The Newsletter of the International Society for Mountain Medicine

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International Society for Mountain Medicine

The International Society for Mountain Medicine, founded in 1985, has the following goals: to bring together physicians, scientists and allied professionals interested in mountain medicine; to encourage research on all aspects of mountains, mountain peoples and mountaineers; to organize and co-organize international scientific meetings and publish a newsletter to spread scientific and practical information about mountain medicine around the world.

FROM THE EDITOR

In this edition of ISMM News, we shall consider some issues that are particularly relevant to those of us who offer a service to other climbers as guides, educators and rescuers. David Hillebrandt asks if we are teaching the right things to our mountain guides in the first article and Urs Wiget and colleagues question the cost-effectiveness of helicopter rescue. Contrast the findings of this European group with the disturbing discussion by Rachel Bishop and Jim Litch suggesting that helicopter rescue in the Nepal Himalaya is driven by the financial concerns of the guides, trek companies or helicopter operators.

I hope that this edition, contains something of interest for you and that you might consider making a comment in the correspondence section of the Newsletter in future. Keep sending your articles for consideration.

AJP

FROM THE PRESIDENT

Last year Bruno Durrer, treasurer and membership secretary of ISMM, received the Wilderness Medical Society World Congress International Award. In the laudatory it says "...he has personally been involved in more than 2000 helicopter rescues and is a leading authority on the rescue and resuscitation of avalanche victims. He is given the award not only for his own remarkable achievements but also as a representative of the many expert professional rescue workers in Europe who have transformed the rescue of accident victims of all types". I am sure I am speaking in the name of all of you when I say that I am very happy about this honour for the work of Bruno and his European colleagues in rescue medicine. I would like to extend my recognition and thanks for all the efforts Bruno has put into the administration of ISMM since the very beginning of our organization. On this occasion I would like to recall that ISMM was founded by the pioneers of modern mountain rescue who were honoured by the Wilderness Medical Society.

In the last newsletter a new journal in the field of high altitude medicine was announced. The first issue of "High Altitude Medicine and Biology" edited by John West should be out by the time you read these lines. More good news about this event can be reported: the publisher of the journal offers a 20% discount for subscription to the members of ISMM. I wish this journal a good start and I hope that many of us will help, as subscribers and authors, to make it a strong journal and a valuable source of information, complementary to our newsletter.

Finally I would like to remind you of the highlight of the ISMM year: the IV World Congress on Mountain Medicine and High Altitude Physiology. You should have received the final announcement by mail. You can also get this announcement from the web at the following address: http://mountain.med.uchile.ch, where you have the option to register and submit abstracts online. The organizing committee, chaired by Claus Behn, has put together an interesting and broad programme covering most of the important topics of acute, subacute, and chronic exposure to high altitude. The programme also includes a day in mountain medicine and offers possibilities to visit places like Chajnantor (radiotelescope site at 5000m) or Collahuasi (ancient mining site at 4000m). These places are hard to get to by individual travel. To make it a great success, the Congress needs your participation and your contributions.

Peter BÄRTSCH

EDUCATION OF LAY MOUNTAINEERS. ARE WE TEACHING THE RIGHT THINGS ?

In any remote area distance from experienced medical help is the norm and even the most experienced wilderness physician would be limited in his ability to help by climate, altitude and lack of facilities. There are many courses now available for the lay mountaineer in all aspects of Mountain Medicine and numerous texts of varying quality offering advice. Most of these have been written, edited or devised by doctors and are based on their own personal experience of medicine in the field.

Over the last twenty years the remote mountain areas of the world have become increasingly available to more and more mountaineers and trekkers, either travelling under their own steam or on commercial trips with the associated commercial pressures and duty of care. Are

we offering these people appropriate advice on preventative travel medicine and on self-care when away from normal first world facilities? Traditionally guides and other mountaineers have been given quite good first aid trauma training, but most medical problems abroad are due to gastrointestinal ailments and a lot of the trauma requiring medical repatriation is caused by cars.

A literature review, primarily using medline from 1992 to 1998, revealed 35 references with key words such as Mountain, First Aid, Altitude, Remote Area, Pulmonary and Cerebral Oedema. Of these 16 were read in full after assessment of their abstracts.. It is difficult to obtain data on medical problems affecting mountaineers on a global basis. I feel that his data is essential for planning any remote area medical course or instructional manual.

Data from rescue teams is biased by the fact that a decision has been made to involve outside assistance, which may be due to the severity of the problem, but equally may reflect the inexperience of the party involved. A survey of accidents in the Sierra Nevada in the U.S.A. attempted to overcome this by also looking at receiving hospitals and coroner records, but could not include many minor but potentially annoying problems (1). A retrospective postal survey of trekkers on the Appalachian Trail in the U.S.A. gives valuable data on minor medical problems in low altitude long distance walkers (2) and this produced suggestions for first aid kit contents (3). The most comprehensive data on wilderness illness and injuries covering the American continent, with over 358,210 person days of wilderness activity up to 6959m, has been produced from records of the National Outdoor Leadership School in the U.S.A. (4), but this only represents students on highly controlled training courses.

Data is available from rescue teams (5,6,7,8) but truly remote or high altitude areas frequently have no rescue facilities (9). The fact that mountaineering and trekking teams in the Himalayas originate from so many different countries makes data collection difficult (10, 11).

In 1998 I conducted a postal survey of all members of the British Association of Mountain Guides (BAMG) which is affiliated to the Union Internationale des Associations des Guides de Montagne (UIAGM) (12). I received 65 replies which represented 40% of the membership. This covered guides who were active on all continents of the world up to a maximum altitude of 8848m. Many put in excess of 100 active mountain days per year and special interests covered all aspects of mountaineering from short technical rock routes to high altitude expedition work and included ski mountaineering. When asked to list the five last medical problems encountered, limb injuries were top of the list with 57 cases, closely followed by 45 cases of altitude illness (20 of AMS, 16 of HAPE and 9 of HACE), then 23 cases of diarrhoea and vomiting, 21 blisters, 20 cuts and bruises, 19 knee injuries and 15 cases of frostbite and 15 head injuries. I suspect that this is fairly representative of any sample of internationally active mountaineers.

When asked what five aspects of Mountain Medicine this group of highly experienced mountaineers wished they had more information available, drug use was top of the list with 37 requests, altitude illness had 36 replies, water purification had 16, travel immunisation 15, and trauma only 13. For these guides this seems to indicate a fair degree of confidence when dealing with limb trauma, but less confidence when dealing with the medical side of remote area and high altitude problems. A breakdown of the figures for requested drug information showed that “general information” rated 19, analgesic use had 11 requests and antibiotic use 7 with drugs for altitude problems rating 6 requests.

