

MRA ICAR MEDCOM REPORT 2023 Dr. Alison Sheets and Dr. Christopher Van Tilburg October 18-21, 2023

The ICAR Congress was held in Toblach, Italy in the Dolomites, also known as the Sud Tirol. We began with a workshop day under the Tre Cime /Drei Zinnen (pictured above) with nearly 500 participants across multiple stations provided by the 4 different commissions: Medical, Avalanche, Terrestrial, Air, and the Canine sub-commission.

The MEDCOM had a full day of presentations starting with "the management of the multiply injured patient in the mountains." Participants who chose this morning's session rotated through improvised splints and carries taught by Dr. Dick Price from New Zealand using typical materials found in the backcountry - packs, skis, ropes, space blankets, and ski poles. Dr. Alison Sheets demonstrated the use of a sugar tong splint for upper and lower extremities, as a useful method of shaping a SAM splint. The emphasis was on the basics of effective and efficient field splinting such as checking distal circulation, sensation, and movement prior to and after a splint and a reminder that if a joint is injured the long bone above and below the joint needs to be immobilized; if a long bone is injured, the joint above and below needs to be immobilized.

Dr. Oliver Reisten of Air Zermatt gave a session on field damage control surgery and demonstrated a technique for physicians to make bilateral open thoracostomies not requiring a chest tube or chest seal. The incision in the axilla must be at least 5cm to stay patent during transportation. Dr. Matthias Jacob of Air Zermatt and Air Glaciers demonstrated advanced airway techniques for physicians and paramedics utilizing mannequins. Procedures including supraglottic, endotracheal and surgical airways were demonstrated, as was a portable video laryngoscope. Dr. Volker Lischke from Germany demonstrated the importance of primary survey to include CABDCE: catastrophic bleeding, airway, breathing, circulation, disability, environment.

In the afternoon session on special circumstances in mountain rescue, Dr. Roger Mortimer, a National Cave Rescue Council delegate from California, discussed suspension syndrome, which occurs when subjects are stuck hanging in a climbing harness with the inability to relieve pressure on neurovascular structures. Sudden syncope may lead to cardiac arrest, and it is difficult to predict which patients may

succumb. This situation should always be treated as an emergency as the deterioration is often rapid. Patients should be encouraged to move and unweight their harness by standing in etriers, slings, or in any way possible. Importantly, patients should be placed in a supine position as soon as they are removed from their hanging position.

A presentation about drowning by Dr. Iñigo Soteras, Spain, highlighted that the main cause of death when falling into cold water is drowning from muscle fatigue, not hypothermia. Personal floatation devices are encouraged when working around water. Cardiac arrest from drowning is rarely survivable, regardless of water temperature. Dr. Peter Paal, Austria, Dr. Les Gordon, UK, and Dr. Martin Musi, USA, covered hypothermic cardiac arrest in the alpine environment. Unlike from heart attack, trauma or asphyxia, cardiac arrest from hypothermia alone has a good chance of survival with normal neurologic outcome. These very cold patients may benefit from prolonged resuscitation, which should be continued until the patient is at an extracorporeal life support (ECLS) facility. Intermittent CPR may be considered. The HOPE score (Hypothermia Outcome Prediction after ECLS) should be utilized for prognosis in hospital when considering ECLS.

The next three days of the congress provided an interesting variety of recommendations, discussions, research results, and case reports. The first day of the MEDCOM meetings began with a president's report and a tribute to Michael Swangard, a longtime member of MEDCOM, an influential SAR doctor, and skier from Canada. Dr. Gege Agazzi, Italian Society of Mountain Medicine, gave a tribute to Swiss Doctor Oscar Bernhard (1861-1939) for his significant contributions to mountain rescue medicine and a fine artist and illustrator. His work below.



The rest of the morning MEDCOM session was spent on stress injury prevention and a review of recent work in the UK, the USA and Italy. This was moderated by Dr. Sheets. "Guiding Principles for Volunteer Wellbeing & Prevention of Psychological Stress in SAR Organizations" presented by Dr. Jonathan White, Mountain Rescue England and Wales, found that exercise and social cohesion were the best strategies for prevention of significant stress injury. He also looked at UKSAR organization's Wellbeing Framework for mental health in the workplace. Although recognizing that volunteer SAR is not exactly a "workplace", organizational factors play a big role in resilience in the individual. Similarly, supporting, empowering, and creating open conversation around mental health is vital for resilience.

Dr. Roger Mortimer presented "Psychological First Aid for Responders". The Wilderness and Environmental Medicine Journal recently published his article on this subject. The foundational skill of providing safety, calm, connection, self-efficacy and hope to stressed individuals remains an important tool for the first responder or rescuer. These are both immediate and long-term interventions. Wilhelm Feichter of Tyrolian Mountain Rescue reported on his team's peer support for prevention of stress injury and to promote wellbeing. They started in 2010 and have had much growth with 21 "peer" support members and professional referrals in place.

