International Commission for Mountain Emergency Medicine
ICAR MEDCOM
FALL MEETING 2013
BOL, CROATIA

Report to the Mountain Rescue Association
By Ken Zafren, MD, Vice President of the ICAR MEDCOM
Representing the MRA – United States

It was once again my privilege to represent the Mountain Rescue Association at the Fall 2013 meeting of the ICAR MEDCOM in Bol, Croatia on the island of Brac. The meeting took place on October 17-19, 2013. For those who are interested in the details of the meeting, I have submitted the minutes and the list of attendees as separate documents.

I was re-elected as a Vice-President of the Commission for another 4-year term.

The Mountain Rescue Association kindly supported registration, including hotel and meals, and intra-European travel to attend the meeting. Travel to and from Europe was supported by the Institute of Mountain Emergency Medicine (IMEM) of the European Academy (EURAC) in Bolzano, Italy. I am a member of the Scientific Advisory Board of the IMEM, which met on October 23, 2012 at EURAC in Bolzano. I also served as a moderator in a session on Telemedicine in the Mountains at the International Mountain Summit in Brixen, Italy on October 22, 2013.

I hope you will find this report useful.

Respectfully submitted,
Ken Zafren, MD

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NEPALESE MOUNTAIN RESCUE PROJECT

In Kathmandu in May 2013, I participated in the third session of a four-session Mountain Rescue Specialty Course for the International Diploma in Mountain Medicine. This course is part of the Nepalese Mountain Rescue Development Project initiated by the European Academy (EURAC) Institute of Mountain Emergency Medicine and the ICAR MEDCOM in conjunction with the Himalayan Rescue Association, the Mountain Medicine Society of Nepal and the Mountain Rescue and EMS services of South Tyrol. This long-term project is financed by the Province of South Tyrol, Italy. The first goal is to establish a core team of technically and medically trained mountain rescuers and physicians in Nepal to be instructors.

Three additional physician faculty, including Buddha Basnyat from Nepal, joined us in Kathmandu. We also had four technical rescue instructors from South Tyrol, including two paramedics. The 10 Nepali doctors spent 5 days in the classroom at Pasang Lamu College in Kathmandu before joining the guides for 4.5 days of practical sessions, some of which were held at Nagarjun National Park on the outskirts of Kathmandu. The 9 Nepali guides spent 2 classroom days with the doctors, then 7.5 days in practical sessions. During the joint practical sessions, doctors and guides worked together as teams on rescue scenarios. The extra half-day was a well-attended public meeting with interested stakeholders discussing our future plans for mountain rescue development in Nepal.

AVALANCHE VICTIM RESUSCITATION CHECKLIST

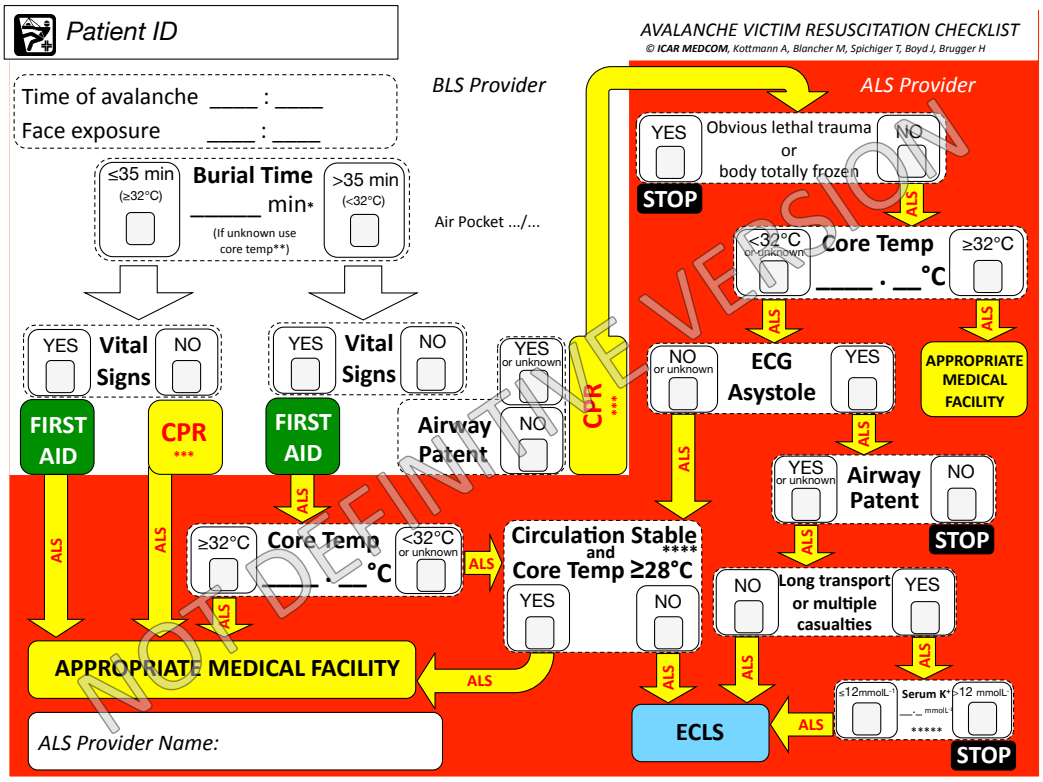
Alex Kottman and Marc Blancher have taken the lead in developing an Avalanche Victim Resuscitation Checklist for field use. (Please see following page or attached file). This checklist is intended for use by rescuers and advanced life support providers in the field. It will be produced as a 2-sided card. The front has the actual checklist, while the back explains the abbreviations and gives guidance for filling in the card. A separate card will accompany each victim.