It is good to see that the message that drug use is not the ultimate key to altitude problems seem to be understood, but it would worry me if I was injured that adequate analgesia may not be available. Is it in the remit of the ISMM to address some of these issues? We must continue to educate all mountaineers regarding altitude illness but should we also disseminate more information about general travel medicine to prevent problems when on expeditions or treks? Would we dare to tackle the complex international regulations governing therapeutic drug use and the potential medico-legal minefield of use of prescription only medicines such as dexamethasone, nifedipine or nalbuphine in remote foreign mountain ranges by unqualified first aiders? It already happens, it can be lifesaving, it is essential, we often condone it but have we got the guts to acknowledge it openly? Training and protocols must be the key to providing these tools to the people who need them. It is interesting that when one questions medico-legal experts on this subject they all pontificate until one asks if they would want these drugs to be administered to them if they were ill or injured on a remote mountainside. They universally want them to be available but are unwilling to stand up and be named (13).

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IS PROFITEERING DRIVING EMERGENCY HELICOPTER EVACUATIONS OF TREKKERS IN THE NEPAL HIMALAYA?

Each year many thousands of trekkers come to the Nepal Himalaya. In the Mt. Everest region alone, some 25,000 trekkers visited in 1999. [1] Inevitably a number of these trekkers become sick, often with altitude illness. When this occurs in the Mt. Everest region there are two established medical facilities with Western doctors, Kunde Hospital which provides year around medical care, and the Pheriche trekker aid post that operates for up to 8 weeks each spring and autumn. A small number of these patients require evacuation to Kathmandu for medical reasons, some urgently via helicopter.

In the autumn of 1999 we were aware of a marked decrease in the number of patients requiring evacuation from Kunde Hospital, and an increase in the frequency of helicopters flying up and down the valley not having been called by either of the medical facilities. Prior to this season there were few communication facilities in the high valleys. One explanation for the increase in helicopters, at least in part, may be the introduction of microwave, radio and satellite telephones at lodges up to 5200 meters. However with further investigation in Kathmandu, we found a marked increase in trekker helicopter evacuations throughout the mountainous areas of Nepal.

In searching for a possible explanation we discovered that helicopter companies have recently begun to offer a US$400 commission to Nepali trek leaders and agencies for calling their airline for a trekker evacuation flight from the Mt. Everest region. This is a massive incentive to local trek staff in a country with a reported gross national product per capita in 1999 of US$220. [2]

This profiting has evolved from the routine system of granting commission in the travel industry. Agents historically have operated on commission for the booking of air transportation and mountain scenic flights, among many other tourist services. In Nepal, mountain rescue operations involving emergency helicopter evacuations are for-profit private holdings rather than government services provided for the public welfare. Even the Nepal armed forces have privatized their fleet of helicopters as a for-hire emergency charter service to civilians for profit generation.

When these Nepal trekking agents have situations develop involving their clients that require emergency helicopter evacuation should the same commission apply? Certainly if one considers strict business practices this policy would seem to be consistent. However with further thought, this appears to result in several problems that put the patient at potential risk:

1. There have been incidents of tourists becoming sick whilst trekking and they are not brought to suitable nearby medical facilities, but rather an evacuation helicopter is called. This is particularly concerning in the case of altitude illness where the patient is encouraged not to descend but wait on-site for a helicopter that potentially may not come for days.
2. We are aware of several cases of trekkers being persuaded by their staff to ascend faster than routinely recommended in anticipation of altitude illness developing which the staff can then argue requires helicopter evacuation.
3. Helicopters are being called for vague complaints such as if a trekker feels "too tired" or "too cold" to continue, or is just no longer enjoying the trek and feels "ill". The average flight time for emergency helicopter evacuations in Nepal exceeds 2 hours due to the long distances involved. Flying aircraft in these remote high mountains carries a significant risk for pilot and passenger.

These practices can result in significant increased charges to international insurance companies that provide evacuation coverage. A single helicopter evacuation flight from the Mt. Everest region to Kathmandu ranges from US$2500 to 6400, depending on the size of aircraft and the specific location of the patient. More distant regions of Nepal are of course even more expensive, by up to 3 times.

We anticipate the continued rise in unnecessary helicopter evacuation flights in the Nepal Himalaya. This needs addressing before the resulting problems escalate. The Mt. Everest region is no longer an isolated area. Use of privately chartered helicopters for sightseeing, heli-picnics and heli-trekking is now routine. However these flights differ from the evacuation flights in that they are planned, only fly in good weather, are taken in full knowledge of the risks of flying and are not inappropriately charged to medical insurance providers.

One way to mitigate these problems is through required pre-authorization of the flights by the insurance companies. At present few of these flights are preauthorised, although many policies dictate that this is necessary. As the telecommunications exist to call the helicopter, they also exist to call the insurance company for pre-authorization to fly. Most insurance companies offer a 24-hour help line, and in our experience contact is straightforward. Few insurance companies would refuse a reasonable request for helicopter evacuation, but the added effort involved might deter a trekking agency in pursuit of a commission.

The other points of control are the visitors themselves and the tour agencies. In visiting and operating in remote areas, the involved parties should recognize that in the event of non-critical illness or injury, a degree of self-sufficiency is required. This calls for groups to be pre-equipped with basic medical supplies and knowledge. Clients should be briefed prior to coming to a remote area that they may need to walk or be carried down to a medical center, road or airstrip should illness or injury occur.

Emergency helicopter evacuations can play an important life and limb saving role, particularly in this area of the Himalaya. They should be limited however to these cases and not abused.

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MODERN MOUNTAIN RESCUE MEDICINE: TOO EXPENSIVE ?

The costs of mountain medicine rescue in Western Europe have increased tremendously over the last decades. This increase is mainly due to a higher number of rescues with the consequent need for the availability of more emergency teams on one hand, and a more modern and sophisticated equipment and medical techniques, on the other.
Politicians, insurance companies and even health professionals have started to question the usefulness and the benefits of our actual rescue system. In response, we report a true rescue situation that may induce some reflections about the actual problem.

CASE REPORT

A group of friends, a fascinating fight of black cows on a summer camp at 2200 m of altitude, the exciting atmosphere under an apparently ever shining sun: this is the end of a beautiful summer day. At twilight the group of men decide to walk down to the valley. The mountain path winds down with sharp bends and steep slopes and finally ends in a forest. A 39-year-old man takes a shortcut without informing his friends. Suddenly, he falls and rolls down for more than 100 meters on an unstable scree-covered slope and rapidly looses conscience. After a while, he wakes up in total darkness without realizing what has happened. He is alone, lying on his back with head down. He realizes that he doesn't feel his legs anymore, and that he is unable to move them. He starts to shout desperately and after an endless time, which in reality must have been approximately an hour, his friends show up. They don't dare to touch him and immediately seek help. The family physician from the valley arrives first on the spot after wandering wearily in the steep slope of loose stones, in the black night, loaded with his emergency equipment. The helicopter brings another physician and a mountain guide with their equipment and puts them down on a safe, open spot close to the accident place. About two and a half hours after the accident occurred, the team is complete and the rescue begins.

