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Metabolic Aspects and Mechanisms

9.24 Metabolic Syndrome and Acute Mountain Sickness

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Introduction. Visitors at high altitude are increasing in age and comorbidities which affect acclimatization. It has been suggested that hypertensive patients should not climb to an altitude higher than 3000 m because of hypobaric hypoxia effects. However, it has been shown that patients with metabolic syndrome (MS) tolerate chronic exposure to 1700 m with favourable effects on cardiovascular and metabolic variables and without physical problem.

Case report. A 44-yr-old man, with a sedentary life style but no cardiovascular diseases and reportedly normal blood pressure (BP), trekked in Khumbu valley (Nepal) to an altitude of 5050 m, following the recommended pattern of acclimatization ascent. Before departure his blood tests showed only impaired fasting glucose (117 mg/dl), low HDL-cholesterol (39 mg/dl) and high triglycerides (159 mg/dl). At physical examination abdominal circumference was 92 cm, BP was 135/92 mmHg and heart rate (HR) 85 beats per minute (bpm). The clinical diagnosis was metabolic syndrome (MS), but the ascent was not contraindicated because he had climbed up to the same place ten years before without major physical problems. At 3450-m altitude, his BP peaked to 146/100 mmHg with HR 88 bpm. At 4200-m altitude, he started complaining moderate headache, mild weakness and poor night sleep. The clinical diagnosis was acute mountain sickness (AMS), according to a Lake Louise Score (LLS) of 7, without significant modification of BP and HR. During subacute exposure to 5050-m altitude, despite conserved diuresis, face oedema was evident and associated with increased HR (120 bpm), LLS 4 and BP 134/94 mmHg. The increase of BP and HR were unrelated to the development of AMS, ruling out increased blood pressure in the pathogenesis of AMS. BP and LLS increased earlier than HR, suggesting that sympathetic stimulation is not the main determinant of AMS.

Discussion. Our case report suggests that endothelial dysfunction of MS may be aggravated by chronic altitude exposure and indicates its dominant role in the pathogenesis of AMS. Patients with MS should be carefully monitored for early signs and symptoms of AMS, whereas grade I hypertension does not seem to be a major determinant of AMS.