

The 2nd Jiri Pelikan Seminar "Contemporary Problems of Mountain Medicine - Diagnostic and Therapeutics Methods in the Mountain, Prague 31. 5. 1991

The Second Jiri Pelikan Memorial Mountain Medicine Seminar on "Contemporary Problems of Mountain Medicine - Diagnostic and Therapeutic Methods in the Mountains" was organized by the Section for Mountain Medicine of the Czech Society of Sports Medicine and the Medical Commission of the Czech Mountaineering Association in Prague on 31st May 1991. Twenty four lectures gave a complete review on news in all parts of mountain medicine and about 90 participants took place in this workshop. J. Rihova (Secretary of the Section) gave report on the activities of the Section since last workshop in 1990. A small workshop of the Medical Commission of the Czech Mountaineering Association took place in Mala Skala in September 1990 and some members of the Section took part in conferences, congresses and meetings on sport and mountain medicine in Amsterdam, Oberwalderhuetten, London, Munich and Salzburg in 1990 and in Crans-Montana 1991. There are many problems in the Section to be solved in new social and economical situation in Czechoslovakia. The Czech Section for Mountain Medicine has 130 members now however it seems the membership will decrease this year.

Jaromir Wolf, honorary member of the Section Committee, died on 29th April 1990 and L. Chladek (Vice-president of the Section) remembered his life, literary and scientific work as well as activity in international mountaineering organization. K. Danek (Nove Mesto na Morave, CSFR) dealt with the "Ascent Poetry" in the Scope of Sports Medicine starting with Eblaic magic forms and the Epic of Gilgamesh till present time. A very comprehensive synthesis of most such specific items of "ascent poetry" was presented by J. Wolf in 1988: "Mountains are naught and low and up to the heavens / do they grow only in the images of our minds - / by the pulse of our heart and the quick flow of our breath, / by our burnt skin and mountain sickness, / by our frozen fingers and in the dream of our pallid brain..// A man ascends their scenery / as if walking through exhibition halls of abstract spleens / and hard fuzzy sculptures, / to which only his feet / and his hands give a real meaning / and his dream imbues them with an objective sense."

L. Chladek characterized contemporary trends in mountaineering and mountain medicine in the world and in our countries. "We are physicians of the adventurers who will learn their limits and we are asked to teach them about symptoms at these limits and tell them where they cannot go further more." Mountaineering physicians have to deal with medical aspects of sojourn at middle and high mountains, as well as with problems of mountain rescue and nowadays with damage of musculoskeletal system due to overuse in sport climbers, too.

E. Jenny (President of the Austrian Alpine and High-Altitude Medical Society) discussed the relation between health state and mountain sports. There are many diseases which do not allow to take part in mountaineering activities but they have to be evaluated individually.

M. Burtscher (Medical Board of the Austrian Alpine Club) analyzed the frequency of cardiovascular fatalities during mountain hikes. In the years 1985 to 1990 a total of 1566 persons in Austria died while doing some kind of alpine sport. In 27% of the cases the cause was given as "sudden hearth death"; 60% of these were

mountain hikers. If cardiovascular fatalities are seen in terms of the number of persons doing alpine sports, the risk of a heart death while hiking is relatively small (1.2 fatalities per 100,000 persons per year). It seems that the risk is considerably greater for occasional hikers than for those who do this sport regularly. Preventive measures include regular endurance exercises, exertion tests particularly for men at age 35 and older, as well as sensible dosing of strain.

M. Philadelphy and M. Burtscher (Medical Board of the Austrian Alpine Club) gave an overview of alpine accidents in Austria in 1985-1990. More than 18,000 persons involved in accidents or emergencies and 1568 fatalities (hiking 41%, downhill skiing 19%, rock climbing 10%, ski touring 8%, crashes with flying devices (paragliders etc.) 5%, glacier tours and ice climbing each 2% and other activity 13%) were collected. Related to the total number of persons involved in alpine sports, the risk of a fatal rock climbing accident (8 fatalities per 100,000 persons) is greater than hiking (3.7). Main causes of fatalities are: stumbling and slipping, cardiovascular emergencies and avalanches.