At first, we find an agitated, disoriented man who answers clearly to our questions and breathes almost normally. His body is aching all over. He is able to move all four extremities, but the right arm has an open, bleeding fracture with a dislocated elbow. The left shin shows a large wound so that the naked bone is visible over more than 10 cm. Cardiopulmonary auscultation does not show anything alarming, but the vertebral column is diffusely painful on palpation. After stabilization of the neck, an antecubital intravenous line

is inserted and bandages are put around the injured parts of the extremities. There are no signs of shock.

The patient's friends mention that there might be a forest road some hundred meters further down. Before we arrived, they apparently had thought about carrying their friend down to this road. Considering the major instability of the slope which was densely covered with stems, and visibility is poor. We ask the pilot to hoist us out despite the hazy night and the forest environment. After his agreement, we then proceed to align and immobilize the elbow after injection of midazolam and ketamine. The horizontal net is placed under the patient without moving him. The hoist operation with an extension cable (40 m of total length) has initially to be performed by an immobile stationary flight because the pilot has only one visible geographical reference point in his projector: the top of a large fir tree. Once in air, the physician and patient begin to spin very rapidly and the latter begins to vomit. It takes some minutes until the system becomes stable and the two people can be flown out without further difficulties.

In the hospital, a dislocated C5-C6 fracture, a dislocated open fracture of the right elbow, a large wound of the left lower leg and a concussion are diagnosed. At first, the cervical and elbow fractures are reduced and operated by the according specialists. The patient remains at the hospital for 14 days, followed by a 24 days in a rehabilitation center. The long term outcome revealed a discrete limitation of the right elbow and the left ankle and a little stiffness of the cervical spine without significant functional limitations.

The complete treatment, including hospitalization, rehabilitation, physiotherapy, follow up medical costs and rescue expenses accounted for a total sum of $23,332 with the rescue part costing $2137. The patient benefited from a 10% invalidity pension based on his functional limitations of the elbow and ankle. Extending the calculations according to the patient's social situation and for an average life expectation of 78 years, the total pension at the end of his life would reach approximately $171,430 (Table 1).

Based on the good final result of this rescue under difficult circumstances, even without an established proof of the benefit of our intervention, one might think about other possible scenarios of outcome: this 39-year-old father of three young children could have died or become quadriplegic based on his C5-C6 cervical spine fracture. It is not uncommon that such patients develop immediate quadriplegia under or shortly after such a fall and consequently die by respiratory failure mainly due to an unfortunate body position. Likewise, his friends could have aggravated the dislocation of the cervical spine fracture by transporting the man down in the difficult conditions of rocky unstable ground, at night and without adequate immobilization. Taking death into consideration, there would be a similar amount of the acute treatment and rescue costs, but a nearly 10 times larger life insurance pension for his family (Table 1). In case of quadriplegia, the acute treatment and rescue costs are about 30 times higher, and the invalidity pension, in this case 100%, would be about 10 times higher compared to the real case (Table 1). In summary, we have real case expenses of about $200,000, compared to $1.2 million in case of death and $1.9 million in case of quadriplegia, respectively.

DISCUSSION

Helicopter rescue as well as the modern treatment modalities of patients by emergency physicians have acquired the reputation of being very expensive. This example, however, shows that the management may also save a lot of money, not to mention the avoidance of a significant invalidity of a single human being. Nevertheless, our observation does not release us from trying to optimize and improve our sophisticated means of intervention.

TABLE 1: Costs of the the real case emergency rescue and consequent costs compared to possible outcomes of death or quadriplegia:

	Actual case	Death	Quadriplegia
Treatment/rescue expenses	23,332	21,430	715,000*
Invalidity/death pension**	171,430	1,143,000	1,860,000
Total	194,760	1,165,000	2,570,000

Values are presented in US dollars ($)

*Acute and long term treatment expenses such as day care, hospitalization, physiotherapy, physician fees have not fully been taken into account. The amounts are crude estimates for the whole life, including only the invalidity pension.
** Invalidity and death pensions are calculated based on Swiss insurance standards (SUVA, Schweizerische Unfall- und Versicherungsanstalt)

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AN INTEGRATIVE APPROACH FOR HIGH ALTITUDE STUDIES.

In general, the effects of hypoxia or high altitude are divided into different categories which correspond more or less to different entities with a specific symptomatology. Among these entities it is worth mentioning, acute mountain sickness (AMS), high altitude pulmonary edema (HAPE), high altitude cerebral edema (HACE), and chronic mountain sickness or Monge's Disease (CMS). Thus, the effects of hypoxia are classified according to respiratory, hematological, cardiovascular and/or brain effects. The cause is one and common, the decrease in the ambient oxygen pressure (PO_2), but the tendency is to order its effect as if there were many different and independent causes.

Usually, we try to apply rigorous rules to the classification of high altitude diseases, but when we become aware of features, which prevent the definition of the exact clinical limits of these conditions, we have particular problems. For example, a decreased ventilatory response and relative hypoventilation are common findings in AMS and CMS; pulmonary hypertension is present in HAPE and CMS, and disorders in vascular permeability are present in AMS, HAPE and HACE (1). Moreover, these characteristics may have been acquired in the prenatal period due to an exposure to excessive hypoxia (2,3).

Another important issue that should be taken into account in the understanding of the process of adaptation to hypoxia is the concept of "normality" and "abnormality". At high altitude, where the organism is compelled to respond to the decreased PO_2, any minor physiological impairment or abnormality (excess or defect) of a certain function will produce an inadequate physiological response. For example, it is worthwhile mentioning hypoventilation and excessive erythrocytosis in CMS, and pulmonary hypertension, decreased oxygen saturation and vascular disorders in acute and chronic high altitude diseases (1,4). Are CMS patients, persons basically intolerant of high altitude in whom its intolerance only becomes apparent with age, or after an associated impairment?

THINKING IN TERMS OF COMPARATIVE PHYSIOLOGY

Comparative physiology of adaptation to high altitude has shown that high altitude diseases affect humans and domestic animals, but not genetically adapted animals (5). It seems that the absence of high altitude diseases in genetically adapted native animals is related to several adaptations which allow adapted animals to regulate their responses to high altitude more efficiently at lower values of PO_2 than sea level animals. For example, in regard to ventilatory function, acclimatised humans and domestics animals hyperventilate around

an arterial PO_2 of 60 torr, adapted high altitude animals start to hyperventilate only around an arterial PO_2 of 30 torr. Additionally, acclimatised humans and domestics animals, show attenuation of respiratory sensitivity to acute hypoxia when compared with sea level controls.