The final presentation in the morning was a review of the ICAR recommendations for "Stress Resilience in Alpine Rescue" by Dr. Alison Sheets. There are 12 recommendations separated into three categories: preparation, during exposure, and after exposure in reference to a traumatic or stressful event. These are general guidelines and aimed at mountain rescue organizations of all types. Also included were the Mountain Rescue Stress Continuum as well as the steps for applying 3:3:3 (days/weeks/months) incident follow up and the Traumatic Stress Questionnaire. The ICAR MEDCOM recommendations were then voted on in the general assembly and are now official. Publication to the ICAR website is planned soon.

"Prospective Study of Avalanche Deaths - a Complete Overview of the Rescue Chain", F.Albasini, L. Krebs, Drouhot, L. Richard, F. Jarry, France. This large research effort looked at an existing avalanche death registry in the French Alps. The intent was to gather information, improve data collection in the field, and improve field management of avalanche victims going forward. The data showed that in 268 avalanche events, 414 people were involved, with 27% mortality overall. They also followed up with survivors to evaluate for PTSD.

An update on Mountain Medicine in Latin America by Dr. Martin Musi highlighted an expedition medicine course in Peru in July of 2023. This was offered by Diploma in Mountain Medicine (DiMM) Andes. This course involved 48 hours of mostly improvised rescue and medical treatment at altitude. Scholarships were made available to all the Latin American students (\$14,000 equivalent) to support their ability to participate. The next DiMM Andes course will be June 5-17, 2024 in Peru. A new DiMM expedition medicine course, by Grupo de Rescate Médico de Montaña and Dr. Nicolas Mena, is scheduled in Chile in November and December 2023.

A case report from Club Andino Bariloche, by Dr. Manu Funk, was presented. The club was founded in 1934 and currently has 61 volunteers and does about 60 rescues a year. The case report involved a badly injured hiker that was caught and carried 70 meters in a mudslide. They were able to expedite the evacuation with a helicopter, which is unusual there. Still the extrication was physically demanding and involved some litter carry to an appropriate landing zone. Patient was treated well medically but unfortunately lost her lower leg due to the violence and debris of the mudslide. The patient is now again active with a prosthesis. This was an outstanding job by the rescue team in an unusual circumstance likely due, at least in part, to climate change.

Dr. Mike Greene looked at the performance of chemical heat blankets (HB) in dry and wet conditions. This well-designed study looked at performance of the heat blanket separate from how well it warms a human subject. The blankets performed as expected with some heat attenuation in the "wet" arm of the study. HB can cause burns, so caution is needed when near skin. Even though the HB works in both dry and wet conditions, if clothing is saturated, it should be replaced with dry clothing for best HB performance.

Day two of the MEDCOM meetings began with Occupational Accidents Among Search and Rescue Providers During Mountain Rescue Operations and Training Events, by Mario Milani, Italy. This was a review of Italy's statistics for accidents that occur to rescuers in the line of duty. Accidents during training were responsible for 59% of the incidents with falls the most common reason for rescuer injury. Italy had 37 fatalities of rescuers during missions from 1954 to 2022. Most fatalities were from falls but also included heart attacks, drownings, rock fall, avalanches, and helicopter accidents.

Causes of death and characteristics of non-survivors rescued during recreational mountain activities in Japan between 2011 and 2015, by Kaz Oshiro. Dr. Oshiro presented data on traumatic, hypothermic, and medical cardiac arrest fatalities. Of all the fatalities from primary cardiac arrest (heart attack), only 3.7% were alive when found by mountain rescue; the rest were found already deceased. This underscores both the importance of companions being able to do CPR and the time sensitivity of heart attacks.

Dr. Ken Zafren described two rescues of crevasse accidents. One was a helicopter pilot who crashed and fell into a crevasse. He suggested that pilots should consider dressing for winter survival even though they don't expect to leave the helicopter. Another case was a climber in a crevasse. There was discussion that rescuers should consider transitioning the subject from vertical to horizontal position as soon as possible during crevasse extrication to help prevent rescue collapse (cardiac arrest due to the movement of rescue). Others remarked that this is neither proven nor practical.

A technical ground rescue complicated by cardiac arrest was presented by Dr. Fabio Passet who was on the rescue, his first with the team. This was a night mission in Italy with a badly injured patient in neurogenic (spinal) shock. Positional changes while evacuating the patient in technical terrain caused worsening hypotension and cardiac arrest multiple times. Ingenious use of intramuscular epinephrine helped support the patient's blood pressure. Dr. Passett highlighted the teamwork involved to complete this rescue with its multiple medical difficulties and over 1000 meters of technical rope work. The patient survived cognitively intact but is now wheelchair dependent.

