SPOLEČNOST HORSKÉ MEDICÍNY

ČESKÝ HOROLEZECKÝ SVAZ
CZECH MOUNTAINEERING ASSOCIATION

33rd PELIKAN SEMINAR "CURRENT PROBLEMS OF MOUNTAIN MEDICINE"

2023

Hotel Filipinum, Jablonné nad Orlicí, 3. – 5. 11. 2023

CONFERENCE REPORT - 33rd PELIKAN´S SEMINAR "CURRENT PROBLEMS OF MOUNTAIN MEDICINE" 2023 (NOTES FROM THE SEMINAR)

33rd Pelikan´s Seminar "Current Problems of Mountain Medicine" November 3-5, 2023, Hotel Filipinum, Jablonné nad Orlicí

Introduction

The 33rd year of the Pelikan´s Seminar, a traditional event dedicated to the problems of mountain medicine in Czechia and Slovakia, was organized by the Czech Mountaineering Association (ČHS) and the Society of Mountain Medicine on November 3-5, 2023 in Jablonné nad Orlicí. More than seventy interested persons from the ranks of not only doctors and other health professionals, but also climbers, hikers, mountain guides and others gathered.

This time the event had three main themes. The first theme was a continuation of last year's event, and again focused on the specifics of women's stay in the mountains and alpine environment. Lenka Horáková, a ČHS delegate to the Medical Commission of the International Mountaineering Association (UIAA), presented the latest findings on the incidence of altitude sickness and frostbite in women and the differences in mortality between the sexes at altitudes above 2500 m. Vladimír Student discussed the safety and effectiveness of hormonal contraception at high altitude. The topic was loosely related to the related issue of children in the mountains, from newborns to older children presented in a number of communications.

The second topic was "e-mountains', i.e. the use of the latest technologies in planning and staying in the mountains. Applications for planning and sharing hikes and other mountaineering activities were presented in a practical workshop by Marie Lollok Klementová, the extension of the use of the well-known *Záchranka* application in the mountain environment was shown by Filip Maleňák and the avalanche forecast using the Snow Safe App was presented by Martin Honzík, a lecturer at the Czech Mountaineering Association. The lecturers Jan Pala and Alexander Kolský also touched on the increasingly widespread phenomenon of movement on electric bicycles not only in the Czech mountains.

The third topic, both scientifically and practically, focused on pre-acclimatization, i.e. techniques for adapting to the climatic conditions during a high-altitude ascent before leaving for an often remote destination. Traditionally, a shorter trip to the Alps, for example, has been used for this purpose, but commercial options such as special hypoxic tents are now available.

The Pelikan Seminar offers not only theoretical lectures but also practical workshops every year. Martin Honzík has prepared practical demonstrations of techniques for stopping bleeding in field conditions.

Friday 3.11.2023

Friday's program began with **an introductory speech by** the President of the Czech Society of Mountain Medicine **Lenka Horáková, M.D.,** who is also a ČHS delegate to the UIAA Medical Commission and vice-president of this commission. She welcomed the participants on behalf of both organizing organizations - the Czech Society of Mountain Medicine and the Czech Mountaineering Association.

Jakub Teplý opened the evening programme with a travel lecture **"Liver disco in Central Asia - tasting local cuisine can have negative consequences**.

Saturday 4.11.2023

MUDr. Lenka Horáková: UIAA MedCom recommendations for women in the mountains

- are published in High Altitude Medicine & Biology (HAMB). HAMB is the first peer-reviewed journal focused exclusively on the latest advances in the life sciences at high altitude and is a major source of information for physicians, physiologists and researchers concerned with the effects of reduced atmospheric pressure and oxygen deprivation.

The journal provides crucial insights into the effects of high altitude on lung and heart disease, appetite and weight loss, pulmonary and cerebral edema, hypertension, dehydration, infertility and other diseases. It covers the entire spectrum of the sciences of life at high altitude, from pathology to human and animal ecology. Published since 2000, in recent years "online only".

