

Mental disturbances at high altitudes

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The conditions in which climbers live during high mountain expeditions cause a particular stress, acting above all on the central nervous system, so that it is by no means strange that attention has long been directed on the mental disturbances which appear at high altitudes. Climbers, describing their subjective experiences at high altitudes, have supplied some very useful observations, and are continuing to do so. Many descriptions of this nature may be found in the available mountaineering literature, both Polish and foreign.¹

A doctoral dissertation on illnesses caused by great heights by Michael Ward in 1968 is worthy of remark among the scientific treatments of this problem. Ward aptly remarks that up to the present time—in spite of the immense advance in medical knowledge—too little attention has been paid to mental disturbances in conditions of hypothermia, high altitude deterioration, hunger, fatigue and exhaustion. He cites the descriptions given by mountaineers who have experienced visual-aural hallucinations, or delusions of persecution, fallen into deep mental depression, and sometimes lost consciousness for many hours. In his opinion, mental disturbances are one of the most important causes of the greater frequency of accidents and illness among climbers living in difficult conditions.²

Richter and Dyhrenfurth have also made interesting psychopathological observations. They found disturbances in visual-motor coordination and concentration, as well as difficulty in taking decisions, in several members of an expedition who from time to time exhibited unfounded excitement, irritability, a tendency to uncontrolled outbursts of anger and misapprehensions.³

Similar descriptions in mountaineering literature as well as personal observations and experiences during high mountain expeditions have led the author to undertake closer studies on this subject. In 1966–70 in the Department of Psychiatry in the Cracow Academy of Medicine (Director, Professor Antoni Kepiński, MD) he carried out psychological and psychiatric investigations on 30 experienced Polish climbers, members of expeditions to the highest mountains in the world. A criterion in the choice of this group was a stay at over 7000 m above sea level (c 26,000 ft) for men and over 4000 m (c 15,000 ft) for women.

The mental disturbances undergone by the climbers studied were of various types and intensities, depending on the altitude at which they occurred and on the time spent there. Hence, they may be discussed separately for different zones of altitude: low (1500–2500 m above sea level), intermediate (2500–5500 m), and high (5500–7500 m).

All those studied had repeatedly remained at moderate altitudes, but only men had stayed at great heights; 15 had exceeded a height of 7000 m and the other 5 had approached this very closely.

a The neurasthenic pattern

At low altitudes (eg in the Tatra Mountains) two types of psychopathological reaction were characteristic; emotional excitement (in 20 subjects) or indifference (in 6 subjects). The other 4 subjects did not report any mental changes at this height. These reactions were manifested in the early days of a period in the mountains and lasted from a few hours to several days, passing off spontaneously. Emotional excitement was shown in a greater mental tension, a somewhat exalted mood, accelerated thinking, impatience and irritability. Emotional indifference was characterised by greater fatigability, lassitude, drowsiness, indifference and deterioration in physical fitness. This was accompanied by a general unwillingness to climb and an exaggeratedly critical estimation of the difficulty of the climb. These symptoms were not maintained for long and yielded spontaneously.

b The cyclophrenic pattern

At moderate altitudes episodic mental disturbances in the form of apathetic-depressive syndromes occurred in 22 subjects, and in 6 the disturbances were of a euphoric-impulsive character. Two subjects manifested a tendency towards the alternating occurrence of both these syndromes.

The apathetic-depressive syndrome was diagnosed in climbers who reported increasing physical fatigue and mental lethargy, indifference and a narrowing of interests, aversion to any sort of activity, especially to continued climbing, a slowing down of thought, dislike of conversation, and depression. The somatic symptoms frequently included headache, palpitations of the heart, nausea, dyspnoea, and cramps in the gastric region. These disturbances appeared suddenly or gradually, and like the others passed off in a few days at the most.

This kind of reaction may be exemplified by the experience of a climber who, at an altitude of c 4500 m in the Alps unexpectedly found that he could not move freely and had no desire for any sort of action. His movements were clumsy, so that he fell over his own feet. He felt severe physical lethargy and languor. He became indifferent to everything, and at times was depressed. In spite of the need for conversation he could not force himself to ask his companions any questions. He said that he existed for himself alone, and felt no bonds with the other members of the team. Encouraged by his companions, he continued to go forward, but with indifference, not caring in the least whether he reached the summit or not. It was only next day, after descending to a lower altitude, that he experienced the full satisfaction of success.

The euphoric-impulsive syndromes were characterised by an exalted mood sometimes tinged with euphoria, bewilderment, an irrational feeling of happiness, intensified psychomotor drive, unnecessary activity and intensified

emotional tension, with irritability, outbursts, facile conflicts with the rest of the team and even episodes of anxiety.

For example, one of the climbers studied felt mentally and physically excited at a height of c 3500 m. During a rest period, he stood on his head to reassure himself and at the same time show off to the others how well he felt at this height. He emphasised his marked sense of well-being. At an altitude of 4000 m on the same day he felt full of vigour, boasted of his strength, and carried a double load. In the evening, however, he suddenly became weak, with vertigo and headache, then vomited and criticised himself for over-taxing his strength unnecessarily. At the same time he was irritable and insolent, reacting angrily to remarks addressed to him.

c The psycho-organic pattern

As already pointed out, among those studied only the men had reached great heights. In the psychopathological picture of the disturbances they underwent in this zone, a psycho-organic syndrome without psychotic symptoms and a psycho-organic syndrome with psychotic complications may be distinguished. In the men's group, 10 subjects exhibited such disturbances; psychotic complications were found in 3 of these.