The checklist follows the algorithm from the article in Resuscitation: Brugger H, Boyd J, Elsensohn F, Paal P, Strapazzon G, Winterberger E, Zafren K. Resuscitation of avalanche victims: Evidence-based guidelines of the International Commission for Mountain Emergency Medicine. *Resuscitation* May; 84(5):539-546, 2013.

The white section in the upper left of the card is intended for use by first responders. As they work through this section, they fill in the times and check the appropriate boxes. If the patient has no vital signs, rescuers should start CPR. The check boxes for airway patent (Yes or Unknown, No) do not change management at this stage, but are important later in the algorithm. The first responder checks the appropriate box for later reference by an advanced life support provider.

The red area in the lower left and the entire right side of the card is intended for use by advanced life support providers. Transfer to a facility that can provide "ECLS" (extracorporal life support: cardiopulmonary bypass or extracorporeal membrane oxygenation) does not mean that ECLS will necessarily be used. The intent is to transfer unstable patients to a facility that has ECLS available, in case it is needed.

The design of the card will be finalized and cards will be used in a pilot project this winter by several rescue teams in the Alps, including France, Switzerland, Austria and Italy.



Air Pocket

☐ Yes, ___ x ___ x ___ (cm)
☐ No
☐ Unknown

Rescue Service:

Base:

Phone:

Abbreviations:
Pat ID = Patient Identity
CPR = Cardiopulmonary Resuscitation
ALS = Advanced Life Support
ECLS= Extracorporeal Life Support (Cardiopulmonary Bypass/Extracorporeal Membrane Oxygenation)

* Time between burial and uncovering the face.
**If duration of burial is unknown, core temperature may substitute using oesophageal or epitympanic (thermistor-based sensor) temperature.
*** CPR can be withheld if unacceptable level of risk for the rescuer, total body frozen or obvious lethal trauma (decapitation, truncal transsection).
**** Patients who present with cardiac instability (ventricular arrhythmias, systolic blood pressure <90mmHg) or core temperature <28°C should be transported towards hospital with ECLS rewarming possibility.
***** if K^+ at hospital admission exceeds 12mmolL^{-1} consider stopping resuscitation (after exluding crush injuries and consideration of the use of depolarizing paralytics); in an adult with K^+= 8-12 mmolL^{-1} and other factors consistent with non-survival, termination of resuscitation should be considered.

AVALANCHE VICTIM RESUSCITATION CHECKLIST
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AVALANCHE TRIAGE

Manuel Genswein and Jeff Boyd made presentations regarding avalanche triage.

The key to Manuel Genswein's scheme is short duration CPR. If unsuccessful, rescuers shift resources to other victims with higher survival chances, including victims who are still buried. The optimal duration of the short trial of CPR is unknown. Simulation techniques can be of only limited help, since the data on which they would be based are so sparse.