Igor Hermann, MD: Newborns at high altitude

During pregnancy, the newborn in utero experiences normobaric hypoxia corresponding to a stay at about 7000 m above sea level, which is compensated by fetal haemoglobin with a higher affinity for oxygen allowing fetal development.

The neonate after birth to high altitude enters a hypobaric hypoxic environment, leading to some increase in vasoconstriction, developing Subacute Infantile Mountain Sickness (SIMS) by 2 months. The protective effect of fetal hemoglobin disappears within 2-3 weeks by its elimination. Neither treatment nor moving to lower altitudes helps and a large proportion of infants die. All this takes place under the dominant picture of right ventricular congestion with right ventricular myocardial hypertrophy, cardiomegaly, dilatation and tamponade due to pericardial effusion. This was observed, for example, in Spanish conquistadors who came to the Andes, moving to high altitude only at about a year of life. There are, of course, genetic predispositions for SIMS: in Chinese with 50 years of residence in the Tibetan area, the prevalence is 2.1 %, in Mongolians with a history of 700 years 0.85 %, in contrast, in Tibetans with 20 to 50 thousand years of residence in high altitude environments, the prevalence of SIMS is already low at 0.27 %.

The lecture provoked a discussion on the pathophysiological impact of vasoconstriction and fetal circulatory closure, but unfortunately again there are very few studies, often only autopsy units of deceased neonates. Moreover, these are often very remote areas.

MUDr. Student added that the higher binding affinity of fetal hemoglobin is several times higher, and MUDr. Kubalová also mentioned the longer persistence of fetal hemoglobin in these persons.

MUDr. Jana Kubalová: Children at heights

The first UIAA MedCom recommendation dates back to 2008, then mostly extrapolating from adults to children. Today the accessibility of the mountain environment for children is great, the reason is often not only to fulfil the ambitions of parents, but often to show their children the beauty of the mountain environment and sports. All ages are getting into the higher mountains.

Symptoms of AMS/HACE/HAPE are non-specific, which is particularly challenging in younger children. There is a lack of incidence data, often only case reports, e.g., HACE ataxia in a wanderer. Children need the same time for acclimatization as the adult population. The general recommendation is not to go above 4000 m until 5 years of age and to overnight at 2500 m.

A special category is subacute infantile mountain sickness SIMS, where Dr. Kubalová referred to the previous lecture. Children 6-13 years have a similar course of acclimatization with almost normalization of parameters (change in heart rate, saturation, capnia).

In children, the Lake Louise Symptom Score (LLSS) does not reflect the severity of the condition, so alternative systems have been developed for 5-11 years - the Lake Louise Age Adjusted Symptom Score (LLAASS) with simplified questions and 0-4 years. The Children's Lake Louise Score CLLS mainly assesses a child's irritability.

She reiterated the 3Ps: prevention, use, emergency plan. In addition, she stressed the importance of not giving drug prophylaxis, e.g. for those who had oxygen in infancy, e.g. acetazolamide 1.25mg/kg á 12 hours after birth (max 250mg/dose). Symptomatic therapy for mild manifestations is paracetamol and ibuprofen.

She highlighted the problem with Nifedipine, which is available in the Czech Republic only in a retarded 40 mg undividable tablet, which at the recommended dose of 0.5 mg/kg is not useful for especially younger children, as it does not only reduce the pressure in the lungs, but also the systemic pressure.

ENT problems can be serious; children's airways are very narrow and very prone to swelling. Watch out for laryngitis, which has an increased risk in ski complexes: dry frost, overheated rooms.

It is important to prevent the effects of UV radiation, lubricate with a minimum SPF >50, as sunburn increases the risk of malignancies later in life.

Physical fitness and the onset of fatigue is also a problem, travel is soon limited, the child has to go as long as he wants. Children get exhausted quickly but recover quickly. Regular diet, rest, distraction are important.

Hygiene worries parents more than children, they are not more prone to gastroenteritis, but then they are at risk of dehydration.

