

Case Report

Subarachnoid Cyst and Ascent to High Altitude— A Problem?

PETER H. HACKETT

ABSTRACT

Hackett, Peter H. Case Report: Subarachnoid cyst and ascent to high altitude—A problem? *High Altitude Med Biol* 1:337–339, 2000.—A 31-year-old man suffered diplopia and ataxia on two occasions when he ascended from sea level to 4000 m. Evaluation revealed a moderate-sized subarachnoid cyst in the left frontal region, which did not communicate with the cerebral ventricles. The cyst might have acted as a space-occupying lesion, and caused symptoms on ascent due to hypoxic brain swelling, brain compression against the cyst, and elevated intracranial pressure. Subarachnoid cysts are common, and they should be considered in the differential diagnosis of neurological problems at high altitude.

Key Words: high altitude cerebral edema; acute mountain sickness; neurology; diplopia; space-occupying lesion

A 31-YEAR-OLD MALE PHYSICIAN developed neurological symptoms during the only two occasions that he ascended to high altitude (for hiking and climbing). His home is at sea level. On the first occasion, he ascended to 4200 m in 2 days. At that altitude, he suffered “terrible” anorexia and insomnia, without other symptoms. Two days later, he climbed to the summit at 5000 m, and returned to sleep at 4200 m, feeling well except for the anorexia and insomnia. He awakened the next morning with diplopia and ataxia, but without headache, vomiting, or confusion. He descended with the help of a partner, but the diplopia and ataxia persisted for 4 days at sea level, then resolved spontaneously with no subsequent neurological symptoms. He self-diagnosed acute moun-

tain sickness (AMS)/high altitude cerebral edema (HACE) and had no medical evaluation.

One year later he returned to the same location, but allowed more time for acclimatization. On this occasion, he felt well, without symptoms of AMS. Specifically, he had no headache or insomnia, and his appetite was good. After two nights at 4200 m, he awakened with ataxia and diplopia, but with a clear mind and no headache. He ingested acetazolamide 125 mg twice daily. The ataxia resolved within 24 h, but the diplopia persisted and he descended 2 days later. The diplopia rapidly resolved at sea level. At no time did he have pulmonary symptoms.

After this second episode, he decided to undergo a full medical evaluation. He had no his-



FIG. 1. Sagittal proton-weighted MR image showing a cystic mass in the frontal region.

tory of any significant illness, and no personal or family history of migraine or any other neurological problem. He had never smoked or used tobacco. Physical exam was unremarkable, as was chest radiograph and electrocardiogram (ECG). On neurological investigation, magnetic resonance imaging (MRI) revealed a moderate-sized subarachnoid cyst in the left frontal area (Figs. 1 and 2), and no other abnormalities. Because this is always considered an incidental finding, further evaluation was performed; magnetic resonance angiography and positron emission tomography (PET) were normal. He now wishes consultation on whether his problems at high altitude are related to this finding of a subarachnoid cyst, and whether he should avoid high altitude exposure. What to tell this man?

DISCUSSION

Did this man have AMS/HACE, or were his symptoms at high altitude related to the subarachnoid cyst? Such cysts are considered to cause no clinical problems and are discovered serendipitously. However, a subarachnoid cyst that does not communicate with the ventricular cerebrospinal fluid (CSF) could theoretically

cause problems at high altitude. The absence of an irregularity in the ventricles on his MRI suggests that the cyst is indeed noncommunicating. The cyst thus acts as a space-occupying lesion. While asymptomatic at low altitude, the increased cerebral blood volume and subsequent brain engorgement at high altitude (Icenogle et al., 1999; Muza et al., 1999) might render the lesion symptomatic, as has been reported to happen with brain tumors (Shlim and Meijer, 1991). Either compression of adjacent brain against the lesion could cause localized symptoms, or the increased intracranial pressure (ICP) would cause more global neurological symptoms. The symptoms of this individual were more consistent with the latter process, and similar to those in the case reports by Shlim and Meijer; two of their subjects had meningioma, and one an astrocytoma. The absence of headache, nausea, vomiting, lethargy and confusion, the absence of pulmonary edema, the abrupt onset and the prominence of diplopia argue against the diagnosis of AMS/HACE, although one cannot rule out an atypical presentation. Overall, although no

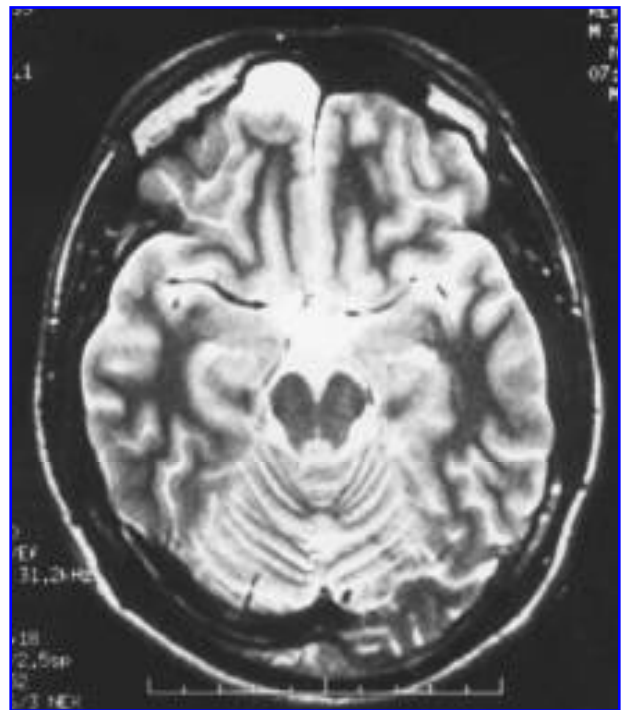


FIG. 2. Axial T2-weighted image demonstrating the subarachnoid cyst in the left frontal area. Spinal fluid in the cyst is white.

firm conclusion can be offered, it seems possible that a subarachnoid cyst could become symptomatic at high altitude, and may have contributed to this man's symptoms. If the subarachnoid cyst were communicating with the ventricular CSF, then one would expect the cyst to become smaller, due to displacement of CSF as part of acclimatization to high altitude (Hackett, 1999).

My advice to this physician is to perform an experiment: proceed to high altitude cautiously, maximize acclimatization by slower ascent and acetazolamide prophylaxis, and descend immediately if neurological symptoms develop. If slow ascent and acetazolamide (and perhaps even dexamethasone) are not effective in preventing symptoms, this would support a role for the subarachnoid cyst. Such a trial is warranted before eschewing further high altitude ventures.

Finally, this example, the brain tumor cases, and others (Litch et al., 1997), remind us that all neurological problems at high altitude are not necessarily altitude illness. A careful history and physical exam will suggest to the astute physician alternative diagnoses.

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Address reprint requests to:

Peter H. Hackett, M.D.

610 Sabeta Drive

Ridgway, CO 81432–9335

E-mail: phack@ruralhealth.org

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