Jeff Boyd presented a previously published scheme – the AvSORT algorithm. (Please see attached files: Bogle et al. 2010 and a letter to the editor in response: Zafren 2010.)

Jeff also presented results of a field simulation of the AvSORT algorithm that had some unexpected results. Experienced rescuers often preferred to expend additional resources on victims whose survival chances were low due to logistical considerations. For example, one rescuer would continue attempted resuscitation while another rescuer descended to a second victim. The plan would be for the lower rescuer to request the help of the second rescuer if extrication or resuscitation of a victim lower on the slope required more personnel. The rescuers realized that it would be much faster and easier for the upper rescuer to descend when needed than for one of them to have to ascend. Experienced rescuers also worked out strategies for saving time, such as having a helicopter fly a less critical victim to a nearby hospital where the pilot could refuel in anticipation of a possible longer flight with the next victim to a hospital capable of critical care.

A working group was formed to extend the avalanche check list to a triage algorithm.

CARDIOPULMONARY RESUSCITATION IN THE FIELD

Mechanical CPR

Several recent articles have discussed the use of CPR in the field. Prolonged use of mechanical CPR (with the LUCAS device) was effective in a case of witnessed cardiac arrest due to myocardial infarction that occurred in the Swiss Alps. (Dembeck et al. 2011 – Article in German. Please see reference list for English language abstract.)

A manikin study (Putzer et al. 2013) suggested that mechanical CPR (with the LUCAS device) is more effective than manual cardiopulmonary resuscitation during helicopter rescue. The authors noted that CPR quality was improved and hands-off time reduced, but there was a longer time before the first defibrillation.

Prolonged Intermittent CPR in Severe Hypothermia

A case report, Neurologic recovery from profound accidental hypothermia after 5 hours of cardiopulmonary resuscitation (Boue et al. 2013), showed the efficacy of prolonged, intermittent CPR in a severely hypothermic patient.

A 57-year old woman was lost during a snowstorm in the French Alps. Several hours after an emergency call, 5 rescuers arrived on site and found the victim with a heart rate of 6 beats/minute and no perceptible respiration. An AED showed ventricular fibrillation. After 3 shocks, the rhythm was asystole. Epinephrine had no effect. It was impossible to move and perform CPR simultaneously. Mechanical ventilation was also technically impossible. The rescuers alternated CPR for 1 minute with 100 manual chest compressions and 1 minute walking to reach a road.

After reaching the road, almost 2 hours after beginning CPR, the patient received advanced life support with endotracheal intubation and mechanical ventilation. The rescuers continued manual chest compressions. The patient reached the trauma center by ambulance almost 3 hours later. Only the last 1 hour of CPR was provided using a mechanical device (LUCAS).

On arrival at the trauma center, rectal temperature was 16.9°C. The patient was rewarmed using extracorporeal membrain oxygenation (ECMO). CPR was continued until full extracorporeal blood flow was established, 307 minutes after rescue. The patient survived with mild cognitive impairment.

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Abstract

We demonstrate the case of a 70-year-old mountaineer with a posterior myocardial infarction and cardiogenic shock in which a helicopter rescue was primarily impossible due to fog. In a combined rescue mission the Alpine Rescue Switzerland (ARS) and the ambulance crew scrambled to attend the patient who was reached after 2 h 10 min and 40 min later the patient suffered ventricular fibrillation. At that point the emergency equipment was still in transit and unavailable. We describe the subsequent resuscitation and medical measures taken, in particular initial resuscitation without ventilation, defibrillation, ventilation with a laryngeal tube, cardiopulmonary resuscitation (CPR) with a mechanical resuscitation device Lucas 2, recovery and reflexes of the patient undergoing CPR with Lucas 2, medication according to ACLS mode via intraosseous line, stabilization and 3 h transport downwards, limited oxygen supplies and frozen oxygen bottle in the cold environment. The patient reached Bern University Insel-Hospital in a stable circulatory and respiratory condition with a body core temperature of 30°C. After percutaneous transluminal coronary angioplasty (PTCA) of a subtotal right coronary artery (RCA) obstruction and installation of 4 drug-eluting stents, ventilation could be stopped after 30 h, the patient was extubated without neurological deficits and could be discharged after 11 days. The patient is now hiking in the Swiss Alps again.

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