Bc. Barbora Veselá: Practical experience with children in the mountains

B. Veselá began her lecture by asking the basic question that should be asked before every trip: Why do I want to take my children to the mountains? What do I expect from it? They want to have time together, deepen the parent-child relationship, foster a love of exercise, teach them to be independent, learn to work with themselves, understand their parents' passion for the mountains, and more.

Barbara and her family have the best experience of travelling by bicycle, and then maybe they run out part of the way. The next question is where I want to go with the kids, there is a difference between inland and foreign travel. More planning is required (weather, clothing, material possibilities). To realize what experience we have and whether we have the upper hand in the situation. It depends on the age difference and the number of children. For example, if I as a parent need to satisfy my physical performance, maybe a parent needs to go for a run first and then go out with the kids.

It's important to have a plan B: alternatives, route options, attractions along the way, huts and shelters (a place to change the little ones), keep an eye on the kids all the time (they can't guess what's too much, cold, hot...).

The most important thing is to be able to work with the motivation of your own children, to know their individual needs (playground, sweets, toys, gifts, time spent together, places they like to go, his own shift if they are already older...).

The problem is the child's illness; a well-equipped first aid kit, a doctor on call, mapping the nearest health facility, personal experience are prerequisites. She added that a paper prescription issued in one country is valid in all EU countries, e-prescription is so far only recognised in Spain, Poland and Croatia; epreskripce.cz has a list of active pharmacies where e-prescription can be picked up. So far the cooperation is not bilateral.

MUDr. Lucie Bloudková: Eating disorders in sport climbing

She drew attention to the fact that eating disorders have been known for a very long time, giving an overview of the historical context from ancient times, through religious reasons in the Middle Ages to Empress Sissi.

She cited a study that diet is highly debated in various climbing forums (e.g., difficulty climbers who climb overhangs need to be light and muscular).

Eating disorders have a prevalence of 0.9% in women and 0.3% in men, and diagnostic criteria are important - often a BMI <17.5 or a body weight >15% lower than that corresponding to sex, age and height. Eating disorders are present in so-called "weight sensitive sports', in addition to ballet, e.g. athletics, equestrian and more recently in sport climbing.

A distinction is made between eating disorder, a classic psychiatric diagnosis, and disordered eating behaviour, which is not classified as a disease but already has changes in the frequency and quantity of food intake. This issue is mostly studied and described in female athletes, where the so-called female athlete triad (prevalence of about 1-4%) is described: amenorrhea, osteoporosis, disordered eating. At least one of the disorders has been found in up to 65% of female athletes. Amenorrhoea is caused by reduced secretion of gonadoliberin, a gonadotropin-releasing hormone (GnRH), which is particularly problematic if a woman wants to start fulfilling her reproductive intentions with distance.

Gradually, it was discovered that not only hormonal and bone metabolism is a problem, but there are also immune and psychological changes, all of which in turn have a feedback effect on performance and training. A number of sports are Olympic, and therefore a panel of experts has issued a statement (2014 IOC Statement of Relative Energy Deficiency in Sport, latest version 9/2023) – currently a much-researched topic.

Low Energy Availability (LEA) is a mismatch between dietary energy intake and energy expended during exercise, which can be calculated, but the input data for the calculation is imprecise and difficult to obtain, despite the availability of wearable devices, etc. The effects can then be seen, for example, by a coach, such as performance changes (poorer recovery, more frequent sickness). Evaluation in practice is possible with a ready-made tool. At the heart of the dispute is the assessment using BMI. Nowadays this is also addressed by the IFSC, where BMI is the entry criterion, which is actually one of the non-significant indicators.

MUDr. Vladimír Študent: Contraception and cycle control at high altitude

He followed MUDr. Horáková's lecture on recommendations for women at high altitude. The recommendation is for women living at low altitude and who are going out for short periods of time. Today, mainly pill forms are known, but there are also implants, depot injection forms, but also vaginal rings and uterine tubes, pessaries and condoms. Oral hormonal contraceptives are very widespread, but the problem in studies, for example, is that these are products with different substances and in different doses.