In contrast, this has not been found in genetically adapted high altitude native animals. Peripheral chemoreceptors, which mediate the hypoxic ventilatory response, have been found enlarged in acclimatised humans and domestics animals, however, no enlargement has been found in llamas or alpacas suggesting an association between anatomical and functional findings. Domestic mammals introduced in the mountains after the Spanish Conquest all show variable degrees of erythrocytosis when exposed to hypoxia. In contrast, animals genetically adapted to high altitude exhibit a modest increase or no increase in hematocrit at the same level of hypoxia. The absence of erythrocytic response avoids the concomitant burden on the circulatory system. At the same level of PO_2, native high-altitude mammals do not respond (as a sea level animal normally would) with pulmonary vasoconstriction. This fact avoids a sustained elevated pulmonary arterial pressure and the consequent right ventricular hypertrophy that is present in humans and in the domestics mammals and birds introduced into the mountains (6,7). The hypoxic pulmonary vasoconstrictor response to hypoxia, which might be beneficial in the first phase of exposure, becomes deleterious when excessive and constitutes a charge to the myocardium for life at high altitude. Additionally, genotypically adapted high-altitude animals have a higher hemoglobin-oxygen affinity than acclimatised humans and domestics animals. This characteristic, which does not favour the release of oxygen to the tissues at sea level, facilitates the oxygen supply, at the tissue level, in conditions of severe hypoxia.

In summary, the absence of high altitude diseases in the genotypically adapted animals suggests that, in order to be considered adapted, a different physiological design may be needed besides a distinctive capacity to regulate the response to hypoxia (4,8). Conversely, the diseases of acclimatisation show the incapacity of men and domestic animals to obtain complete adaptation to hypoxia. The lack of an accurate regulation of their responses to acute and chronic hypoxia are an indication of the limited use of their phenotypic capacity beyond the limits of tolerance to life at high altitude.

The great challenge is to determine, at the organ and/or at the cellular level, by what anatomical and physiological advantages some animals are adapted to high altitude while others are not (including man). The actual tendency to try to explain the process of adaptation to hypoxia from the field of molecular biology should not make us forget that the control of the process is at least as important (if not more) as the identification of the organic molecules which participate in the process of adaptation. If the logic of successful adaptation to high altitude is to be made clear, an integral approach is required. This approach should include the conventional disciplines, but also ought to incorporate fields such as epidemiology and population genetics, as well as the fortuitous neonatal history of the organism.

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TAKE NOTE OF ALTITUDE GASTROINTESTINAL BLEEDING

In the October 1999 issue of the ISMM Newsletter, the case discussion is of importance in the understanding of gastrointestinal haemorrhage occurring at high altitude. It leads to some intriguing speculation about the effects of high altitude on the gastrointestinal mucosa, and particularly the cause of gastrointestinal bleeding (GIB).

The epidemiological and clinical studies suggest that GIB is not uncommon at high altitude. In Tibet, Lian TY and Hun XM (1) reported that from 1978 to 1984, a total of 4,520 labourers and 830 staff ascended to and worked at altitudes between 4767m and 5232m constructing and repairing the Qinghai-Tibetan Highway between May and October each year. The incidence of GIB in labourers and staff was 0.95% (43 cases) and 1.93% (16 cases), respectively. Among them, the onset of GIB in two cases were five and eight days after arrival at altitude, the rest were 10-70 days. In the Mt. Karakoram area, Liu MF (2) reported about patients at a Chinese Army Hospital located at the foot of Mt. Karakoram (3550m). The hospital took in sick soldiers who were from the lowlands and stationed between 3700m and 5380m for one year. GIB accounted for 0.8% of the total patients and 1.5% of AMS cases hospitalized during the same period.

As most mountain physicians know, although cardiac, respiratory and neurologic symptoms are more common among mountaineers, epigastric pain, dyspepsia, haematemesis, piles and peptic ulcer are also frequent features in them (3). Hu HC and Wu TY (4) pointed out that GIB may be manifested by, haematemesis, by melaena or by hematochezia. Bleeding, however, may be only occult, with normal-appearing stools which on chemical determination are shown to cotain blood. The occult blood in stool was examined by Naito H et al (5) during their Iwate Karakoram expedition. In 10 mountaineers, they used "OC-Hemodia Kit" which can detect only human hemoglobin without cross-reaction to any other animal's Hb. The results showed a positive reaction in two subjects associated with apparent gastric symptoms, the other five members responded with slightly positive results. These data suggested that silent GIB may occur at moderate altitude (3800m). Nevertheless, Saito A (6) reported five climbers who suffered from upper alimentary bleeding which occurred at extreme altitudes between 5154m and 8200m on Mt. Everest, all of them presented with tarry stool and acute anemia.

GIB give rise to many of the symptoms and signs which depend upon the rate and extent of bleeding. In general, an acute moderate bleeding (blood loss of greater than 500 to 1,000ml) results in drowsiness, dizziness, oliguria, sweating and pallor. Blood pressure changes occur first in the form of orthostatic hypotension. Pulse rate seems to be a far less accurate parameter, particularly at high altitude, as tachycardia is common amongst such mountaineers. The findings of a decreased BP, increased HR associated with epigastric pain, pallor, acute anemia and a positive reaction of the test for blood in stool support the diagnosis of GIB.

Recently, scientists performed a series of important studies using endoscopic examination among altitude residents and mountaineers. Sugie et al (7) reported the results of endoscopic examination at the Mt. Xixabangma BC (8020m). 22 mountaineers served as subjects (20 males and 2 females, mean age 32.2 yrs). Gastro-duodenal mucosal lesions were presented in 13 of the 22 subjects (59%). Among them, 3 had acute gastric mucosal lesion (AGML) (2 linear gastric ulcer and one bleeding gastritis), 2 duodenal ulcer and one gastric ulcer. Zhao GB and Li R (8) also performed an endoscopic examination with a mucosal biopsy among 51 young healthy male subjects (mean age 27 yrs). The subjects were Han Chinese lowlanders who had migrated to the Lhasa area at at 3658m to 4200m (Tibet) within the previous one week to one month. They found the incidence of gastro-duodenal mucosal lesions to be 60.8%. 27 had acute superficial gastritis, 3 had AGML and one had duodenal ulcer. Diffuse bleeding and erosion, and ulcerous necrosis were observed in the stomachs with AGML.
Endoscopic examination suggests that GIB at altitude is caused by gastro-duodenal ulcers and also bleeding gastritis and diffuse erosion of the gastric mucosa.

Surprisingly, one male mountaineer on a Mt. Everest Expedition developed a massive GIB and serious anemia at an altitude of 7028m, because his Hct decreased to 21%. He was sent back to Japan immediately, the endoscopy examination performed just after his arrival at sea level, showed no abnormality (6). Also, Zhou XD (9) reported the case of a health lowlander Han subject who developed a GIB during a sojourn at Lhasa (3658m). He died from a recurrent massive GIB, postmortem revealed only diffuse superficial erosion in the stomach with no evidence of peptic ulcers. Perhaps, it may be a specific form of AGML.

AGML is induced by some drugs. Relief of headache in AMS is, as David Syme suggested, a difficult matter because of the risk of analgesics like aspirin and other NSAID causing GIB. Dexamethasone has been used

for the prevention and treatment of AMS (10,11), but caution is needed if the person has previously suffered from ulcer as dexamethasone may increase the risk of GIB.

