

Risks in Travel to High Altitude and Rescue Services in the Himalayas.

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Abstract

Problems relating to altitude sickness, namely acute mountain sickness (AMS), high altitude pulmonary edema (HAPE) and high altitude cerebral edema (HACE) will be discussed in terms of their basic knowledge, prevention, and some forms of treatment. In addition we will talk about some other (non altitude sickness) common medical problems at high altitude in the Himalayas like gastroenteritis (diarrhea) and cough and how to deal with these problems. Finally, we will end by talking about rescue services, and the importance of obtaining helicopter rescue insurance before coming to the Himalayas for trekking and climbing.

Text

Mountains cover one-fifth of the earth's surface; 38 million people live permanently at altitudes \geq 2400 m, and 100 million people travel to high-altitude locations each year. Skiers in Aspen, religious pilgrims to Lhasa, trekkers and climbers to Kilimanjaro or Everest, and military personnel deployed to high-altitude locales are all at risk of developing acute mountain sickness (AMS), high-altitude cerebral edema (HACE), high-altitude pulmonary edema (HAPE), and other altitude-related problems. AMS is the benign form of altitude illness, whereas HACE and HAPE are life-threatening.

Altitude illness is likely to occur above 2500 m but has been documented even at 1500 – 2500 m.

Acute Mountain Sickness and High Altitude Cerebral Edema

AMS is a neurologic syndrome characterized by nonspecific symptoms (headache, nausea, fatigue, and dizziness) with a paucity of physical findings developing 6 – 12 h after ascent to a high altitude. AMS must be distinguished from exhaustion, dehydration, hypothermia, alcoholic hangover, and hyponatremia. AMS and HACE are thought to represent opposite ends of a continuum of altitude-related neurologic disorders. HACE (but not AMS) is an encephalopathy whose hallmarks are ataxia and altered consciousness.

The most important risk factors for the development of altitude illness are the rate of ascent and a history of high-altitude illness. Exertion is a risk factor, but lack of physical fitness is not. One protective factor in AMS is high-altitude exposure during the preceding 2 months; the explanation for this association is intriguing but remains uninvestigated. Children and adults seem to be equally affected, but people >50 years of age may be less likely to develop AMS than younger people. Most studies reveal no gender difference in AMS incidence. Sleep desaturation—a common phenomenon at high altitude—is associated with AMS. Debilitating fatigue consistent with severe AMS on descent from a summit is also an important risk factor for death in mountaineers.

Gradual ascent, with adequate time for acclimation, is the best method for the prevention of altitude illness.

Above 3000 m, a graded ascent of ≤ 300 m from the previous day's sleeping altitude is generally recommended, and taking every third day of gain in sleeping altitude as an extra day for acclimation is helpful. Spending one night at an intermediate altitude before proceeding to a higher altitude may enhance acclimation and attenuate the risk of AMS.

Clearly, a flexible itinerary that permits additional rest days will be helpful. Sojourners to high-altitude locations must be aware of the symptoms of altitude illness and should be encouraged not to ascend further if these symptoms develop. Any hint of HAPE or HACE mandates descent.

Pharmacologic prophylaxis at the time of travel to high altitudes is warranted for people with a history of AMS or when a graded ascent and acclimation are not possible—e.g., when rapid ascent is necessary for rescue purposes or when flight to a high-altitude location is required.

Acetazolamide (125 - 250 mg twice a day), administered for 1 day before ascent and continued for 2 or 3 days, is effective. Higher doses generally are not required. Paresthesia and a tingling sensation are common side effects of acetazolamide.

HIGH-ALTITUDE PULMONARY EDEMA

Unlike HACE (a neurologic disorder), HAPE is primarily a pulmonary problem and therefore is not necessarily preceded by AMS. The initial manifestation of HAPE may be a reduction in exercise tolerance greater than that expected at the given altitude. HAPE develops within 2 - 4 days after arrival at high altitude; it rarely occurs after more than 4 or 5 days at the same altitude.

Although a dry, persistent cough may presage HAPE and may be followed by the production of blood-tinged sputum, cough in the mountains is almost universal and the mechanism is poorly understood.

Early recognition is paramount in the treatment of HAPE, especially when it is not preceded by the AMS symptoms of headache and nausea. Fatigue and dyspnea at rest may be the only initial manifestations. Descent and the use of supplementary oxygen (aimed at bringing oxygen saturation to >90%) are the most effective therapeutic interventions. Exertion should be kept to a minimum, and the patient should be kept warm.