E. Ehler (Medical Commission of the Czech Mountaineering Association) reported on progress in knowledge in physiology and pathology of man in high mountain environment. Contemporary investigations of the physiological reactions to the milieu of high mountains try to characterize responses to separate factors of this strain and to their combination. For the development of the acute mountain sickness there is a typical rise of plasmatic aldosterone, antidiuresis, water and sodium retention, increase in plasma volume and extracellular fluid. The increase of plasmatic aldosterone is not mediated via renin-angiotensin-system. The role of atrial natriuretic factor is still discussed. At present transportable pressure bag, dexamethasone and calcium channel blockers (nifedipin, nimodipin), together with acetazolamide in pulmonary forms of AMS take important role in the treatment. In contrast to AMS (which develops in the first days or weeks after arrival at high altitude) and chronic mountain sickness (which appears after many years of sojourn) the subacute form of mountain sickness affects up to 20% of persons after two months' stay around 5800 m. This form is characterized by heart failure caused by hypoxia, pulmonary hypertension and vasoconstriction, and polycythemia.

W. Schobersberger et al. (Clinic of Anaesthesiology and General Intensive Care of the University of Innsbruck) examined the influence of rapid (22 h) and slow (72 h) ascent of 17 mountaineers to 4559 m on hematological parameters and red cell oxygen transport. Rapid ascent to high altitude resulted in an increased in vivo hemoglobin-oxygen affinity due to respiratory alkalosis. After a slow ascent this initial leftward shift of the oxygen dissociation curve was largely compensated by the elevated concentration of 2,3-DPG which was the consequence of the stimulated erythropoiesis.

I. Herman (Department of Sports Medicine in Usti nad Orlici, CSFR) reported on 7 cases of AMS in 11 climbers ascending the summit of Kilimanjaro (5963 m). Members of the group accompanied by the physician were less affected because the symptoms of AMS were earlier recognized than in those who ascended without medical care and suffered from life-threatening forms of mountain sickness.

T. Skricka (Ist. Surgical Department, Masaryk University, Brno, Czechoslovakia) described his experience in 14 patients during 6 high mountains expeditions in period 1978-1988 (6 perianal thromboses, 5 hemorrhoids of the 1st or 2nd degree, 2 of the 3rd degree and 1 of the 4th degree). The most frequent causes of above mentioned lesions are microtraumas caused by insufficient hygiene, dehydration, increased physical effort, and altered digestion (diarrhoe or constipation). High blood pressure can also play role in extreme conditions. Therefore principles of the prevention are quite clear. Own original observation has shown following results: sitting on the seat of WC, the intraampular pressure was about 1 kPa. During the squat position this pressure rose several times higher (up to 5 kPa). This can, together with other influences, give rise to hemorrhoidal disease or perianal thrombosis. Therefore it is recommended, to make always latrines (if possible) and not to squat.

M. Smid (Institute of Pharmacology, Faculty of Medicine, Charles University in Prague) dealt with pharmacological considerations about the usage of drugs at high altitudes. Considering the dehydration, hemoconcentration and decreased liver metabolism under hypoxic conditions, it is possible to predict in most drugs the increases in biological half-times and plasma concentrations. Consequently there is a greater probability of side effects. The general principles for using of drugs at high altitude are as follows: to use the drugs with high therapeutic indexes, to give preference to drugs with shorter half-times and drugs with limited liver metabolism, not to use drugs that become dangerously concentrated in urine and nephrotoxic ones, to pay attention to interactions, and to have some antidotes prepared. As examples of unsuitable and problematic drugs can be mentioned: phenacetin, barbiturates, digitalis glycosides, aminoglycoside antibiotics, antacides and benzodiazepines, sulfonamides, opioids, tetracycline antibiotics respectively. It is recommended that greater interest is shown in the results of pharmacotherapy in the mountains, because the reports about interactions of drugs with a mountain environment and information about their effectiveness and safety are limited. K. Gursky (Faculty of Pedagogics, P.J. Safarik University, CSFR) dealt also with problems and limits of the treatment of acclimatization disorders at high altitudes.