Historically it was believed that use of alcohol could relieve and protected against AMS (Marcet, 1886-1888). However, it is now recognized that alcohol may be a risk factor of GIB at altitude. Steele (12) described three Sherpas presenting with severe epigastric pain, nausea and vomiting after strong drinks on Mt. Everest. He considered that they were suffering from acute peptic ulceration and had to be brought down. One Sherpa had a brisk haematemesis of about 1 liter, after a heavy drinking bout. As mentioned. it is probable that a relatively higher incidence of GIB in the staff on Mt. Tanggula may related to their drink hard (l).

High-altitude GIB can be life threatening and acute massive bleeding with the secondary effects of shock-increasing anoxia, cellular dysfunction and acidosis at high mountains may lead to death. The mortality reported by Liang TY (1) was 6.8%, four individuals died. Among 59, two died on the high mountain because they were in remote area and unable to descend. Two died because evacuation to a lower altitude was delayed. Descent is curative. 31 cases were transported from the mountain to an altitude of 2800m, 24 cases were evacuated to 2260m, and hospitalized immediately for further evaluation and treatment, and their conditions gradually improved.

The mechanisms of altitude GIB remains obscure. Experimental studies suggested that AGML could be induced by cold stress (13) or hypoxic stress (14) in rats. However, on high mountains, the cold stress usually accompanies the effects of hypoxic stress in the same mountaineer. In this regard, hypoxemia is probably the main factor causing AGML in mountaineers who were otherwise healthy at sea level (7). Kamiyama et al (15) attributed a potential difference (PD) as a gastric mucosa defensive mechanism that may play an important role in the pathogenesis of hypoxia-induced AGML. The PD is closely related to transport of electrolytes by gastric mucosal cells which depend on aerobic metabolism. Hypoxemia might cause changes in tissue levels og oxygen resulting in decrease PD. Naito et al (16) noted that peroxidation of phosohatidylcholine in gastric mucosa is another possible mechanism for the development of AGML. Polycythemia is a common feature seen in mountaineers (8,9). AGML could be caused by microvascular thrombosis due to polycythemia (17).

The above factors could partly explain the higher incidence of gastric ulcers (18) and of bleeding from ulcers in high altitude residents who were chronically exposed to a hypoxic erivironment (19). Therefore, persons with known peptic ulceration should not go to altitude unless their symptoms have been well controlled with medication.

The emergency manoeuvre for an apparent altitude GIB is rapid descent, oxygen inhalation and saline-infusion or blood transfusion (if possible). Drugs, such as the H2 blockers (ranitidine etc) or proton pump inhibitors (e.g. omeperazole) has been shown to be effective in ameliorating GIB. Any mountaineer should know about symptomatic self care for GIB, that is, when the symptoms such as epigastric pain is present. An H2-receptor antagonist is effective for the ulcers and GIB and is the current recommended, therapy.

We also noted that approximately 64% of GIB occurred with AMS, and about 36% have altitude GIB along (4). Thus, whether altitude GIB is a form of mountain sickness or a complication of ascent to high altitude only? Further investigations are needed.

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AUSTRIAN & GERMAN COURSES FOR MOUNTAIN MEDICINE

This draft presents the system for the post-graduate education of a mountain physician according to the *„international label“* of MEDCOM UIAA, MEDCOM IKAR and ISMM. Herein are stated the aims and the programe for the education required for optimum mountain medical training in combination with decisive climbing training as it has been established and developed by the Austrian Society for Mountain and Altitude Medicine (ÖGAHM) since 1992. Since 1998 we perform our courses together with the German Society for Mountain and Expedition Medicine (BEXMED).

Since 1992 we have performed 23 one-week-courses with altogether 845 participants.

Profile of participants 1992 - 1998

Total:		
845 participants	(418 persons)	
Country of orign:		
Austria	213	(51 %)
Germany	185	(44 %)
Switzerland	10	
Italy	6	
Netherlands	4	
Status:		
Physicians	409	
Students	9	
Sex:		
Female	114	(27 %)
Male	304	(73 %)

Because of the great mobility of alpinists, the aim should be an *inter-nationally portable system* in education, standards and examination. It is desirable that participants be able to attain parts of the requisite education in different countries, but complete their final examination in a country and language of their own choice.

In our opinion, a *separate specification between mountain rescue doctors, expedition doctors or others* shoud be avoided - every „mountain and altitude physician" should be *equally trained in all aspects of mountain medicine.*

Structure & aims
Training and further education of medical doctors in all aspects of mountain medicine, both in theory and practice by means of three separate one-week courses:

Basic course
Advanced winter course
Advanced summer course

In each course the programe consists of the following related and linked-together elements:

Mountain medicine workshops
Mountain medicine practical exercises
Climbing education

with the aim of relating the interconnections between the practice of alpinisme and all the medical issues and problems that thereby en-sue.

The TEACHING PRINCIPLES: The three elements of each course are interlinked in every way possible. Lectures on theory are combined with practical field experience in the mountain environment.

Elements

- **MOUNTAIN MEDICINE WORKSHOPS**

Twenty hours per week (5 days á 4 hours). All topics are presented in five blocks. A one-hour lecture followed by four hours hands-on trai-ning sessions (training-college):

TOPICS:
Sports physiology and sports medicine in the mountains
Training, nutrition
Physical demands of mountaineering & climbing
Physiology and medicine of medium, high and extreme altitudes
Trekking-, expedition-, travel-medicine
Climbing with children and youths
Climbing for prevention & rehabilitation
Health risks and sicknesses in mountains areas
Suffication, survival
Risk management
Mountain traumatology
Emergency care in the mountains

Cold injuries and avalanche medicine
Mountain rescue techniques
Helicopter rescue techniques
Mountain medical kit
Prevention of mountain accidents

AIMS: Education and improvement of theoretical and practical know-ledge in all aspects of mountain and altitude medicine in two seperate steps: In the basic course one learns the underlying priciples; in the two advanced courses, these principles are enhanced on a higher level with the specific knowledge required for differing conditions of climate, weather and difficulties.

- **MOUNTAIN MEDICINE PRACTICAL EXERCISES**

Twenty hours per week, in the field and in small groups.

TOPICS:
Emergency care at the accident site
Fall in crevasses
Hanging on the rope
Mountain rescue techniques
Evacuation techniques (overland and by helicopter)
Avalanche rescue
Emergency bivouacs

AIMS: The practical aspects of mountain medicine are taught under the most realistic conditions and in appropriate terrain. In the advan-ced courses, the conditions become more arduous.

- **CLIMBING AND MOUNTAINEERING TRAINING**

The climbing program, led by special professional mountain guides, consists of theoretical and practical exercises to enhance the skill and abilities of the participants in mountaineering techniques. If possible, summits will be climbed during the week - but this is not the major task of the climbing training.

TOPICS:
Climbing equipment
Mountain metereology
Orienteering
Snow techniques and avalanche prediction
Geology & glaciology
Preparation and performance of mountain tours
Mountaineering hazards, avoidance and prevention of accidents
Natural and environmental considerations
Bivouac techniques

Examination & diploma

From 1998 on, we are performing the following procedure:
* After passing the three courses, a participant can pass an examination in all theoretical and practical aspects of mountain medicine;
* The examination will be conducted by a commission headed by the chairmen of both organising societies.
* After passing all portions of the full course and examination, an applicant receives the UIAA/IKAR-CISA/ISMM "International diploma of Mountain Medicine"

Up to 1999, ***71 diplomas*** have been issued.
43 of these mountain medicine doctors are establishes as ***"Mountain and Altitude Medicine Advisory Boards":*** Their adresses (1999: 25 in Germany, 18 in Austria) are published and can be contacted for special mountain-medical advice.