Other Medical Problems:

A very common problem in the Himalayas is diarrhea which can be severe and lead to dehydration and giving up the attempt to climb the mountain. It is important to drink lots of fluids and have proper antibiotics for treatment of infectious diarrhea. Finally, cough while climbing mountains is very common and sometimes people have broken their ribs while coughing excessively. Breathing through a silk scarf and using cough suppressants and nasal decongestants has helped some people, but there is often no specific drug treatment for this condition which usually gets better upon descent.

Finally people with pre-existing medical problems like diabetes, hypertension, renal problems and other problems need to consult carefully with their doctor before undertaking a high altitude climbing trips.

Rescue Services

Rescue services in the Himalayas are very basic. Indeed this is why emphasis on prevention of serious altitude illness like HACE and HAPE are of the utmost importance. Helicopter services are readily available for a fee. But often due to bad weather flying in the high mountains for rescue may be a risk in itself.

The good news is that descent is the most important feature in the treatment of altitude sickness and the helicopters are effective in bringing people to lower altitude and serve an important function in that regard. For this reason it is important for people to realize to obtain proper helicopter rescue insurance in their home country before their trip to the Himalayas. Many times even serious HAPE or HACE patients dramatically improve after they are brought down to a lower altitude from the high Himalayas.

高海拔地區旅遊的風險及 喜馬拉雅山區的救援服務

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摘 要

我們會藉者介紹基礎知識、預防方式與各種治療方式來討論包含急性高山病、高海拔腦水腫與高海拔肺水腫在內的高海拔疾病。此外，我們也會談到在喜馬拉雅山區的高海拔環境中常見的、但不屬於高海拔疾病的其他常見身體不適，這包含了：腸胃炎(腹瀉)及咳嗽，並介紹如何處理這些身體不適。最後，我們會以討論救援服務以及前往喜馬拉雅山區進行健行或登山活動前投保直昇機救援保險之重要性做為結尾。

內 文

一、高海拔地區旅遊的風險及喜馬拉雅山區的救援服務

山，覆蓋者五分之一的地球表面；世界上有 3800 萬人永久定居在海拔高於 2400 公尺的地區，而且每年有一億人至高海拔的地區旅遊。在美國科羅拉多州的滑雪勝地阿斯本(Aspen，位於洛磯山脈)的滑雪者、前往西藏拉薩的宗教朝聖者、前往吉力馬札羅火山或聖母峰的健行者或登山者、以及部署在高海拔地區的軍事人員都暴露在發生急性高山病、高海拔腦水腫、高海拔肺水腫與其他高海拔相關身體不適的風險中。急性高山病是高海拔疾病一開始的表現；反之，高海拔腦水腫及高海拔肺水腫則是危及生命的。高海拔疾病容易發生在高於海拔 2500 公尺的地區；然而，即使在海拔介於 1500 公尺至 2500 公尺的地區，也有病例被報告過。

二、急性高山病和高海拔腦水腫

急性高山病是(1)以非特異性的症狀(頭痛、噁心、疲憊、頭暈)表現、(2)缺乏身體檢查發現、且(3)在爬升至高海拔地區 6 至 12 小時之後發作的一種神經疾病。急性高山病必須與以

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下身體狀況做分別：(1)虛脫、精疲力竭、(2)脫水、(3)失溫、低體溫、(4)酒後宿醉、以及(5)低血鈉。急性高山病及高海拔腦水腫被認為是連續進展的高海拔相關神經學症候群的起點與終點。高海拔腦水腫(非急性高山病)，是一種特徵以運動失調及意識改變為特徵的腦部病變。

發生高海拔疾病最重要的危險因子是(1)爬升速度以及(2)過去是否曾發生過高海拔疾病。勞動是一項危險因子，但是體適能較差並不是危險因子。在高海拔活動前兩個月內經歷過高海拔暴露是急性高山病的一項保護因子；如何去解釋這兩者的關聯是相當令人好奇的，但目前仍然尚未被研究。孩童與成年人的急性高山病發生率似乎相同，但是高於 50 歲的人們與較年輕的人們相比可能比較不會發生急性高山病。大多數的研究指出急性高山病的發生率與人種無關。睡眠時血氧濃度降低是一種在高海拔地區常見的現象，與急性高山病有關。由山頂下降高度的過程中同時發生極度疲憊虛弱與嚴重急性高山病，是導致登山客死亡的一項重要危險因子。

