Altitude Illness

• Umbrella term
  AMS, HAPE, HACE (Re entry HAPE)

• The physiology of Acclimatization.

• Case Report (Hodgkin’s Disease).

Epidemiology and Pathophysiology

• 140 million people live permanently at high altitude ie > 2500m. 100 million go trekking, hiking, skiing etc.

• AMS: 5-50 % have AMS at 4000 m if you walk up in 5 days. If you fly in, 80% will have the problem. D/D Exhaustion, Hypothermia, Hyponatremia, Hangover.

• HACE, about 1 to 4 %. Brain swells irrespective of HACE. Suddenly symptomatic tumors.

• HAPE, about 1 to 4%

Risk Factors

• Rate of ascent
• Exertion
• Alcohol
• Sedatives
• Sleep Desaturation
• Infection
• Patent Foramen Ovale.
• Hemosiderin deposits in the corpus callosum.

Prevention Strategies

• Sleeping altitude should be not more than 300 to 500m from the previous nights altitude after 3000m. Take your time. 1 % VO2 Max decrease for every 100 m gain above 1500m. Same sleeping altitude every 3rd night.

• Stay at high altitude (> 2000m) for a week before the high altitude trek.

• Hydration
• Role of Diamox (acetazolamide), non antibiotic sulfonamides, nifedipine, sildenafil, steroids (VEGF factor) in prevention.

• Acetaminophen and Ibuprofen.
• How do the above drugs work?

Vulnerable Population at altitude

• Porters
• Pilgrims
• Yarsha Gumba (caterpillar fungus) pickers
• People who keep checking with their pulse Ox.

Sherpas and other people of Tibetan ancestry

The role of HIF (a master switch; specifically HIF 2 Alpha is over represented in Tibetans and controls erythropoiesis and VEGF production among other things so that the Tibetans in general, unlike South American highlanders or the Han Chinese, do not have polycythemia and do not in general suffer from Chronic Mountain Sickness.

A striking recent finding shows that some of these genetic characteristics may stem from those of Denisovan hominids who were contemporaries of the Neanderthals. And the changes took place 3000 years ago which is fast in evolutionary terms.

Greg Semenza and Peter Ratcliff
Cases

• SAH
• Venous sinus thrombosis and also mesenteric vein thrombosis.
• Velcro like crackles.

Other

• Antiphospholipid Syndrome.
• Macular Hemorrhage.
• Transient global amnesia
• CPAP for obstructive sleep apnea. Obstruction converts to central sleep apnea. So give Diamox too.
• 672 hypertensive patients study. No problems. Aconcagua.
• Comet tail sign on ultrasound means extra pulmonary lung water.
• Indian war.
• Budesonide

Further Reading
