, CTB face dilemma

In the wake of the recent bomb explosions in buses, security precautions are being tightened at the Central Bus Stand (CBS) in Pettah and the Fort Railway Station.

However, these steps are causing practical problems on the streets with the CBS and the Fort Railway Station.

Police sources said an X-ray machine has been set up at the CBS to check the luggage of passengers but there is a need for more machines to cater to the rush of passengers.

CTB sources said they have set up additional security personnel at the CBS but they need more personnel to ensure the security of passengers.

Railway sources said they have set up additional security personnel at the Fort Railway Station but they need more personnel to ensure the security of passengers.
Men, women, children die in highway inferno: 25 dead, over 50 injured

Truck driver was asleep at the wheel?

Mother and baby locked in embrace fought to death

Fire at Kandy Library claims life of child

Firemen sans water to douse flames, say witnesses
Fire Dept. denies charges
EARTH SLIPS

Living on the edge: What is safe and what is not

Peradeniya town controversy

Many of the protests against the decision to relocate Peradeniya, with residents claiming that the town is safe.

"The decision to relocate the town has already been taken because the risk is increasing. The shops should be shifted. The problem is not from the land area where the landslide took place but the riverside. Shops are now hanging over the Mahaweli river and it is very dangerous. We cannot endanger people's lives," stressed Governor Tikiri Kothmale and insisted the decision to relocate the town.
Earthquake – Pakistan: mostly crush injuries...

19 10 2005
Crush injury: the need for mechanical ventilation
Bioterrorism

- Use of biological pathogens as a weapon
  - E.g.: Brucellosis, Anthrax, Plague, Botulinum toxin, Viral haemorrhagic fevers, viral encephalitis

- Bioterrorism preparedness
  - Assess surge capacity
    - Education and training
    - Facilities and equipment
    - Resource deployment in a MCI
  - Develop protocols

Is Sri Lanka prepared? NO
Special needs of children

- **Biological event**
  - Children have an immature immune system – thus greater morbidity and mortality

- **Chemical event**
  - It is a challenge to assess, manage and guide decontamination

- **Radiological event**
  - Children are more susceptible to consequences – cancer
Some times

- System fails.....
  - Example: Hurricane KATRINA – USA

- No System.. but
  - Tsunami – Sri Lanka
  - Makeshift arrangement – effective
  - Volunteer help / cultural

Command centre – TV Channel
Workforce - volunteers
The Key
- Preparedness
- Efficiency

Summary
MCI

Low-income countries
Prevention
Peradeniya Teaching Hospital: 600 beds