



Acute high-altitude illness

To the Editor: It was delightful to see an article^[1] about altitude illness in a recent issue of *SAMJ*, especially in view of the fact that over the years there have been many unnecessary deaths on Kilimanjaro due to climbers going up too high too fast. For this reason, prevention of altitude illness is indeed a very relevant topic for your local readership in Africa. The authors have rightly pointed out that ascending gradually is the best way to acclimatise to high altitude and not suffer from acute mountain sickness (AMS) and life-threatening high-altitude cerebral oedema (HACE) and high-altitude pulmonary oedema (HAPE).

Unfortunately there are several misperceptions in the article, and I would like to focus on the use of acetazolamide. The authors do not seem to be clear about the fact that there is strong evidence for the role of acetazolamide in the prevention of AMS. In fact, the guideline^[2] that they cite mentions this in no uncertain terms. Clearly for most trekkers it may be best not to take any drugs and trek up the mountain gradually, but in certain circumstances (for example in a trekker with a prior history of AMS) acetazolamide is certainly very useful chemoprophylaxis. This important fact about the usefulness of acetazolamide when necessary is not emphasised. In fact, the authors promptly note the uncommon side-effects of acetazolamide, including blurred vision, and later lump the most common side-effect (by far), which is a tingling and burning sensation in the fingers and toes, together with the relatively rare side-effects.

In addition, in the treatment of moderate AMS, where acetazolamide is clearly indicated with strong evidence for its effectiveness,^[2] the authors bring up acetazolamide treatment almost as an afterthought.

They suggest acetazolamide for established HAPE, but in the setting of HAPE this diuretic may in fact cause more dehydration and hyperventilation and complicate the problem, and is not indicated.^[2] In addition they suggest treatment of HAPE with dexamethasone, when there is no proof in the literature for this, and they also suggest simultaneously administering both nifedipine and sildenafil for HAPE, which many high-altitude doctors would frown upon.

Finally, it is probably true to say that if knowledgeable guides were to carry acetazolamide and dexamethasone on Kilimanjaro trips, lives could potentially be saved.

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1. Hofmeyr R, Tölkén G, De Decker R. Acute high-altitude illness. *S Afr J Med* 2017;107(7):556-561. <https://doi.org/10.7196/SAMJ.2017.v107i7.12612>
2. Luks AM, McIntosh SE, Grissom CK, et al. Wilderness Medical Society practice guidelines for the prevention and treatment of acute altitude illness: 2014 update. *Wilderness Environ Med* 2014;25(Suppl 4):S4-S14. <https://doi.org/10.1016/j.wem.2014.06.017>

Dr R Hofmeyr et al. respond: We note with pleasure that our recent article on acute high-altitude illness^[1] has drawn significant attention, and are greatly encouraged by the discourse it has generated. We are grateful to Dr Basnyat for his expert engagement and acknowledgement of the challenges of managing acute altitude-related illnesses (such as AMS, HACE and HAPE) in Africa. We regret, therefore, if the brevity of our article and its strong emphasis on safe acclimatisation practices and basic field management of altitude illness have left the misapprehension that we do not advocate the use of acetazolamide where indicated.

Rapid ascent to high altitudes by relative novices is not a uniquely African problem, nor is it limited to mountaineers.^[2] However, African

peaks (such as Kilimanjaro, Kenya, Stanley and Toubkal) very frequently feature short approaches with increased potential for high-risk ascent profiles.^[3] The non-technical nature of many of these peaks allows many trekkers and climbers to ascend and descend rapidly enough to have returned to lower elevations before altitude illness has fully manifested. This practice has led to the true risks being underestimated, and (in our opinion) to an over-reliance on chemoprophylaxis to compensate for high-risk ascent profiles (see Table 2 of our article, adapted from Wilderness Medical Society guidelines^[4,4]) rather than risk reduction through profile adjustment.^[5] This increasing use of and/or reliance on chemoprophylaxis has also been described elsewhere, such as in Himalayan trekkers.^[6] Furthermore, while there is good evidence that acetazolamide undoubtedly hastens acclimatisation (numbers needed to treat in the range of 3 - 8, depending on circumstance^[6-8]), it cannot compensate for excessively rapid ascent.^[9-12] For this reason, we have placed great emphasis on prevention, but wholeheartedly agree that acetazolamide has a strong role in moderate- to high-risk cases where acclimatisation alone is insufficient.^[6,13] We reiterate our recommendation for first-time users to take a few test doses of acetazolamide prior to departure; while (as Dr Basnyat notes) the most common side-effect is severe paraesthesia/tingling/burning of the digits, it does help the user to identify the less common side-effects, which may be confused with AMS at altitude.^[6]

With regard to treatment (as opposed to prophylaxis), it is worth noting that while acetazolamide is widely accepted and used, there are remarkably few examples of robust randomised studies supporting this practice.^[4,14] However, we would re-emphasise our recommendation to follow the existing guidelines and initiate treatment in moderate to severe AMS.^[4] For management of HAPE alone, acetazolamide and dexamethasone are indeed of questionable value, although the latter has been the subject of significant debate and appears in various guidelines.^[4,15,16] While the brevity of our text and the accompanying cognitive aid may give the mistaken impression of a 'shotgun' approach, treatment must of course be selected in the context of the patient's clinical condition, which may or may not include isolated AMS, HACE, HAPE, or any combination thereof. Dr Basnyat's closing remark is apt: Lives could certainly be saved on Kilimanjaro by knowledgeable administration of acetazolamide, dexamethasone and other drugs. However, an ounce of prevention through conscientious mountaineering and adhering to safe ascent profiles is worth a pound of cure.

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