Many women try to control their cycle before the trip by taking Norethisterone, which is actually similar to pure progestin contraception. Cycle control needs to be hormonal, combined estrogen-progesterone products work more, but they carry more potential risks (mainly thromboembolic risk). Various cycle changes can occur when you start taking them, increasing the risks, e.g. again thrombotic effects, so it is not advisable to take them just before going on an expedition.

He also mentioned theoretical effects on acclimatization and performance at high altitude, but no effect of hormonal contraception has been shown. A common question from women is the effect of gastrointestinal problems and antibiotic use. Current work has not found an effect, but M.D. Student's personal experience is that at low altitude in these situations women bleed more often when using contraception.

A typical symptom of possible contraceptive failure is "spotting" during the cycle when menstruation is not supposed to come.

Probably the biggest concern is thromboembolism, which is not common in the core population of women, but other risk factors may be added when traveling to higher altitudes. The greatest risks are with combination preparations and in the first year of use. The recommendation is to continue using contraception even when travelling, even continuously to delay menstruation.

It is also important to consider the risk of sexually transmitted diseases. And then, certainly from the hormonal ones, the pure progesterone form is preferable. Surprisingly, the thrombogenic risk is higher with the combined vaginal ring, and in the future a progesterone ring should be available (in some countries even sold over-the-counter at the pharmacy.

Filip Maleňák: Application "Záchranka" (Rescue) its use in mountain environment

The aim of the app is to simplify and streamline calls to the Emergency Medical Services (EMS) emergency line. The app conveys a range of important information, including battery status and internet connection. It connects to the nearest operations centre. If we are in a mountainous environment, it also forwards data to the Mountain Service (HS) to avoid problems getting to the affected person. A call can also be sent directly to the mountain service. If we are in a place where there is no internet data, it is possible to generate an SMS that is sent (this function can be installed on Apple Watch, not yet on android smartphones, there are too many types).

It is important to set the Rescue App so that it can use the phone's location permanently. The use of the app is on the rise. There are also apps in Slovakia, Hungary and Austria. In Slovakia there is full connection to the Mountain Rescue Service (HZS), outside the area they dial 155/112.

Already during the development of the Záchranka application, it was connected with the HS module. Electronic hiking book (CZ/SK) - conversion of paper hiking books into electronic form, registration of hiking books is mandatory in Slovakia. Part of the hike registration is also downloading info about the area – warnings and alerts. Members of the hike are also listed, if we do not report that we have reached the hike destination, the Fire Brigade is notified after 3 hours after the listed group members and contact at home are contacted first.

Since this winter, there is also a new avalanche prevention module. The web version can transmit video and photos via a click-through. Coming up: a "guardian angel" in the hike book, continuous sending of approximate location, export of hikes to the mapy.cz application. Hike planning will be whispered according to points of interest from *mapy.cz*. Since 2024 avalanche widget will be possible.

Mgr. Radim Šlachta, Ph.D.: Heart rate variability - good servant, bad plan

He introduced us to his project, which started as a start-up, and today the entire system has more than one million measurements. He has taken what were originally laboratory measurements to literally every athlete's bedside table. The system monitors Heart Rate Variability (HRV) to within 1 ms, based on thousandths of a second resolution, the distance of each heartbeat varies a little each time, which is partly due to the fact that it's feedback controlled by the autonomic nervous system. It is not a quantitative measurement, but a qualitative one: it is a unique biomarker, suitable for monitoring the state of the organism, an indicator of the "quality" of the measurement. "HRV reflects your physiological responses to all stressors, not just training stress" (Marco Altini).

For example, if a young athlete stares into the night at his phone, this also affects the autonomic nervous system. The stressors may be different, but the outcome may be similar. The mySASY system requires the use of a mobile app and any chest belt. Measurements are taken after waking up, which must be standardized, lying-standing-lying, for a total of about 5 minutes. Individual measurements are not evaluated, but rather their dynamics and evolution.

