

HIGH ALTITUDE HEADACHE - AN ETIOLOGICAL BASED STUDY

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ABSTRACT

Objective: To determine the various causes of headache in patients evacuated from high altitude.

Design: Descriptive study

Materials and Methods: An observational hospital based study carried out on 50 soldiers evacuated from Northern Areas to Military Hospital Rawalpindi between Sep 2009 to Mar 2010 for evaluation of headache as their major complaint. Necessary investigations including neuroimaging were carried out in coordination with Department of Neurology, Military Hospital and an appropriate diagnosis was made in each case. The data was analyzed accordingly.

Results: A total of 50 patients were analyzed. They were all males and the mean age was 25 years. 52% patients had Acute Mountain Sickness, 12% hypertension, 10% High altitude cerebral edema, 8% Tension type headaches, 6% Dural venous sinus thrombosis, 6% migraine, 2% encephalitis, 2% were of Subarachnoid hemorrhage and 2% patients Hydrocephalus.

Conclusion: Acute mountain sickness and high altitude cerebral edema accounts for a significant number of patients with high altitude headache

Keywords: Acute mountain sickness, Headache, High altitude.

INTRODUCTION

For more than 2,000 years, headache has plagued those who tried to ascend to high altitudes. Headache was so common among travelers along an ancient silk route in Central Asia that a Chinese official named the area "Great Headache Mountain and Little Headache Mountain". ICHD-2 diagnostic criteria for High altitude headache is as follows:

Headache with at least two of the following characteristic and fulfilling criteria C and D:

- A. 1. Bilateral
2. Frontal or frontotemporal
3. Dull or pressing quality
4. Mild to moderate intensity
5. Aggravated by exertion, movement, straining, coughing or bending
- B. Ascent to altitude above 7500 feet.
- C. Headache develops within 24 hours after ascent.
- D. Headache resolves within 8 hours after descent.

Military Hospital Rawalpindi is a tertiary care hospital of the Armed forces for the soldiers deployed all over Pakistan. A significant amount of our troops are deployed in Siachin and Kargil Sectors, with most of them serving at altitude more than 14000 feet. High altitude headache has become an important health problem for troops deployed at high altitude, with great economic consequences as there are increasing number of referrals and evacuations of soldiers.

We made an observational based study in 50 patients over a span of 06 months to determine the percentage of various headache disorders in soldiers at high altitude.

PATIENTS AND METHODS

A cohort analytic study was carried out in Military Hospital Rawalpindi between 1st Sep 2009 to 1st Mar 2010. Patients were identified by using hospital information system. Data was analyzed from troops evacuated from Northern Areas for evaluation of headache as their primary complaint during this period. We underwent a study in 50 patients to determine the etiology of headache individually in each case so as to decrease the incidence of high altitude headache as well as economic, health and social burden overall. This whole study

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was carried out in close collaboration with neurology department Military Hospital Rawalpindi. A proforma was developed which included information related to patient's age, sex, symptomatology, duration of stay, altitude of evacuation and investigations including cranial CT scan with a suitable diagnosis. Lake Louise system for estimation of the intensity of headache was used and added in the proforma accordingly. Data was analyzed using SPSS version 15. Descriptive statistics were used to describe the data.

RESULTS

Fifty cases were reviewed during the study period, all were males and the age range was between 18 to 40 years, with mean age of 25yrs. Acute mountain sickness was found to be the most frequent cause of headache to make a total of twenty six(52%) of cases. Second most common etiology was raised blood pressure, and six (12%) of patients remained hypertensive even after continuous monitoring and after necessary investigations were found to have essential hypertension. Five (10%) suffered from High altitude cerebral edema, four (8%) patients had tension type headache, which was diagnosed according to the criteria of international headache society (IHS). Dural venous sinus thrombosis was found in three(6%) soldiers. Migraine was in three(6%) patients, one (2%) patient developed headache and leg weakness at Skardu and the cranial CT scan and MRI showed obstructive hydrocephalus due to a Dandy Walker variant, one (2%) suffered from fever and severe headache and altered mental status which later on was proved to be a case of meningo encephalitis with multiple brain infarcts. One (2%) patients developed excruciating occipital headache in which CSF was xanthochromic and the CT scan brain showed extensive subarachnoid hemorrhage due to AV malformation diagnosed on CT Angiography. The average time period during which headache subsided after descent depended on the cause and varied among different individuals. The shortest time period for the headache to settle was for migraine (average 05 days), and longest for cerebral venous sinus thrombosis, that was around 43 days.