逐步的上升高度並配合充足的時間來進行高度適應，是預防高海拔疾病最好的方式。一般建議，在高於海拔 3000 公尺的地區，睡眠海拔高度不要比前一晚睡眠海拔高度高於海拔 300 公尺。且每上升三天睡眠高度時，額外增加一天做高度停留。在進入高海拔地區前，花費一個晚上停留在中海拔可以促進高度適應並減少急性高山病的風險。

很清楚的事實是，一個可以允許額外休息日之有彈性的旅程對於減少高山病的發生是有幫助的。到高海拔地點的旅行者必須對於高海拔疾病的症狀有所警覺，而且一旦這些症狀發生時，鼓勵他們不要再繼續上升高度。任何高海拔肺水腫或高海拔腦水腫之細微症狀一旦出現時，必須下令下降高度。

高海拔旅遊使用藥物來預防高海拔疾病的時機是：(1)曾經發生過急性高山病的人們，或(2)當必須上升特定的高度但不可能進行高度適應時，例如：必須快速上升高度去進行救援或需要搭飛機前往高海拔的地點。Acetazolamide (丹木斯，125 至 250 毫克，每天兩次)，在登高前一天開始服用，並持續服用 2 或 3 天，對於預防急性高山病是有效的。更高的劑量通常是不需要的。皮膚感覺異常以及針刺感是 Acetazolamide 常見的副作用。

三、高海拔肺水腫

不同於高海拔腦水腫(一種神經疾病)，高海拔肺水腫根本上是一種肺部疾病，所以可以逃過急性高山病而發生。高海拔肺水腫一開始的病因可能是在特定高海拔地區的活動適應力比預期中的下降更多。高海拔肺水腫在進入高海拔地區 2 至 4 天內發生，而且很少在相同海拔高度停留超過 4 至 5 天後才發生。

雖然乾咳或持續咳嗽可能暗示發生高海拔肺水腫，而且可能隨後會惡化到出現帶著血絲的痰液。但是，在高山地區咳嗽是很普遍的，而且造成咳嗽的原因目前還了解很少。

治療高海拔肺水腫最重要的事情是及早辨識，特別是當他跳過急性高山症的頭痛及嘔吐症狀而發生時。疲憊虛弱及休息時呼吸急促可能是剛發作時唯一的症狀。下降高度並給予氧氣(目標是讓血液中氧氣飽和度來到高於 90%)是最有效果的治療方式。勞動必須要盡量減少而且病患必須給予保暖。

四、其他的身體不適

在喜馬拉雅山區很常見的身體不適是腹瀉，甚至可以嚴重到造成脫水且必須要放棄登山行程。喝大量的水且服用適當的抗生素來治療感染性腹瀉是很重要的。最後，在登山過程中的咳嗽是非常常見的，有時候過度劇烈的咳嗽甚至會造成人們的肋骨骨折。呼吸時隔著一個絲質的圍巾、服用止咳藥物及服用消除鼻粘膜充血的藥物可以對部分人們有幫助。但是，登山過程中的咳嗽通常在下降高度的過程中會改善，而且沒有一個絕對的藥物治療方式可以緩解這種情況。

最後，患有糖尿病、高血壓、腎臟疾病或是其他疾病...等本身就有疾病的人們，在著手進行高海拔登山旅遊前必須小心謹慎地請教他們的醫師。

五、救援服務

在喜馬拉雅山區救援服務是非常基本及常見的。這就是為什麼一再地強調預防高海拔腦水腫或高海拔肺水腫...等嚴重高海拔疾病是極度重要的！直昇機救援服務是很容易付費取得的。然而，在高山地區用直昇機來救援常常會因為壞天氣而讓飛行本身充滿風險。

值得慶幸的是，由於下降高度是治療高海拔疾病最重要的方式，而直昇機可以很有效率的帶著人們至較低海拔。因此，針對下降高度這個治療目標，直昇機救援可以提供一個很強大的功能。基於以上的原因，讓人們理解前往喜馬拉雅山區旅遊前在他們的國家先投保適當的直昇機救援保險是非常重要的。很多時候，即使病患在較高海拔的喜馬拉雅山區出現嚴重的高海拔腦水腫或高海拔肺水腫，病患的病情往往會在被下撤至較低海拔的地區後獲得戲劇性的改善。