To simplify for the layman, the parasympathetic as a system for providing and storing energy, the sympathetic as a system for mobilizing and consuming energy. This is shown in the interactive graphic. They have determined the long-term adaptive capacity, which creates 4 groups of people: talent, keeper, classic, threat. The evidence can be used for example to create training profiles, which can have a greater impact on the work of coaches.

For example, the talent type has a disposition for training, and on the contrary, long rest has a rather negative effect for them. The system also has a dashboard, where e.g. the coach can compare the results of each person. The training profile can also change over time. They observed in athletes who spent some time at high altitude, either for training or racing reasons. There are groups of people for whom the influence of HA will affect the autonomic nervous system setup, while for some the difference is large.

JUDr. Jiří Žák: Telemedicine – present-day and importance for the activities of the expedition doctor

The theme of e-mountain was continued on the topic of telemedicine. Telemedicine is not only patient-physician communication, but also between, for example, consultations between two physician-colleagues (e.g. a consultation between an expedition doctor and a specialist doctor in another country), or the transmission of data for evaluation.

Legally, this is a question determined by the Health Service Act, or there may be a commercial contract under the Civil Code.

Is there a legal framework for telemedicine? Legal support can be found in the Health Services Act, and health services may include consultancy services to assess individual treatment, or to suggest changes or additions to it. The content of the consultation itself is not defined. There is a National Telemedicine Centre (NTMC) in Olomouc, which functions as an organisational and educational centre for telemedicine. The General Health Insurance Fund supports only specific pilot projects. A system for sharing medical data is being developed in Europe but is not yet established.

There is a Recommended Diagnostic and Therapeutic Procedure for General Practitioners 2020 - TELEMEDICINE (also here), which mainly highlights the pros and cons. The big risk is that in the event of any malpractice, the consequences may not be covered by the medical facility's insurance or even individual commercial liability insurance.

Another major challenge is the ability to ask good questions because of the lack of a physical examination. The use of AI is also an issue, but the doctor is always responsible.

It is not possible to underestimate the protection of personal data (GDPR), technical means – guaranteeing discretion is very difficult and these things need to be seen as appropriate to the circumstances. Dr. Žák speculated that even the heart rate variability analysis app MySASY could be used as a telemedicine tool to assess the ability to continue e.g. exercise/physical activity. There has been a big discussion about AI in particular.

MUDr. Jaroslava Říhová: Late effects of frostbite, prevention, treatment, lessons learned

One of the most frequently consulted problems within telemedicine is frostbite, on which Jaroslava Říhová is a Czech expert. She presented two case studies of frostbite in climbers who were not treated properly abroad. The most common late consequences of frostbite include vasospastic disorders, cold intolerance and frostbite arthritis. Cold intolerance tends to be the biggest problem, with some people having problems in temperatures as low as around 15°C, which is very limiting in everyday life.

Frostbite arthritis occurs with a lag of months to years. Treatment of late sequelae, where vasodilator therapy is pivotal, has a good experience with the drug Cilostazol which is only covered by the National Health Insurance for ischaemic lower limb disease (ICHDK). She pointed out the need for long treatment. The treatment of neuropathic pain is also very problematic (gabapentin, duloxetine, ointments with lidocaine and capsaicin), and she also noted the positive effect of the hyperbaric chamber. The dietary supplement Neuromedic is also a good preparation.

MUDr. Jana Kubalová: Accidental hypothermia up-to-date

The lecture started with interactive quiz questions on the topic of lowest temperatures, risk factors, etc. She reiterated the shift in hypothermia assessment (Revised Swiss Scale), problems with temperature measurement in the field. In terms of treatment, she stressed, for example, that active exercise is best for stage 1, which can raise body temperature by up to 1-5°C, but is inappropriate from stage 2 onwards as it interferes with cold vasoconstriction.

In hypothermia, we have 1 minute to establish circulatory arrest and other tools such as an automatic defibrillator AED or ultrasound must be used. She also repeated the principles of defibrillation, securing the airway, administering adrenaline and directing the patient to a medical facility.