Mountain medicine courses 2000
Winter course: March 18 – 24 Alpinzentrum Rudolfshütte (hohe tauern)
Expedition medicine course: March 25 - 31 Alpinzentrum Rudolfshütte (hohe tauern)
Expedition medicine course: April 8 – 14 Berner Oberland
Basic course 1: June 3 – 9 Adamekhütte (Dachsteingebiet)
Basic course 2: June 17 – 23 Adamekhütte (Dachsteingebiet)
Summer course: July 8 – 14 Franz-Senn-Hütte (Stubaier Alpen)
Refresher course: September 7 – 10 Oberst Klinke Hütte (Gesäuse).

Austrian Society for Mountain and Altitude Medicine
Founded APRIL 15. 1989
MEMBERS 1150 FROM 13 COUNTRIES (1999)
Austria 66%
Germany 28%
Others 6%
Physicians 76%
Students 6%
Others 18%

GOALS AND DUTIES:

communication- & information platform
international links
promotion of scientific projects
connection between sciences & practice
measures for health and safety in the mountains
education & training in mountain medicine
congresses & mountain medicine events
publishing of: newsletters, annual almanacs, books, articles, folders, guidelines ...

DIVISIONS:

altitude physiology and medicine
trekking- and expedition medicine
mountain emergency medicine
ground rescue
helicopter rescue
mountain accidents
education
mountain sports medicine
sports climbing medicine
sports sciences
aeronautical medicine
neurology und psychology
history of mountain and altitude medicine

MAIN ACTIVITIES since November 1998
4 courses for Mountain Medicine (see above)
2 newsletters
Annual book 1999
Handbook for Trekking- and Expedition Medicine (4th edition 1999)

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APRIL CASE DISCUSSION

The subject of this case, passed away during the climb of Aconcagua. The death certificate granted by the local police does not account for the actual cause of the death. The subject was a fit 67 years old, male. He had previous experience of high altitude sojourns, such as Mt. Kilimanjaro (5,900m), Mt. Elbrus (5,642m), and Mt. McKinley (6,194m) without any severe altitude related problems. His health certificate at sea level examined just before his climb to Mt. Aconcagua reported that he had no health problems except in ECG, which showed sinus bradycardia (44/min), left ventricular hypertrophy and ST depression on II, aVf and V6 leads. Further examination such as loaded ECG test was recommended but he did not accept this suggestion because he had been examined by these tests one year before which revealed no abnormal findings.
On January 10th, 1999, following the two nights rest at base camp (4,250m) of Mt. Aconcagua and previous acclimatization climb, he climbed to the 2nd camp which was located at 5,800m. His SpO2 was 88% and HR was 55/min and he seemed to be in very good condition the next morning. The party then proceeded further up at 5:15 of the next morning (Jan 11th). He led the party at the top up to 6,600m, where he vomited. He claimed that the sports drink he took there made him feel sick. He began to get behind the party at around 6,800m, but, finally he managed to get to the summit of 6,962m at 16:30, 2 hours later than the first member's summit. At 17:05 I met the subject climbing down from the top. The subject told me that though a little bit tired he could return safely by himself by going slowly and steady. At 17:30, after reaching the summit, I caught up with the subject. He complained that he had bursting pain on his back bone. I tried to help and evacuate him with a local guide but he could not walk by 18:00, though his consciousness was so clear that he could talk. At 18:15, he became unconscious and while CPR was performed for 30 min he never recovered. I did not hear rales on his lung fields. Due to bad weather conditions, carrying down of his body was postponed until February 5th. The body, they said, had been buried in the snow. He was autopsied 25 days after of his death by the local police. According to the death certification issued by the local police, the cause for the death was "High Altitude Pulmonary Edema". The examiner who did autopsy reported to the family of the subject that the pulmonary edema induced myocardial infarction. He also mentioned that no evidences of dissection of an aortic aneurysm was found. I cannot believe that this autopsy report describes the actual cause of his death because he was so well that he climbed at the head of the party just below the top.

Case supplied by Kiyoshi FURUNO via Shigeru Masuyama, Department of Chest Medicine, Chiba University 1-8-1, Inohana Chuo-ku, Chiba 260-0856 Japan (e-mail:masuyama@med.m.chiba-u.ac.jp)

Gerald Dubowitz, US
This individual had ascended exceptionally fast. For a 67 year old performing so well, he was either an outstanding athlete or pushing himself too hard. The consequences would seem to imply the latter. Peer pressure and even individual over-drive is a recognised contributor to acute mountain sickness (AMS), high altitude cerebral edema (HACE) and high altitude cerebral edema (HAPE).
This speed of ascent would easily make him prone to HAPE and an exhausting climb may well induce an MI or cardiac ischaemia in any individual with pre existing coronary problems.
I am not at all surprised that the autopsy showed HAPE as this fits the events well. Whether this was the primary cause of death is almost impossible to ascertain. There is no doubt that HAPE would, and almost certainly did, contribute to his death. It is equally possible that the HAPE lead to myocardial infarction (MI) or an MI plus cardiac hypoxia lead to the HAPE. Either way I think the cause was rapid ascent and physical overexertion, but to be sure of what came first is pure conjecture.
Slow ascents do not definitely rule out problems occurring but they certainly improve your odds (and the reverse applies to rapid ascents).

Bernard Marsigny, France
In my opinion, with our experience of patients with such symptoms occuring during the ascent of Mont-Blanc or the descent of the Vallee Blanche, it was certainly a cardiac infarct.

Charlie Houston, US
The first reaction is a dissecting aneurysm with acute pulmonary edema. If the autopsy is correct, this would be ruled out. More probable is acute myocardial infarction with subsequent and/or terminal pulmonary edema. I do not believe this is HAPE

Zubieta Jr, Bolivia
Although the autopsy report is not specific, it sounds like multiple myocardial infarction, in a previously diseased heart and pushed to the limit. Furthermore, "silent myocardial infarction" at high altitude is well known. The pulmonary edema, is probably secondary to the myocardial infarction, no doubt aggravated by high altitude hypoxia.
The WILL to reach the summit is fundamental, but note that: W (work) + ILL is not equal to WILL, it is equal to IMPRUDENCE, which in this case has a fatal outcome. Whenever there is a medical suspicion that something is just not right (like bradycardia, left ventricular hypertrophy and S-Tdepression in this case), patients should be alerted and advised to postpone climbing until improvement.
Unfortunately, patient stubbornness and/or ignorance leads to life loss.

