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Review Article

Internal Medicine Section

High Altitude Illness: A Nepal Perspective

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INTRODUCTION

The basic impetus for carrying out this work was based on the experience of one of the authors, Brijesh Sathian, during his trip to the Dhaulagiri Ice Fall (3950m) from Pokhara (827m), when he experienced nausea, vomiting, dizziness, headache and loss of appetite. His trip involved a rapid ascent of 3123 m for a 24 hour duration (which involved both air transport from Pokhara to Jomsom and trekking from Jomsom to the Ice fall, which involved a 10 hour trek).

High altitude illness collectively describes the syndromes that come into play shortly after the ascent to a high altitude and it mainly affects unacclimatized individuals. It encompasses the syndromes of acute mountain sickness (AMS), high altitude cerebral oedema (HACO) and high altitude pulmonary oedema (HAPO) [1].

ACUTE MOUNTAIN SICKNESS (AMS)

Acute mountain sickness is a self-limiting condition which is charcterized by mild to moderate headache, loss of appetite, nausea, dizziness and insomnia [2]. Acute mountain sickness is usually seen at a moderately high altitude of above 2800 m [3]. The occurrence and the severity of AMS depend on the altitude, the rate of ascent and the physical exertion after the entry into the high altitude, besides other variables. Recent studies have indicated AMS as a polygenic condition with a strong environmental component [4]. An incidence of 68% has been documented by Basnyat et al in their study among pilgrims, at an altitude of 4300m in Nepal [5]. The rate of ascent has also been reported as a risk factor for the development of AMS. However, no difference between the sexes with regards to the susceptibility to AMS has been reported [6].

HIGH ALTITUDE PULMONARY OEDEMA (HAPO)

HAPO is a life-threatening non-cardiogenic form of pulmonary oedema that afflicts vulnerable individuals, following a rapid ascent to a high altitude of above 2500 m [7]. A major determinant for the incidence of HAPO is the vulnerability of an individual [8]. The symptoms of HAPO are known to develop within the first four days at a high altitude [9]. These include incapacitating fatigue, chest tightness, dyspnoea and a dry non-productive cough which progresses to cough, with a pink frothy sputum due to haemoptysis [2]. The hallmark of HAPO is an excessively elevated pulmonary artery pressure in response to hypoxic pulmonary vasoconstriction, which leads to an elevated pulmonary capillary pressure and protein content, as well as an oedema fluid rich in the red blood cells. HAPO is a form of hydrostatic pulmonary oedema with an altered alveolar-capillary permeability [10]. A reduced clearance of the fluid from the alveoli may also contribute to this non-cardiogenic pulmonary oedema[8]. Among the pilgrims, at an altitude of 7300m, Basnyat et al observed the incidence to be 5%. They also observed that women had a higher incidence of HAPO at an altitude of 4300m [5].

HIGH ALTITUDE CEREBRAL OEDEMA (HACO)

HACO is one of the most severe forms of high altitude illness. The common symptoms and signs of HACO in the order of frequency are disturbed consciousness, ataxia, headache, anorexia, nausea and papilloedema [11]. HACO represents the end stage of AMS [12]. High altitude cerebral oedema seems to result from an increase in the intracranial pressure which is directly dependent on an increase in the cerebral volume [13]. Basnyat et al observed the incidence to be 31% among the pilgrims at an altitude of 4300m in Nepal [5].

PREVENTION

A better knowledge of the high altitude sickness among the members of the trekking groups will be essential for the prevention and preparedness towards this health problem. Indoctrination sessions about the dos and don'ts at a high altitude for trekkers, pilgrims and other associated high risk groups prior to starting the ascent must be done. A slow ascent to the high altitudes must be encouraged. The consumption of depressants like tobacco, alcohol, barbiturates and tranquilizers should be avoided, as these further reduce the respiratory drive. A sufficient amount of fluids should be consumed in order to maintain the hydration levels. Drugs like acetazolamide can be used for the treatment as well as for the prevention of high altitude sickness. They act by increasing the respiratory rate and by thus minimizing the symptoms which are caused by poor oxygenation. Dexamethasone has also been found to be effective in reducing the symptoms of AMS and also in adults with a history of HAPO, by decreasing the systolic pulmonary artery pressure. Nifedipine, a calcium-channel antagonist, plays an important role in the prevention and the treatment of HAPO by inhibiting the hypoxic pulmonary vasoconstriction. The adverse effects of high altitude illness, especially HACO and HAPO must be tackled as medical emergencies. The provision of air evacuation and hyperbaric chamber facilities will be highly useful for decreasing the morbidity and the mortality burden which are caused by high altitude illness. Health professionals at all levels should be trained in the management of high altitude sickness.

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