Christopher Van Tilburg described the utilization of intramuscular (IM) ketamine as a primary pain medication, instead of injection opioids that often require an IV. Barriers to use in the USA include its status as a controlled substance necessitating waivers for paramedic use in some states and as a drug of abuse. The dose for pain control is 1mg/kg IM, which is lower than a sedation dose. Ketamine is used widely in the prehospital environment and many MEDCOM members provided their personal experiences using it. The Wilderness Medical Society is updating clinical practice guidelines on analgesia in the wilderness and this conversation will inform that work.

The SAFEBACK study, presented by Dr. Giacomo Strapazzon described a new type of avalanche safety tool which involves a battery-operated fan that, when activated by a pull handle, blows air from the back of the backpack to the front of the backpack near the user's face. This could prevent asphyxia by providing a renewed supply of air to the wearer. The initial studies showed that pulse oximetry levels in a simulated burial were maintained at a higher level with use of the device. It can be combined with an airbag system.

Dr. Simon Rauch, presented accident data based on 2500 avalanches with 4270 victims in Switzerland. This data suggested that the new avalanche survival curve is similar to the old one: half of people die in

the first 25 minutes. The new curve shows an earlier drop in survival, beginning at 10 minutes after burial. Also new is an increase in long term survivors, which typically only occurs with a patent airway. Death after 130 minutes usually occurs from hypoxia, hypercapnia, and hypothermia. The average rescue time has also shortened since the initial survival curve was published. The probability of rescue was originally 50% at 45 minutes, it is now 50% at 30 minutes. Overall survival improved slightly to 58%; a possible result of quicker rescues due to better training, information, or equipment.

The final day all four commissions gathered in one room to hear plenary sessions. Of the talks, three were from MEDCOM members:

Rescue at Very High Altitude paper, Kyle McLaughlin, Parks Canada. Dr. McLaughlin addressed the question of "Do rescuers need [pharmacologic] prophylaxis when responding to very high altitude?" Mountain rescuers at high altitude have different needs than the average climbers. They often have short notice when responding to high altitude. The project has grown so large that it has morphed into three distinct papers. The first will address rescuers. For them, prophylaxis might include oxygen or steroids, but likely will exclude medications that take several days to take effect. A second paper will cover helicopter operations, such as operating aircraft at very high altitude or the crew being unexpectedly stranded due to a mechanical issue or weather. A third paper will focus specifically on the medical treatment of patients in the high-altitude environment with its unique environmental challenges to medications, equipment, and physiology.

Mountain Events in Hot Weather by Dr. John Ellerton and Dr. Darryl Macias. This was an overview of heat illness, which can be very serious with high mortality. For example, a patient with a core temperature of 40C with any mental status changes has heat stroke and a 50% chance of death. The presence or absence of sweating is not helpful in determining critical heat illness. An ice bath is the most effective way of treating heat stroke; this can be done in the wilderness setting with a cool stream. Other methods are less effective. It was also pointed out that heat illness can occur even in mild to moderate temperatures. We don't know if we will see more heat illness with climate change but it is likely.

The Marmolada Glacier Collapse by Dr. Giacomo Strapazzon and Dr. Simon Rauch. The final presentation from the MEDCOM was a multi-casualty incident which was used to illustrate possible implications of climate change. The accident occurred July 3, 2022, as many climbers were descending the regular route from the summit of Punta Penia. There were 11 fatalities and 7 severely injured subjects. The avalanche was calculated to contain 70,000 cubic meters of ice, rock, and water. Free water flowing into a crevasse likely caused the failure. The first alarm was at 13:45 and many people in the area witnessed and even took video of the event. By 13:52 the 1st helicopter was arriving. There was utter carnage and an uncomfortable silence, as described by rescuers on scene.

The location of the disaster was at the junction of three different regional authorities, so the coordination of air assets, patient identification, and transport destinations was difficult. Multi-agency communication was complicated by a lack of pre-planned common radio channels, and rescuers who spoke different languages. After survivors were evacuated, the decision was made to get personnel and equipment off the scene and use UAVs to continue search efforts as further ice fall was a concern. The discussion then turned to MCI's and lessons learned. Their conclusions:

- 1. Safety of the rescuer is the highest priority.
- 2. The initial response should focus on setting up a command-and-control structure, triage, and performing lifesaving interventions.
- 3. Leadership and effective communication are essential.
- 4. Getting the patient to the appropriate treatment facility saves lives.
- 5. Tools that enable clear identification and tracking of patients should be available.
- 6. Planning and interagency training are essential.
- 7. We should learn from experience.



Marmolada glacier failure 2022