T.A. Volkova and N.V. Chomyak (Dnepropetrovsk Medical Institute, USSR) studied antihypoxic mechanisms of phytotherapeutic drugs used in the mountains to prevent AMS. Extractum Rhadiolae fluidum, Extr. Eleutherococci fluidum, and Extr. Leusea are known to cause excitation effect on the central nervous system (CNS). Nevertheless even in overdose under condition of highland they have no pathogenic effect specific to overdose (extreme stimulation of the heart and vascular system, CNS etc.). On the contrary, acceleration of adaptation to high-altitude conditions and increased ability to perform physical load under high-mountain hypoxia were observed. Antihypoxic mechanism of these drugs was investigated experimentally modelling the hypoxic condition in rats placed into altitude chamber. The results of the investigation show important antioxidative protective effects of these drugs under the hypoxia in highland.

L. Holub (Department of Psychiatrics in Trutnov) and E. Markova (Astronomical Observatory Upice) observed influence of

bioclimatic factors on the health state changes in patients with psychiatric diseases. Extreme high-altitude conditions affects also brain functions and these disorders can explain many mountaineering emergencies and accidents.

J. Spunda (Clinic of Anaesthesiology and Reanimation, Charles University in Prague) described the pathophysiology of emergency states. The concept of modern emergency care has changed the traditional medical methods. The first step of acute symptomatic therapy involves substitution or support of failing functions according to pathogenetic factors regardless of the etiology of the lesion, it means according to preliminary diagnosis. After the stabilization of vital functions of the injured person follows the professionally secured transport to the place where definitive management can be administered.

Professor G. Flora (Vice-president of the Austrian Alpine and High-Altitude Medical Society, Tyrolean Air Ambulance Innsbruck) delivered an excellent lecture on the development of air mountain rescue in Austria and I. Miko (Mountain Rescue Service of High Tatras) reported on mountain air rescue in the most important mountains Czechoslovakia. Some of High Tatras' peaks reach a height of more than 2600 m. About 5 millions people visit this small territory every year. The number of rescue actions per year has stabilised at 350-400 actions per year, with mortality above 20 persons yearly. Not long ago Mountain Air Rescue Service in High Tatras obtained an Aerospatiale Alouette III helicopter which has changed the situation in rescue service essentially.

J. Semotanová et al. (Prague) directed attention to psychological and sociological aspects in relation between mountaineers and members of mountain rescue service as well as within both groups.

V. Svancara (Rescue Service in Hamr na Jezerce, CSFR) demonstrated modern methods of the first aid and medical treatment in cases of thorax injuries.

Last part of the conference discussed medical aspects of new mountaineering sports. M. Stanek (Veseli nad Moravou, CSFR) reported on biomechanical aspects of upper extremity injuries, T. Hochholzer et al. (Clinic of Sports Traumatology in Munich) analyzed injuries of sport climbers by means of magnetic nuclear resonance method and I. Rotman et al. (Medical Commission of the Czech Mountaineering Association) informed about results of the 3 years study in sport climbers in Czechoslovakia.

H. Gaulrapp et al. (Clinic of Sports Traumatology in Munich) analyzed 59 injuries in 107 competitive mountain-bikers. 31 injuries affected the upper, 19 the lower extremities. 4 cases referred to the head, 2 to the cervical spine. Most frequent were fractures (21/59) and severe contusions (16/59). The region mainly injured was the shoulder showing 5 clavicular fractures, 4 scapular fractures and 4 luxations of the shoulder, followed by injuries of the hand (3 fractures of fingers and metacarpalia each). Of the lower extremities especially the lower leg was endangered. The results cannot be transferred to mountain biking as a public sport.