RNDr. Jan Pala, Ph.D.: Electric bikes – a plague not only in the Czech mountains

Examples of formerly active athletes who now promote e-bikes, such as Arnold Schwarzenegger or Jaromir Jágr. It is understandable, for example, in the context of convalescence, at work, for the elderly and disabled, but it is strange to ride an e-bike on flat asphalt. The most bizarre are children's electric bikes. He added his opinion on why he thinks that even the elderly shouldn't switch from a normal bike to an e-bike – there's no need, it's just motorized touring. Even in studies where they targeted newly diagnosed diabetics to ride e-bikes, but unfortunately the mileage was minimal.

Sunday 5. 11. 2023

MUDr. Alexandr Kolský: Injuries on bicycles from the perspective of the mountain service

After a short personal remembrance of MUDr. Jiří Pelikán (1952-1988 Annapurna, for which our annual conference is named since 1990), he presented some basic data about the Mountain Service of the Czech Republic, including interesting statistics of interventions. In 2022, there were 1006 interventions on cyclists, 177 on scooters and 27 on electric bikes. In terms of areas in terms of cyclist injuries, the Jeseníky Mountains lead the way (376 interventions), where there are a number of single tracks or some cyclists ride directly down the slopes in the summer months. He also compared the number of injuries 20 years ago – in 2003, when the number of hits was significantly lower. Effect of terrain on injuries; difficulty of climbs and descents; terrain texture – fords, roots, gravel. Artificial obstacles such as barriers, potholes, wood dumps, crash barriers are also important.

Main causes of accidents: overestimation of own abilities, inappropriate equipment, inappropriate and insufficient clothing (especially in case of bad weather).

Finally, it is important not to overestimate your own strength, have a first aid kit with you, there is no shame in getting off the bike and pushing the bike for a while in a difficult place.

JUDr. Jiří Žák: Risk of sunburn in mountain environment

After last year's lecture on snow blindness, this year he focused on solar erythema, with both injuries occurring in the Wildspitze region of Austria. He sees the causes in the morning start in the dark, morning confusion, strenuous ascent, when no thought was given to the application of protective cream. Importantly, UV radiation increases with altitude, clouds don't filter UV completely, scattered light burns a lot, fresh snow is the worst. The recommendation is to always protect yourself from direct sunlight in the mountains, use protective creams, eliminate sunburn by good route planning, and of course protect your eyes, including goggles with side shields.

Martin Honzík, DiS: "I'll take it on the second" Accidents of second climbers, belayers and top rope – not only first climbers are falling

M. H. devoted himself to the "safer" discipline of climbing with as a second climber. The most common denominator of accidents is poor belaying with the absence of a partner-check.

Most of the time, the unfinished eight leads, sometimes lasting one or more sit-ups before it crashes. He recounted an earlier accident where a second-timer tied himself to the middle of the rope on a fox, the passing rope burned through the belay eye and the climber collapsed.

Another common mistake is a belay error, especially in the case of a sudden fall, they try to use their hands to avoid hitting the rock, let go of the rope, and then when they try to grab the rope again, their hands get burned when they grab the belay device.

The problem today is the increasingly thinner ropes, often 1-1/2-twin hybrids - it is important to know the minimum rope thickness for our equipment. Hands too high above the belay.

Accident 6/2023 from the Uran tower in Adršpach, an unsecured belayer was struck by a falling first ascender, and still collapsed from the fore slope, with severe injuries.

He warned of injuries from slipping when unfastening the express loop, or from the carabiner being stuck in the hand (e.g. here) or in the nose. Blackout – the second-ascender has unhooked all of the bolts, including the top...

Beware of rings – they can completely strip your finger, the sharp edges of artificial holds are particularly insidious.

Often the cause is distraction. The lanyard in the material loop, or the carabiner in the snapping has come out of the lanyard. Accidents where a belay breaker on a busy rock cancels another rope team's belay. An incredible number of accidents at winches where a climber forgets to click.

