



High Mountain Rescue Team Experience with Pediatric Trauma. Report of Five Years

Nicola Zampieri², Francesco Perusi¹, Enrico Carità¹, Carlo Romagnoli¹, Alberto Rossato¹, Massimo Corain¹

¹Orthopedics and Traumatology, Trauma Clinic, Livigno- Italy

²Department of Surgery-Paediatric Surgical Unit-Azienda Ospedaliera Universitaria Integrata-University of Verona-Italy;

BACKGROUND-INTRODUCTION-AIMS

DATA ARCHIVES: more than 800.000 tourists (November –May)

STATISTICS DATA: more than 500 per season (paediatric trauma more than 50/y)

Type of trauma: 1- joint distortion 2- bone fractures 3- blunt abdominal/thoracic/head trauma 3- joint dislocations 4- skin lesions 5- medical problems (stroke, cardiac arrest, AF/VF/VT/AT, head-hake, high pressure, panic attack).

HYPOTHERMIA: 24% of accidents had mild hypothermia

Team Organization:

Mountain rescue team: 1 doctor + 4 rescuers specialized for alpine rescue

Trauma Clinic team: 2 orthopedics+ 1 radiology technician + 1 nurse+ 2 drivers + staff secretary

Equipment: snow moto/ski/rescue sled(Toboggans)

vacuum mattress/vacuum splint/femoral traction splint/pelvic slings

braces/spine boards/back boards/cervical collars

defibrillator/drugs/ oxygen/first aid kit (suture, surgical instruments)

thermo blanket

Workplace temperature: -25°C to 10°C

The aim of this study is to report our experience as a high mountain rescue team with pediatric blunt trauma in the ski area.

MATERIALS AND METHODS

We retrospectively review medical charts of patients aged 3-10 yrs treated in the ski area in high mountain (2800-3000 mt) between January 2010-January 2015; inclusions and exclusions criteria were created. data were analyzed focusing on type of injury and type of management. The rescue team worked with helicopter support when necessary due to the difficulty to treat these patients in a locum first-aid centre.

Exclusion criteria: patients lost to follow-up or repatriated for treatment.

PATIENT STABLE without acute urgencies go to Trauma clinic for consideration

PATIENT stable/unstable with acute urgencies: transferred after stabilization by helicopter (from 6 to 20 minutes after call) to Acute Trauma Centre (III level Hospital)

RESULTS

During the study period 37 patients were treated but we analyzed 18 cases; 9 cases were excluded because lost to follow-up. 5 patients had femur fracture, 6 patients had single leg tibial and fibular fractures, 6 patients had blunt abdominal/thoracic trauma and 1 had head trauma. All these patients were treated in loco by the rescue team with the helicopter support for hospitalization.

Patients treatment: a) 1 rescue man start immediately after call and localization into the sky area (mean 3,7 minutes); b) after evaluation he asks for advanced treatment (mean 3,3 minutes); c) team organization and starting with materials (mean 4,2 minutes); d) diagnosis, prepare patients and decision (mean 5,4 minutes)

When helicopter support was impossible into 20 minutes, patients were stabilized in the ski area and secured at the Trauma Clinic while helicopter coming. All bone fractures were treated surgically within 24 ours after trauma; cases with blunt abdominal/thoracic trauma were treated conservatively following the APSA guidelines. None of these patients required surgery (3 liver trauma, 2 spleen trauma, 1 lung contusion with liver and renal trauma). All patients were stabilized in the ski area with peripheral venous cannulation, fluids and pain-killer infusion, thermo blanket, oxygen, braces and vacuum devices as indicated. One patients with head trauma required assisted ventilation without intubation. All patients were treated first to avoid hypothermia.

DISCUSSION

Trauma is frequent in pediatric age; in high mountain the role of a well organized rescue team (one doctor and three specialized rescuers) is essential to avoid complications especially in ski area without country hospitals or first aids.

From a clinical point of view some questions are necessary: **1.** If effective treatment technology had been available, would an individual have survived ? **2.** Are a significant number of people treated by personnel that are not knowledgeable, or not equipped with current technology? **3-** If a hypothermic victim is rescued but has complications during recovery, and there is no other significant trauma or disease, does this suggest that complications may have resulted from inappropriate or ineffective treatment, or no treatment at all ?

Rescuers have an important role in the first aid medical treatment of victims

Accidental hypothermia is defined as an unintentional drop in core body temperature below 35°C. Hypothermic cardiac arrest is defined as cessation of circulation caused by hypothermia, including ventricular fibrillation (VF), ventricular tachycardia without pulse (VT), pulseless electric activity (PEA) and asystole (AS). Hypothermia is classified as mild (32–35°C), moderate(28–32°C), severe (20–28°C) and profound (<20°C).These definitions represent respectively: a preserved capability to maintain core temperature through compensating thermoregulatory mechanisms (mild), loss of ability to sustain temperature voluntary and autonomic (moderate), high risk of malignant arrhythmias (severe)and cardiac arrest (profound).

Treatment of hypothermia starts in the field. Many rescuers and first-aid providers do not have equipment to institute rewarming with warm, humidified oxygen, and warm IV-fluids, although these methods should be initiated to help prevent (core) temperature afterdrop

The most important phase of treatment is the prevention of post-rescue collapse during the first 30 minutes following rescue, and during transportation to a Hospital or Clinic

...Nobody is dead until warm and dead...



REFERENCES

International commissionfor Alpine rescue: The Avalanche Victim Resuscitation Checklist. Alpine medicine commission-December 2014

International Commission for Alpine Rescue -Commission for Mountain Emergency Medicine. Recommendation REC M 0031 of the Commission for Mountain Emergency Medicine, 2013