Limitation in Multi Casualty Incidents

Cold-Wet-Pain
Treat the basics

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Mass casualty incidents

A mass casualty incident is defined as an event which generates more patients at one time than locally available resources can manage using routine procedures.

It requires exceptional emergency arrangements and additional or extraordinary assistance.
It can also be defined as any event resulting in a number of victims large enough to disrupt the normal course of emergency and health care services (WHO 2001).

MCI demands a change from unlimited individual emergency and medical treatment to treatment with limited personal and material resources for a uncertain time slot.
Cabelcar accidents in the mountains caused MCI:
- 1951-1960 3 accidents => 36 fatalities => 7 casualties
- 1961-1970 4 accidents => 23 fatalities => 10 casualties
- 1971-1980 6 accidents => 80 fatalities => 27 casualties
- 1981-1990 6 accidents => 46 fatalities => 23 casualties
- 1990-2000 8 accidents => 49 fatalities => 44 casualties
- 2000 Kaprun 1 cabel care fire => 155 fatalities
- 2000 Grainau 1 cabel care accident => 29 casualties
- 2000-2010 14 accidents => 21 fatalities => 63 casualties

Plain crashes in the mountains caused MCI:
- 1946-1950 2 crashes => 54 fatalities => 12 casualties
- 1951-1960 1 crashes => 8 fatalities
- 1961-1970 1 crash => 117 fatalities
- 1971-1980 1 crash => 29 fatalities => 16 casualties
- 2000-2010 4 crashes => 98 fatalities
- 2011-2014 2 crashes => 92 fatalities
• 1970 France => 39 fatalities
• 1970 Switzerland => 30 fatalities
• 1979 France => 74 fatalities (56 children)
• 1991 Turkey => 200 fatalities
• 1998 France => 11 fatalities
• 1999 Switzerland => 12 fatalities
• 1999 Austria => 38 fatalities
• 2002 Ossetia => 150 fatalities
• 2014 Nepal => 16 fatalities

Lightning caused incident MCI in the mountains:
  2003 Grand Teton National Park => 7 casualties
  2010 Grand Teton National Park => 17 casualties => 1 fatality

Weather caused MCI in the mountains:
  1954 Dachstein => 13 fatalities
  2014 Mont Blanc => 5 fatalities
Different kinds of reasons for MCI in the mountains:

- nature hazards (avalanches),
- transport systems (cablecar, airplains),
- mass events (sports events, concerts).
- The number of MCI increased in the past.
- Nature hazards caused MCI will increase with climate changes(?)
- New transport systems and new mass events will further increase the number of MCI in remote areas in the future.

Thus, MRS has to be prepared for MCI in the mountains.
Who takes care and who can help first?

- Bystander and mountain companions
- Ski resort and cable car employees
- Local residents
- Mountain guides
- Organized mountain rescue services
- Ambulance services
- Air rescue services
- Fire brigade and civil defense
- Armed forces

Problems of communication with the different services because of different communication systems and different organizational structures.
Change from
- unlimited individual emergency and medical treatment,
- towards
- treatment with limited personal and material
- resources for a uncertain time slot.

Goal:

Gratest benefit for the greatest number of victims
Triage in MCI in the mountains

START:
Simple Triage and Rapid Treatment
used by first responders (or paramedics)

Goal: efficiently evaluate all victims.

Assessment: 60 seconds

- **Immediate care / life-threatening**
- **Delayed urgent care / can delay up to one hour**
- **Minor delayed care / can delay up to three hours**
- **Deceased** victim is dead / no care required
Triage in MCI in the mountains

**Triage Sieve**

- **WALKING**
  - YES INJURED
  - NO NOT INJURED
    - NO INJURED
      - SURVIVOR RECEPTION CENTRE
        - NO
          - DEATH
        - YES BREATHING
          - NO OPEN AIRWAY
            - BREATHING
              - NO
                - RESPIRATORY RATE
                  - 9 or less
                    - PULSE RATE
                      - 10 - 29
                        - IMMEDIATE PRIORITY 1
                      - over 120/min
                        - URGENT PRIORITY 2
                      - under 120/min
                        - IMMEDIATE PRIORITY 1
                  - 30 or more
                    - IMMEDIATE PRIORITY 1

Capillary refill test (CRT) is an alternative to pulse rate, but is unreliable in the cold or dark: if it is used, a CRT of > 2 seconds indicates PRIORITY 1.
Treatment

- Help as many patients as possible.
- Identify and treat potential life-threatening injuries/illnesses
- Treatment according standard protocol
- Secondary triage during treatment as possible by resources.
- Stabilize and prepare for transport on a priority basis to hospital(s).
Mass casualty incidents in the mountains

- far, high, cold, hot, wet, dry, late, long and many “
- Difficult to find, to reach, to walk, to help, to explain.
- difficult area, no save area.
- Prolonged activation and evacuation time
- Help as many patients as resources permit.

Sometimes it is necessary to reduce the treatment to the basics:

Treat Cold, Wet and Pain!
Mass casualty incidents in the mountains
Cold-Wet-Pain

Keep warm:
- shivering = hypothermia stage 1
- increases oxygen consumption by 400 %.
- Hypothermia in trauma is associated with a significantly increased mortality.

Keep dry:
- thermal conductivity of water is 240 times greater than still air.
- Wet clothes lose about 90 % of their insulating value.
- Consider wind-chill

Reduce pain:
- Pain increases the stress response leading to increased oxygen consumption.
Cold-Wet-Pain

- Blood loss (hemorrhagic shock)
- Hypothermia
- Pain

→ impaired oxygen delivery to tissue

Hypothermia and pain induces stress response

→ increased oxygen consumption.

→ Oxygen deficit (Acidosis)
Hypothermic patients have increased bleeding (coagulopathy)

Lethal triade

Hypothermia + oxygen deficit (azidosis) + coagulopathy

Major cause of death in trauma
COLD

SHIVERING = HYPOTHERMIA STAGE 1

- Rescue blankets
- Woolen blankets
- Chemical heatpack or blankets

Reduced hypothermia → reduced oxygen consumption

→ Reduced acidosis

Consider all patients hypothermic in mountainous environment
Reduce Pain:

- recognize, assess and treat pain.
- pain relief can be provided by nonpharmacological methods
- distraction,
- splinting of injuries,
- confidence and reassurance
- If recommended use strong opioids
- Consider N₂O (Entinox), „Mucosal Atomiser Device“ (MAD).

monitoring and documentation.
Zugspitzlauf
14.07.2008
Conclusion

Preventing Hypothermia:
  Easy
  Rapid
  Effective

Reducing Pain
  Reduces stress
  Does not require heavy equipment
  Effective

Can be applied by first responder and rescuers
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