Jana Kubalová added several accidents from the artificial wall in Brno.

MUDr. Jana Kubalová: Resuscitation on the ferrata

There are several ferrates of different difficulty levels in Slany on Slánská hora, which are easily accessible from the town. Call for intervention: a woman resuscitated a man sitting on a ferrata at about 12 metres. He collapsed in front of her eyes, she tried to perform indirect chest massage on that man sitting in the seat harness on the ferrata, the intervening firefighter on the ladder only tilted his head, thus clearing the airway, and no circulatory arrest was noted. The question was raised as to whether such resuscitation would even be feasible. There is no data on this.

Therefore, a study was designed directly on the ferrata using SimMan 3G plus, 6 participants (5 male, 1 female, persons with resuscitation experience), controlled by software (SW). First, resuscitation was performed on the ground, then when he was hanging on the ferrata.

Pitfalls: inability to use own body weight used in cardiopulmonary resuscitation (CPR) on the ground, need for correct body positioning, rapid fatigue). Outcomes from SW - even the best participant failed to maintain the recommended depth of compressions, but had a higher rate, but tended to do so on the ground. Duration 2 minutes. Female average depth 34mm, pauses due to position.

Overall tendency to higher frequency on land and ferrata, depth only 10% of correct depth on average, correct hand position in 24%.

Conclusion: resuscitation on the ferrata is feasible, does not lead to worsening of the rate of compressions or deterioration of chest relaxation during the two-minute resuscitation...

Recommendations: try to get down on the floor, lean your back so that there is a hard mat, try to lift the legs a little so that there is a venous return, if more than one person is present, it is a good idea to take turns after a maximum of 1 minute, because after 1 minute the effectiveness of the massage decreases rapidly.

MUC. Kateřina Dostálová, MUC. Pavel Pískovský: The simulation center – part of the modern study of medicine

Fourth-year medical students reported how medics today are increasingly encountering simulation medicine. Simulation medicine has taken inspiration from other fields such as aviation and aerospace. From simple simulators to very sophisticated simulators with software. Start by preparing at home with e-learning, including tests and quizzes. The lessons are attended by tutors from among the senior students.

Many of the tasks are algorithmic, the goal is to experience the procedure, so the checklist is reviewed during practice. The follow-up debriefing is important, the possibility of repeating a given scenario. Team-based Learning first pre-class reading, then test verification and collaborative discussion with the facilitator.

Case study of a virtual patient - discussion both at the individual group level and between groups. The principle is a safe environment ("Mistakes are welcome in SIMU"), time is kept very well, there is an opportunity for everyone to try out the simulation and dialogue with each other is still possible. There are also courses for physicians and non-physicians. The idea is that students should be as well prepared as possible before coming to see a real patient. Medical psychology and psychosomatics with actors from the Brno theatre, practicing communication with different types of patients (anxious, aggressive), recording the lesson on video with a detailed debriefing with a psychologist.

MUDr. Jana Kubalová: Evidence-based preacclimatization

Upon reaching higher altitudes, the effect of hypobaric hypoxia (HH) sets in quickly. The body's response is within minutes to days: heart rate and minute ventilation adjust immediately. The unequivocal acclimatisation varies according to different studies. In short – time is needed, but the holiday has only a limited number of days.

The recommendation of 500 m/day with rest-days on days 3-4 is supported by a single randomized trial at Muztagh Ata. Hypobaric hypoxia has been shown to be significantly different, and worse (even worse symptoms), than normobaric hypoxia (NH), so there is no complete substitute for staying at altitude.

Pre-acclimatization strategy: the hypobaric chamber is the most reliable method, but it is usually not feasible for climbers.

Of the medications used, acetazolamide is retained H^+ in the body, which increases ventilation and does not mask the symptoms of acute mountain sickness (AMS). However, it is recommended not to use the medication.

Stage climb - acclimatize well to altitudes around 2500-2600 m – the body is then better prepared for climbing higher. Limit the pulmonary vascular response to hypoxia, ideally 6 days but even 2 days will help. Intermittent hypoxia – several hours per day of HH or NH, 1.5-4 h/d at >4000 m.

