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REVIEW ARTICLE

Wilderness and Adventure Travel With Underlying Asthma

Daniel Doan, MD; Andrew M. Luks, MD

From the Department of Medicine (Dr Doan), Division of Pulmonary and Critical Care Medicine (Dr Luks), University of Washington, Seattle, WA.

Given the high prevalence of asthma, it is likely that providers working in a pretravel setting will be asked to provide guidance for asthma patients about how to manage their disease before and during wilderness or adventure travel, while providers working in the field setting may need to address asthma-related issues that arise during such excursions. This review aims to provide information to assist providers facing these issues. Relevant literature was identified through the MEDLINE database using a key word search of the English-language literature from 1980 to 2013 using the term "asthma" cross-referenced with "adventure travel," "trekking," "exercise," "exercise-induced bronchoconstriction," "high-altitude," "scuba," and "diving." We review data on the frequency of worsening asthma control during wilderness or adventure travel and discuss the unique aspects of wilderness travel that may affect asthma patients in the field. We then provide a general approach to evaluation and management of asthma before and during a planned sojourn and address 2 particular situations, activities at high altitude and scuba diving, which pose unique risks to asthma patients and warrant additional attention. Although wilderness and adventure travel should be avoided in individuals with poorly controlled disease or worsening control at the time of a planned trip, individuals with well-controlled asthma who undergo appropriate pretravel assessment and planning can safely engage in a wide range of wilderness and adventure-related activities.

Key words: asthma, β-agonists, corticosteroids, high altitude, scuba diving

Introduction

Asthma affects an estimated 300 million people worldwide,[1] and is considered one of the world's most common chronic health problems. In the United States alone, 26 million people or roughly 8.2%[2] of the population have been diagnosed with asthma, with further increases expected in the future. With the large number of individuals traveling into wilderness settings for work and pleasure, and the high prevalence of the disease among young people (60% of all asthmatics are younger than 45 years old),[2] it is likely that providers who advise patients planning wilderness travel or practice medicine in the wilderness will be asked to provide pretravel advice regarding asthma management in the field or address asthma-related problems that develop during a sojourn.

Corresponding author: Andrew M. Luks, MD, Division of Pulmonary and Critical Care Medicine, Harborview Medical Center, 325 Ninth Avenue Box 359762, Seattle, WA 98104 (e-mail: aluks@u.washington.edu).

The purpose of this review is to provide practitioners a framework for approaching the asthma patient in these situations. We begin by considering the frequency with which asthma patients experience worsening control during wilderness or adventure travel. We then described unique aspects of wilderness travel with the potential to affect disease control and provide a general approach to both pretravel evaluation and the assessment and management of asthma during planned wilderness activities. We conclude by addressing 2 particular wilderness situations, high altitude travel and scuba diving, which pose unique risks to asthma patients and warrant more specific attention. A general overview of the pathophysiology and management of asthma is beyond the scope of this review. Readers interested in this topic may refer to several excellent reviews on these topics.[3,4]

Asthma Exacerbations During Wilderness Activity

Perhaps the greatest concern regarding wilderness or adventure travelers with asthma is the possibility they

will develop disease exacerbations while away from access to medical resources. Several studies provide information on the extent to which such problems are seen in the wilderness setting. Separate reviews of National Outdoor Leadership School (NOLS) records indicate that 1.9% to 2.1% of reported medical incidents were attributable to asthma,[5,6] whereas a review of medical incidents from 2003 and 2007 in Shenandoah National Park indicated that 3.5% of reported medical incidents were related to asthma exacerbations.[7] Data from various types of adventure races suggest between 1% and 6% of participants in such races develop symptomatic asthma requiring medical attention.[8–10] Comparing data among these studies is challenging as the nature of the activities and the environments in which they are conducted vary among studies and may affect the degree of asthma control.

Only a single prospective study has specifically addressed the extent to which asthmatics experience worsening asthma control during adventure travel. Golan et al[11] screened 5835 patients and subsequently identified 203 individuals with asthma who presented to a travel clinic before a planned sojourn. Forty-three percent reported an exacerbation during their trip, and of these individuals, 37% experienced the "worst asthma attack of their life" and 13% reported a life-threatening attack. Risk factors for worsening control included frequent (>3/wk) use of inhaled bronchodilators before the journey and participation in intense physical exertion during trekking. Together with the studies described above, these results suggest that worsening asthma control does occur during a range of activities in the wilderness, and medical providers dealing with patients engaged in such activities should be prepared for this possibility.

Features of Wilderness or Adventure Travel With Potential to Affect Asthma Control

Several features of wilderness and adventure travel have the potential to affect asthma control in either a positive or a negative manner and warrant consideration during the pretravel assessment.

EXERCISE

A common feature of many forms of wilderness and adventure travel is that they involve exercise ranging from mild to severe in intensity. This is important in the context of asthma management as large numbers of asthma patients report exercise as a trigger for worsening disease control. Fifty-four percent of patients reporting to an emergency department[12] and 41% of the travelers in a travel clinic,[11] for example, identified exercise as a trigger for asthma symptoms. Even among the general population without asthma, a significant proportion have an entity known as exercise-induced bronchoconstriction (EIB), defined as reversible airways obstruction triggered by physical exertion or forcible inhalation of dry cool air.[13,14] Sonna et al,[15] for example, reported that 7% of military recruits undergoing basic training manifested evidence of EIB, whereas prevalence rates as high as 35% have been reported in figure skaters.[16]

ALLERGEN EXPOSURE

For many patients, exposure to environmental allergens has a significant impact on symptom control. Fifty-four percent of emergency department patients and 25% of travel clinic patients in the studies noted above identified allergens as a trigger for their exacerbation.[11,12] Such individuals may be at risk for worsening control with wilderness or adventure activities if their itinerary involves travel into regions with a greater allergen burden, such as springtime travel into areas with high pollen counts. In some cases, however, wilderness travel may actually decrease allergen exposure. At high altitude, for example, the burden of dust mites, a common trigger for many patients, is decreased owing to the lower humidity and other environmental factors and has been associated with outcomes such as decreased airway reactivity to methacholine and histamine challenge.[17]

AIR POLLUTION

Because wilderness and adventure activities are typically conducted outside an urban environment, it would seem reasonable to expect that participation in such activities would involve travel into areas with better air quality and less risk of worsening symptoms. This may not always be the case, however. Adventure travel, for example, frequently requires passing through major international cities such as New Delhi, Bangkok, or Kathmandu, which are notorious for poor air quality. Even in mountainous regions, asthmatic patients may be exposed to poor air quality, as mountain valley systems can trap moisture and air pollution from remote urban settings.[18] In addition, along many major trekking circuits, yak dung and other biomass fuel sources are commonly used in stoves and heaters in local lodges, leading to poor local air quality in the early morning and early evening hours when use of such stoves is at its highest. Indoor air pollution may also be a problem in some regions if stoves in lodges or teahouses are not well ventilated to the external environment.[19]

CHANGES IN AIR TEMPERATURE

As with exercise, a significant proportion of asthma patients report cold air as a symptom trigger.[11,12] Other