The following symptoms indicated these changes in the mental sphere: a marked decrease in motor activity and physical strength, lack of resource caused by disturbances in temporal and spatial orientation, decreased critical ability, instability of mood varying from depressive states to euphoric episodes, disturbances in memory, visual-motor coordination and equilibrium, as well as a restricted range and weakening of the perception of stimuli from the surroundings. In the intellectual sphere, decreased efficiency and precision of thinking were found, with difficulty in revising conclusions. Three subjects experienced visual or aural disturbances.

One of those studied was in a state of apathy when descending from a peak over 7000 m high, and felt completely cut off from his fellows. He did not remember how long he had remained at the summit. After descending to an altitude of 6900 m he felt weak; first dark spots appeared before his eyes, and after that he lost his balance. Then he saw red and orange snowflakes, and finally the whole vicinity took on these colours. At the same time the landscape he was looking at began to jump before his eyes like the frames of a broken film, but stopped after some time. He lost his equilibrium and had to be led by the hand. The hallucination of coloured snow lasted for some days, and only passed off after descending below 5000 m. The experience described was accompanied by a fear of losing the sense of sight. A month later the sight was still weak; it is now completely restored, and ophthalmological tests have not revealed any changes in the eyes.

Marked disturbances in consciousness occurred in 4 men while they remained over 7000 m, consisting in suddenly falling asleep for a little while, sometimes

only for a few seconds. This happened not only while resting, but even on the march. This strong desire for sleep was hard to overcome; the following description gives evidence of its exceptional intensity. After reaching 7000 m the subject became apathetic and uninterested in everything. He felt an overwhelming desire to sleep, if only for a short time. He continued the march but felt that his field of consciousness was narrowing down and that he was gradually losing his sense of direction. He moved automatically. His indifference was such that he completely lost the urge for self-preservation; 'the question of life or death was of no importance there, the instinct of self-preservation was entirely suppressed; if I had been allowed to remain there in my sleeping-bag, I should have done so without regard for the consequences . . . ; my will-power and desire for action had completely vanished, and I also felt a distaste for life'.

Three men experienced episodes of psychotic disturbances in the form of visual-aural hallucinations, persecution delusions or symptoms of derealisation and depersonalisation, accompanied by complete isolation from those surrounding them and retirement into the self. In 2 of these men, there were also disturbances in consciousness.

It is worth emphasising that these last changes in the mental sphere were accompanied by symptoms of 'altitude deterioration', with general somatic breakdown and physical emaciation; one climber lost 25 kilograms in body weight. These subjects had remained for a long time in conditions of mountain hypoxia, low temperature and unsuitable food. Although a height of approximately 7500 m above sea level was reached, oxygen apparatus was not used.

The results of clinical and auxiliary examinations (encephalographic, psychological and neurological) indicated the possible occurrence of permanent and distinct changes in the central nervous system brought about by traumatic factors specific for this environment. In the group studied, such changes were found in 4 men who had remained in the 6500-7500 m altitude zone for several days without using oxygen apparatus. On account of the specific aetiopathogenesis, this form of psycho-organic syndrome may be called the high altitude asthenic syndrome (*asthenia altitudinis*). Check-up examinations of these climbers 2 years later showed that symptoms of the apathetic-asthenic syndrome with a tendency to varying moods, emotional disturbances, and decreased efficiency in mental work were still maintained in the psychopathological picture. Auxiliary examination results suggested an organic substrate.

Various factors, both exogenic and endogenic, were important in the aetiology of the disturbances described. They may be ranged in order of importance as atmospheric factors, the somatic condition and mechanical traumata, psychological and sociological factors. The most important aetiological factor in the disturbances discussed was indubitably hypoxia of the central nervous system, provoked by the lack of oxygen in the ambient atmosphere. The partial oxygen pressure at a height of 5000 m is lower by half, and at a height of 8000 m it is only one-third of the normal value. Assuming that the nerve cells use about 20 times as much oxygen as the muscle cells, each state of hypoxia in the

organism causes above all disturbances in the functioning of the central nervous system.⁴ This is also suggested by the characteristic psychopathological picture, in which disturbances in mood, memory, orientation and consciousness predominate. This would give evidence in the first place of disturbances in cortical functioning.

Among somatic factors, all morbid conditions or congenital abnormalities diminishing the efficiency of the circulatory-respiratory system are of great importance. Among these should also be included smoking and the use of alcohol before and during the expedition. Among sociological factors should be emphasised the isolation of a mountaineering team from the social environment, the spell in a foreign country, the change in the way of life, the language barrier, separation from family, and the general atmosphere prevailing in expeditionary teams, also competent leadership avoiding conflict. The thesis that the simultaneous influence of a complex of external factors, together with the somatic and emotional predispositions already present, always affects the aetiology of the mental disorders described seems to be justified.

The psychopathological aspects of mountaineering which have been sketched show how very rich and constantly varying may be the experiences of climbers in the special conditions of their environment. The mental disturbances described are not as a rule an indication for psychiatric therapy, and in this field prophylaxis should prevent even these complications. Further studies are essential, especially on account of the ever-widening opportunities of organising expeditions to the highest mountains in the world. Postulates that the organisers and members of these expeditions should take this danger into account, however, are now justifiable, especially when oxygen apparatus is not used.

References

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