ASK A PH SPECIALIST

Q: Will moving to a higher altitude make my pulmonary hypertension worse?

A: Decreased atmospheric pressure at high altitudes leads to decreased oxygen within the lung and decreased oxygen content within the blood. For example, normal partial pressures of oxygen in the blood at sea level may be 85 – 95 mm Hg, but the same person in Denver, Colo. (at elevation 5,280 feet above sea level) may have normal partial pressures of 65 – 75 mm Hg.

These changes in ambient and absorbed oxygen can theoretically have at least two potential consequences that could affect a patient with PH. First, small pulmonary blood vessels (arterioles) constrict when exposed to conditions of low oxygen. This is a normal protective physiologic response at sea level to match blood flow to ventilation in the lung and divert blood flow away from areas of the lung which may temporarily contain less oxygen. However, when it occurs in the whole lung, it can cause increases in pulmonary pressures. It is felt that 9,842 feet (about 3,000 meters) is the approximate altitude which is most clearly related to significant development of pulmonary hypertension due to hypoxemia (low oxygen in the blood). Previous studies have shown significant elevations of pulmonary pressures among residents of this altitude. These changes tend to reverse with return to a sea level existence.

There have been no extensive, detailed human studies of the potential interaction of hypoxic vasoconstriction at altitude with the proliferative vascular changes typically seen in patients with PAH. It is clear however, that many PAH patients do complain of decreased exercise capacity and worsened symptoms even at modest altitudes.

A second possible negative consequence of decreased oxygen levels in the blood is the usual occurrence of an increase in heart output to deliver the same amount of oxygen to peripheral tissues. This extra demand on the heart may make symptoms of PH worse given pre-existing strain on the right ventricle.

To further complicate the issue, some people may have genetic predispositions to react abnormally to the exposure to low oxygen levels (hypoxia). Various studies and estimates suggest that as many as 20 or 25 percent of people may have this characteristic. It might be expected that such a predisposed PAH patient may have substantial worsening upon exposure to even modest hypoxemia found at higher altitudes.

Consensus opinions often suggest careful attention to oxygen supplementation when traveling to help lessen these potential problems. Advice of moving to sea level to assess any change in PAH symptoms may also be advocated. Travel or chronic residence above 8,000 – 10,000 feet (approximately 2,400 – 3,000 meters) for patients with PAH is typically discouraged. A week or more trial period of residence at any altitude may give an early indication of the impact of the move on your PAH. As always, discuss these issues with your pulmonary hypertension physician.

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