DISCUSSION

High altitude headache is a very common problem faced by the troops and mountaineers¹. The headache does not appear to be the result of low blood oxygen (hypoxia) alone because the attack often does not begin for hours to days after thriving at the higher altitude^{2,3}. The underlying cause of the headache remains unknown. Swelling of blood vessels has been considered as a potential cause. The most important variables affecting the incidence of HAH according to studies include an individual's birthplace, acclimatization in the week before the travel, the rate of change in altitude and days of rest while ascending^{4,5}. Rest days were most potent protective variable.

The Lake Louise consensus group defined AMS as the presence of headache in an unacclimatized person who has recently climbed at an altitude above 2500m^{6,7}. Harris et al in April 2010 defined acute mountain sickness as the most probable cause of headache in travelers. Headache and acute mountain sickness occur commonly over 8,500 feet above sea level. Modern evidence that headache occurs frequently at high altitude comes from studies of people living in the South American Andes and from soldiers of the Indian Army who moved frequently between different heights. Even during the Mexico City Olympics held at an altitude of 2,300 meters, migraine headache occurred more frequently than Olympics held at lower altitudes^{8,9}. Headache may be a prominent symptom in people with chronic exposure to high altitude. In a study of 379 adult men who lived for more than 10 years in Peru at an altitude of 4,300 meters (14,200 feet), nearly half (47%) complained of recurrent headaches, either migraine (32%) or tension-type headache (15%). The occurrence of migraine and tension-type headache increased with age in this group of people, the opposite to that observed at sea level. Because the lungs efficiency in supplying oxygen to the body declines with age in all individuals, oxygen levels in the blood may decrease even further with advancing age in those who reside at high

altitudes. Since migraine occurs more commonly when the blood level of oxygen falls, this might explain why headaches seem to increase with age in those who live at higher altitudes.

In a study conducted near the Mt. Everest Base Camp in Nepal, a Massachusetts General Hospital (MGH) resident physician and his colleagues have found that acetaminophen is as effective as ibuprofen in treating high-altitude headache and acute mountain sickness is the most common reason for the altitudinal headache¹⁰. The rate of AMS among conference delegates to moderate altitudes (1920-2957m) in Colorado, USA, was 25%. In the mountain region of Nepal, about 50% of trekkers who walk to altitude higher than 4000m over 5 or more days develop AMS, and 84% of people who fly directly to 3860m are affected^{11,12}. High altitude illness is much more likely to occur at altitude higher than 2500m than at lower altitudes, but is being increasingly recognized at altitude between 1500m to 2500m. The incidence of HACE and HAPE is much lower than for AMS with estimates in the range 0.1-4.0%^{13, 14}. In a study by Mosby Elsevier showed AMS as major cause of high altitude sickness followed by HACE and HAPE. Another major cause of high altitude headache that is being readily diagnosed with the help of latest neuroimaging techniques like MRI, MRV is venous sinus thrombosis. Clinical manifestation include headache, papilloedema, visual loss, focal or generalized seizures, focal neurological deficits, confusion and coma^{15,16}.

Other headache syndromes like migraine, tension type headache, cluster headache can be triggered by high altitude itself or other exacerbating factors like stress, worry, exertion, fatigue, lack of sleep etc.

CONCLUSION

Headache at high altitude is a very common problem for soldiers serving beyond 12000 feet. Apart from the common causes like migraine and tension type headache, acute mountain sickness and cerebral venous sinus thrombosis remain a significant cause of the said illness. By avoiding certain preventable

causes considerable amount of morbidity and mortality among soldiers can be avoided.

RECOMMENDATIONS

Following recommendations have been made to avoid the preventable causes of headache at high altitude

1. Avoid dehydration by drinking five 8-ounce glasses of water prior to reaching a higher altitude and while at that altitude.

2. If possible, travel to a high altitude should be gradual with rest or minimal activity days to allow your body time to adjust to small, gradual decreases in the amount of oxygen in the air and in your blood.

3. Sleep at lower elevations than you play. If you are hiking or skiing at altitudes above 8,500 feet, stay in accommodations below 7,500 feet whenever possible.

For people who have trouble sleeping and breathing problems at night, particularly if AMS has occurred in the past, use acetazolamide (Diamox) as a preventive treatment before and during the time spent at the higher elevation.

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