Conclusion: 1-5 weeks of daily exposure for 1-4 hours at 4000 m triggers ventilatory and autonomic nervous system adaptation to high altitude. For longer stays the effect of physical activity in hypoxia is better, nowadays it is possible to rent hypoxic tents in the Czech Republic. The paper sparked a great discussion, also regarding the possible effect of breathing exercises of the type of the method according to Wim Hof.

Michal Veselý: Pre-acclimatization, speed ascents and expeditions

"The money is there, but the time is not". In the Hypoxic Centre in Hradec Kralove there is hypoxic training room simulating about 2800 m, you can also rent a hypoxic tent. Hypobaric chamber is available e.g. in Slovakia. It is still an alternative to a trip to the Alps.

The author has no experience with medicaments, including Chinese medicine. After previous experience with covid there is poor adaptability to altitude, borderline saturations can be noted on the first nights >2000 m. He prefers preacclimatization in the mountains. Symptoms persist such as low saturation, feeling colder than in the past, poor mental status, fear, but on the positive side, low heart rate, appetite persists, no headaches.

In conclusion: the preparation consists in acclimatization even for lower hills (4000 m). Promoters of speed climbs - Kilian Jornet (Summits of My Life), Ueli Steck†. The need is perfect knowledge of the conditions (e.g. Jornet walked the route 20 times before speed climbing the Matterhorn), personal factors - experience, ability; nowadays better times due to extremely light equipment that allows fast ascents. Family trips are very empowering as the best mental and physical enhancement. Ultratrail, skyrun, ski mountaineering is also excellent. Vertical 1km record by Philip Götsch in 28:53, speed ascents of the north face also beat Ueli Steck. He presented some of his recent climbs, such as the world's highest volcano in Chilla Ojos del Salado 6893m.

Martin Honzík DiS: App Snow Safe

First, he presented several avalanche accidents where the dangerous avalanche situation was known in advance and all information was available in the avalanche forecast. The Snow Safe app integrates avalanche information and weather from a number of regions, not only Alpine countries, but also Norway, etc. It includes not only the weather history but also the forecast. It is also possible to add your own observations.

RNDr. Jan Pala, Ph.D.: Speed ascents, expeditions and movement

First, he introduced several historical milestones with interesting performances, including Kilian Jornet again. He also set up a website More Kilometers, More Fun (mtnath.com), where he has a Fastest Known Time - summaries of the most famous climbs. Lenka Poláčková Vacvalová who has been putting in a number of interesting performances. Kristin Harila Former cross-country runner, all 14 eight-thousanders with helicopter transfers, all with jumar, Sherpa support to fix ascent routes, 92 days in total, large team providing logistics.

RNDr. Jan Pala, Ph.D.: Selected avalanche accidents in the winter season 2022-2023

In Slovakia 21.9.2022 Bradavica (High Tatras): two groups, both standing on a snow slab that collapsed with them, 2 dead.

Second accident 10.12.2022 Priečné sedlo (a saddle in High Tatras): at the hut warned of unsuitable conditions, they had no avalanche equipment, 2 alpine hikers, on foot, inflated slab, avalanche passed through a stone field.

21.1.2023 Velký Kriváň (High Tatras): during the 2nd avalanche stage, 7 experienced ski mountaineers, long avalanche, 1 with avalanche pack 1 without, no serious injuries.

11 March 2023 Nižná Popradská štrbina ((High Tatras, Mengusovská dolina): 10 ski mountaineers and 2 hikers, most of them torn down by the chute, minor injuries. Also presented several accidents from USA, 2 dead covered by snow from roof.

7. 10 .2023 Shisha Pangma: two American women who missed this peak to complete the Crown of the Himalayas. Avalanche from an unstable blown slab just below the summit.

Lenka Horáková, MD (6 November 2023),
Edited by Ivan Rotman, MD (May 2024)