Jim Milledge, UK
This is a puzzling case. My first thought when I read about the "Bursting pain in the back" was of a dissection of the aorta but the post-mortem examination seems to rule this out. The cause of death was given, apparently, as HAPE which caused myocardial infarction. I have not heard of this as a complication of HAPE and Dr Masuyama's account does not fit with HAPE. His previous ECG suggests some myocardial ischaemia presumably due to coronary artery disease and if an MI was found at PM I would have thought this was the likely cause of his problem and death. The "bursting pain", though felt in the back, might have been due to angina from an extending infarct.

John Severinghaus, US
If the pathologists really did look for and not find a dissecting anneurysm, which would have been my first bet, I presume he had a posterior wall MI. It does not sound like HAPE.

Ken Zafren, US
This is a very unfortunate case of sudden death at high altitude. The clinical clues include an episode of vomiting at the summit of Aconcagua, which is consistent with a myocardial infarction, but hardly diagnostic and the patient's complaint of "bursting pain in his back bone." I would be quite suspicious of a dissecting aortic aneurysm in spite of the pathology report. It's also possible he had a myocardial infarction. Aortic aneurysm can cause a secondary myocardial infarction. The pulmonary edema may also have been a secondary finding. The absence of crackles on physical examination might indicate that the edema was mild.

Michael Yaron, US
Sudden death secondary to cardiac arrest must be considered as the most likely cause in this case. it is unclear where in his back he experienced this "bursting back pain" but dissecting thoracic aortic aneurysm was excluded on the autopsy.
Atypical chest pain from a myocardial infarction would be my guess as the cause of the pain. This was also likely to be the cause of his nausea. No mention of coronary artery occlusion was made in the autopsy. The lack of rales on exam, the clear sensorium, and the sudden rapid decline in his condition that resulted in his death are all unlikely to be caused by HAPE.

Peter Hackett, US
The clinical description and the observations by an apparently reliable observer make it abundantly clear that this man did not die of HAPE. There may have indeed been some degree of pulmonary edema on autopsy because of the postmortem CPR. For a clear-cut diagnosis of antemortem pulmonary edema sufficient to cause death, however, the lung weights would have to be at least twice normal, more likely in the range of 1000 grams. Lung weights probably were not mentioned. Autopsy reports from agencies such as that mentioned are highly suspect. To local authorities, such deaths are a nuisance requiring time and paperwork, and shortcuts are common. I recently assisted with an autopsy of a man brought back from Kilimanjaro. The autopsy report from the authorirties in Tanzania clearly described swelling of the brain. On our repeat autopsy, we discovered that the cranium had never been opened! The clinical story suggests a diagnosis such as ruptured aortic aneurysm as much more likely; I would ignore the autopsy report and try to do a repeat autopsy if possible.

Brownie Schoene, US
Hard to tell but have to rely on clinical history, ie spine pain, still curious about dissecting aortic aneurysm, can't rule out MI although in light of great previous health it is not likely. Pulmonary edema finding on xray would be hard to diagnose as HAPE in light of the fact that anyone who dies with cardio-vascular collapse will have fluid-filled lungs.

Simon Gibbs, UK
This subject had electrocardiographic evidence of left ventricular hypertrophy with some non-specific ST changes before the trip. He made a rapid ascent to

almost 7000 m, complained of interscapular pain and died. The post mortem report comments on pulmonary oedema and there is informal mention of myocardial infarction. Aortic dissection was apparently excluded at post mortem.
I think the most likely differential diagnosis is myocardial infarction with either acute heart failure and / or preceding high altitude pulmonary oedema; or left ventricular hypertrophy associated with an arrhythmia causing acute heart failure. Pulmonary embolism is a further possibility. HAPE itself would not cause myocardial infarction but could precipitate it in somebody with ischaemic heart disease.
I would like to know what the pre-departure ECG evidence for left ventricular hypertrophy actually was since the ST changes described are not consistent with left ventricular hypertrophy: were these in fact ischaemic changes masquerading as left ventricular hypertrophy? Had he ever had echocardiography to assess the hypertrophy? The cause of the left ventricular hypertrophy may be important: we are not told about hypertension in the past although this is the most likely cause, but hypertrophic cardiomyopathy or aortic stenosis are also possible. He is in an age group at risk from coronary disease and left ventricular hypertrophy if caused by hypertension would increase this risk. The timing of the event coincided with maximum sympathetic activation. In summary this sounds like cardiac death associated with underlying heart disease and precipitated by exertion without full acclimatisation and hypoxia.

Oswald Oelz, Switzerland
This subject on Aconcagua was a fit but 67 years old male. I am surprised about his heart rate at an altitude of 4250 m which was 55/min at a saturation of 88 %. Even considering his excellent physical condition this heart rate is too low suggesting some cardiac pathology. Subsequently after summiting the subject developed back pain and died. Considering the autopsy report I have no doubt that this young old man suffered a myocardial infarction which was complicated by left ventricular failure.

CORRESPONDENCE

Editor, I'm writing in response to the January case discussion about a young military recruit who had a fairly sudden decrease in consciousness requiring evacuation and intubation while at an altitude of 2300m. I concur with what seems the consensus of your panel in that this is unlikely to be HACE given the low altitude and rapid unconsciousness without mention of prodromal symptoms (Headache, confusion, lethargy, etc.). From the history, it sounds as if this gentleman had a fairly abrupt onset of unconsciousness/coma which resolved over 4 hours (he was extubated 3 1/2 hours after intubation) leaving him amnestic to the entire event. This sounds a lot like intoxication with gamma-hydroxybutyrate (GHB) or another rapidly acting sedative-hypnotic (i.e. flunitrazepam (Rohypnol)). GHB in sufficient doses (>50mg/kg, which can be just a few drops of liquid or powder) can cause a rapid onset of coma with apnoea and dilated pupils, and such an overdose can render the patient unconscious for several hours. Patients awaken with amnesia to the entire episode. Intentional and unintentional use of these so called "date rape" drugs is a widespread problem in the U.S., and GHB is currently outlawed and only manufactured illegally. Routine drug screens would unlikely detect GHB, and a special assay is usually necessary in suspect cases. Whether this soldier intentionally used GHB for its intoxicative effects, or was slipped something in his water bottle is difficult to know. However, given an essentially negative work-up (normal head CT/LP), and the rapid onset of coma at a low altitude, a drug ingestion, or perhaps an atypical seizure with post-ictal episode, seems likely.

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Editor, regarding the article "Cardiac arrhythmias at high altitude: effect of aging" by Dr. James Alexander (Vol 10, #1, Jan 2000). People going up to Kilamanjaro seem on a regular basis to be ascending too quickly and I presume this is what this doctor did although the rate of ascent is not clearly delineated. Proper acclimatization may have decreased the sympathetic stimulation of the heart and thus decreased the ventricular premature contractions (VPCs). However it's always a tricky deal attributing cardiac morbidity or mortality (as he has done in the discussion section) to VPCs without knowing about any prior history of heart disease or the presence of any functional impairment of the left ventricle in a particular individual (1) ie these could be of benign nature if the heart is healthy.
Finally when the author had the run of ventricular tachycardia (fig. 1) it would be important to know if there was any clinical symptomatlogy at the time. Because he has not mentioned it I would presume he did not have any. Furthermore I would wager that if many of the trekkers to the Himalayas went up to the mountains with Holter monitoring plenty of recordings may be scarier looking than what this good doctor had

to show, but again there probably would not be any simultaneous clinical correlation.

