BODY ATTITUDE AT HIGH ALTITUDE

Anjula Sachan, *Pratap Shankar, Amod Kumar Schan, Rakesh Kumar Dixit

Department of Pharmacology and Therapeutics, King George’s Medical University, Lucknow, UP, India – 226003.

ABSTRACT

Beside the experience and joy of adventure, travelling at high altitude can be harmful for life of everyone. Travel may be for diverse purposes like religious, adventure, travel, tourism or war. Apart from that travelers may or may not be professional and trained; rear to reach on substantial heights protecting themselves from exposure of dangerous effects of high altitude environmental changes. These changes may affect the all biological functions of the body. In this review we will discuss about the effectiveness of the high altitude on body in all the aspects.

KEY-WORDS: Altitude, Attitude, acute mountain sickness, Physiological change.

INTRODUCTION

That is an adventurous experience while travelling in mountain for life of everyone. That can be for religious reasons, adventure, travel, tourism and war. In current days wars at mountain peaks are increasing day by day for the greed of country exploration and due to technology development. Beside all above reasons peoples (mountaineers) wants to reach the highest peak for records as well as the adventure. Some of them have professional training and experience of living at mountains (acclimatized to high altitude). While mostly are without proper training and relevant experience. They rear to reach on substantial heights and protect themselves for the exposure of dangerous effects of high altitude environmental changes. Almost each and every system of the body gets affected by the high altitude [1]. Physiological changes as well as the physical fitness in human and all the organisms affected by the exposure of extreme environmental conditions such as heat, cold and high altitude (HA) [2-9]. High altitude causes so many problems mainly pulmonary, cerebral syndromes,
hemopoietic and the most common acute mountain sickness (AMS) which usually begins within a few hours of ascent and typically consists of headache variably accompanied by loss of appetite, nausea, vomiting, disturbed sleep, fatigue, and dizziness [10-12]. Risk factors include home elevation, maximum altitude, sleeping altitude, rate of ascent, latitude, age, gender, physical condition, intensity of exercise, preacclimatization, genetic make-up, and pre-existing diseases [13-15]. Present article focuses some of the very important changes in organs due to sudden environmental changes at high altitude.

**Importance of Study**

The information is interesting to physician as well as persons who are going or planning to high altitude. This will also add the knowledge to physicians who are advising people who wish to venture to high altitude with pre-existing medical conditions. The person travelling should be educated regarding the common happening because at these heights it is very rare incidence that trained physician present there. Body when ascends at high altitude acclimatizes through the acute and chronic phases in terms of optimizing oxygen delivery to cells. The person hyperventilates, as initial step in acclimatization. Hyperventilation is due to stimulation of carotid body in response to decreased O$_2$ concentration in blood. All mammals, including humans, uses increased ventilation as the primary respiratory mechanism to compensate for reduced oxygen availability at high altitude [16-17]. Next to hyperventilation increased catecholamine and pulmonary hypertension developed secondary to vasoconstriction of pulmonary circulation improving the ventilation perfusion mismatch [18]. All the changes to acclimatization of body are to survive at the high altitude atmosphere. Chronic changes occur in the form of increased erythropoietin induced erythropoiesis. These process may not be optimum in individuals and overall the acclimatization has also ceiling effect beyond which person develops number of medical problems.

High altitude pulmonary edema is without cardiac involvement is more common when person ascends above 12000 feet [19]. It is one of the commonest medical emergencies of high altitude [20]. Pathophysiology of high altitude pulmonary edema involves a transient large pore leak in the pulmonary circulation without major activation of inflammatory mechanism. Sudden elevation of pulmonary arterial pressure leads to increased permeability of vascular endothelium. There occurs massive central sympathetic discharge which shifts blood from high resistance system to low resistance pulmonary circulation which results into pulmonary hypertension and lung haemorrhage [21]. All these changes may occur in lung without pre-
existing disease. A normal cardiopulmonary function at sea level is no guarantee for pulmonary edema. Previous acclimatisation does not necessarily guarantee against high altitude pulmonary edema [22].

Most of the cases occur acutely more than 2/3rd of all cases develop within three days of arrival. The person presents with cough, palpitation, chest pain, breathlessness, headache, giddiness, pronounced weakness, fatigue, sleep disturbances etc. The cough is dry to start with but becomes pink frothy latter [23]. Early diagnosis is most important thing to reduce mortality and morbidity of pulmonary edema. First clue may be in the form of severe weakness and fatigue. The best prophylaxis and treatment is to bring down the person to low height as quickly as possible. If descend is not possible patient may be put into recompression chamber [24]. Next step is to put person on oxygen which lowers pulmonary arterial pressure dramatically [25]. Medical treatments are in the form of Furosemide, morphine, antibiotics, dexamethasone nifedipine etc. [26]. While at high altitude cerebral edema is very dangerous stage with poor prognosis. Fortunately it usually present several days after the onset of mountain sickness. In this intracranial pressure is increased due to increased brain cell volume, cytotoxic edema or vasogenicedema. Persons feel as irritability severe headache, ataxia, nausea, impaired judgement, etc. More severe presentation may be in the form of hallucination, paresis, and coma. Treatment includes descent, oxygen, dexamethasone, mannitol etc.

Acute mountain sickness is characterised by headache loss of appetite, disturbed sleep, nausea, malaise etc. This occurs in the persons who ascend up to 6500 feet very rapidly. It may occur in any one irrespective of physical fitness. More severe form may present with physical peripheral edema, altered consciousness, rales, cyanosis, ataxia etc. Mild form of acute mountain sickness will resolve automatically by staying 2-3 days in same height. Medicinal treatment in the form of analgesics, acetazolamide, prochlorpromazine, dexamethasone is sometime needed (27-28). There are miscellaneous changes in body in form of immune suppression (T-cell function is impaired), transient ischemic attacks, splenic infraction, thromboembolic episodes in females taking oral contraception pills and many more.

CONCLUSION
Altitude induced changes in attitude of body is common and may result in major difficulties of journey. Self treatment is most of the time becomes necessary and only single option. If
possible the best treatment is descent to lower height.

REFERENCES