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FORTHCOMING MEETINGS

THE THIRD UKRAINIAN CONGRESS OF PATHOPHYSIOLOGISTS
Honoring Academician Nikolay Gorev (1900 - 1992)
Odessa, 24-27 May, 2000

The Congress is organized by:
Ministry of Public Health of the Ukraine, Ukrainian National Academy of Sciences, Ukrainian Pathophysiological Society, Odessa Medical University

ADDRESS of the Organizing Committee: Bogomoletz Institute of Physiology of the Ukrainian Academy of Sciences, Bogomoletz St.,4 Kiev 252024, UKRAINE
Phone : (380-44) 293-6151, 256-2492, 256-2489, 256-2479
Fax : (380-44) 293-1678, 293-3431
E-mail: sereb@mail.kar.net

The Congress is dedicated to the 100th anniversary of the birth of Ukrainian pioneering pathophysiologist, ***Nikolay Gorev***. It will be concerned primarily with the following topics:

1. Pathophysiology of the circulatory and respiratory systems.
2. Age-related pathophysiology
3. Pathophysiology of the immune system
4. Clinical pathophysiology
5. Pathophysiology of extreme conditions
6. Pathophysiology of the nervous and endocrine systems
7. Teaching of pathophysiology in universities.

The Congress presents the opportunity to visit Ukraine, to exchange ideas with scientists from many countries, and to learn of the past and current activities of Ukrainian scientists. The visits of scientific laboratories is planned.

OFFICIAL LANGUAGES: Russian, Ukrainian, English (simultaneous translation)

4th World Congress on Mountain Medicine and High Altitude Physiology, Arica, Chile 1st-6th October 2000

Details from:
Claus Behn, Physiology and Biophysics, ICBM, Faculty of Medicine, University of Chile, Independencia 1027, Santiago, Chile Phone: 56-2-678-6215; Fax 56-2-777-6916; email
cbehn@machi.med.uchile.cl

International Congress on Cold Injuries September 21-24, 2000

An International Congress on Cold Injuries will be hold at Bruneck (South Tyrol, Italy) with 35 speakers from North America and Europe. The meeting will be organized by the Austrian and Italian Societies of Mountain Medicine, together with UIAA-MEDCOM. President of ISMM will speak as well. English, German and Italian are the official languages. Info at www.bruneck2000.com

12th International Hypoxia Symposium, March 10-14, 2001.

Jasper Park Lodge, Jasper, Alberta, Canada. Contact info@hypoxia.net for more information, or visit www.hypoxia.net. Preliminary program will be available online in January 2000.

World Congress of Mountain Medicine. 16th-20th April 2002

Meeting to be held in Barcelona, Spain

ANNOUNCEMENTS

Hypoxia Symposia:

The complete proceedings of the ten Hypoxia Symposia (1981-1997) are available on one CD. Email: studd@fhs.mcmaster.ca
Sharron Studd, Division of Continuing education, McMaster University, 1200 Main St West, Hamilton, Ontario L8N 3Z5, Canada.

Bibliography of High Altitude Medicine and Physiology

The Bibliography of High Altitude Medicine and Physiology (BHAMP) is online at a new web site, with a faster search engine. The site is still sponsored by the National Radioastronomy Laboratory. You can find the BHAMP online at: http://annie.cv.nrao.edu/habibqbe.htm. As before, you can search to your heart's content, but you cannot download references. For full functionality you must purchase the BHAMP ($75 US + shipping and handling). It comes in formats compatible with all word processors, but for database functionality you must purchase separately one of the popular bibliography management packages (EndNote, Reference Manager, Procite can all import the BHAMP). BHAMP is provided on one CD in several formats. The CD version now includes bonus libraries with all citations from Index Medicus containing the keysords altitude, hypoxia and mountain. On special request, CDs can be provided for Macintosh computer systems. Orders to: BHAMP, PO Box 343, Montezuma, NM 87731 USA. Enquiries to rroach@hypoxia.net.

Mountain Medicine Website

Mountain Medicine Website: www.mountainmedicine.org
This site was installed 1999 by ICAR-MEDCOM. It is a meeting point for mountaineering physicians and rescuers and offers a wide range of mountain medicine information. The homepage is linked to the most important mountain medicine organisations of ICAR, UIAA

and ISMM and many others. So you can choose from a lot of different sources in this field. It will be our aim to collect all scientific and practical data about mountaineering medicine and its medical emergency aspects.
Furthermore you will find also on this site the homepage of ICAR-MEDCOM, the Commission for Mountain Emergency Medicine. Try it!

Hermann Brugger, Bruneck
brugger.med@pass.dnet.it

ISMM WEBSITE

The homepage is at
http://www.medicine.mc.duke.edu/ismm/

The site contains useful links to other relevant sites and is maintained at Duke University, North Carolina, USA

The ISMM website (www.medicine.mc.duke.edu/ismm/) now has a page dedicated to research and clinical opportunities in high altitude medicine. Please contact me if you have vacancies.

David Murdoch

MEMBERSHIP SUBSCRIPTIONS

Subscriptions are due on the 1st January each year. A single reminder will be sent to members who forget to pay on time and if fees are still not received by the membership secretary, membership of the society will cease. Where members have difficulty in paying their subscriptions, they may apply in writing to the President of the society for complimentary membership.

Please ensure that you complete the entire back page of the newsletter each January when you renew your subscription, so that we can be sure that we have your correct address. The coordination of newsletter production, is a complicated international process. Please let us know if you experience any problems.

INTERNATIONAL SOCIETY FOR MOUNTAIN MEDICINE
APPLICATION FOR MEMBERSHIP and MEMBERSHIP RENEWAL FORM

There are several ways by which you can pay your membership fees: **1.** By credit card: please use the form below or **2.** Send a ***Euro***check (in Swiss Francs) in favour of the ISMM directly to the Membership Secretary **3.** Give your bank the order to transfer the appropriate equivalent amount to our account: nr.CO-257.980.0, United Bank of Switzerland (UBS), CH-1211 Geneva 4, Switzerland. **4.** *Swiss* members can pay by postal check to PC 12-172-9 and mention the ISMM account number CO-257.980.0 at UBS. Renewal of membership is due on the 1st January each year. If fees are not received on time, membership will cease, after a single reminder.

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[ ]group member (170 US$ or 200 Swiss Fr)
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** complimentary membership is available for those who experience difficulty in paying their subscription

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Signature: _____ Place and date:_____

Send to: Dr.Bruno DURRER, Membership Secretary of the ISMM, Arztpraxis CH 3822 Lauterbrunnen, SWITZERLAND, Fax:++41 33 856 26 27, email: B.Durrer@popnet.ch