Oral glucose tolerance test of lowlanders in acute hypoxia

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The glucose is the only nutrient that is used by the encephal, retina and germinal epithelium of the gonades in enough quantity to give them energy. The glycemia concentration in appropriate ranges it is very important and it needs a rigorous control, which is regulated by several factors. Many hormones with glucoregulatory activity are important in the control of the glycemia, the insulin and the glucagon play an important role in directing the flow of metabolic fuels, whereas there are factors that regulate insulin and glucagon secretion from de pancreas like acetylcholine, norepinephrine and epinephrine. Other hormones like growth hormone, thyroid hormone, glucocorticoids, catecholamines, are released usually when the glycemia falls. Much has been learned regarding the adjustments made by the body in response to exposure to high altitude (hypobaric hypoxia). Ascent to high altitude is a known stressor with physiologic and metabolic consequences. These adjustments to high altitude are further complicated by the added stress of physical activity.

Observations found that hypoxia develop alterations in carbohydrate metabolism in man have shown that ascent to high altitude (HA) is associated with an increase in insulin, cortisol and growth hormone concentrations under acute hypoxia (Sawhney 1991), the epinephrine and norepinephrine secretion are high in acute hypoxia also (Robert S.2003)

Nevertheless Pilar Navia found in habitants of La Paz high values of tolerance to the oral glucose test, that could lead to increase incidence of glucose intolerance. However, to our knowledge, no investigation has directly compared the oral glucose tolerance test at different altitudes in acute hypoxia, whereas (Sawhney, Robert S, E. Picon-Reategui, Kimberly E.) studied glycemia control after fasting and during acclimatization in different days, but they have not showed dates about the oral glucose tolerance test in acute hypoxia.

In order to replace speculations it seems to us mandatory to measure the oral glucose tolerance test in lowlanders from Moquegua at 1400m that ascending to high altitude to Puno at 3820m in acute hypoxia.

Medical student volunteers, nonsmoking, normal-weight, will participate in the study. For inclusion, subjects will have to maintain a stable body weight for the previous 6 month, to be in good health without chronic illnesses, and to have been born at sea level.

The study will have two parts, at sea level and at high altitude, first we will measure at sea level, the first test will be performed in the morning after an overnight fast (8h), them all subjects in the study will drink 500 ml of solution containing 75g of glucose and blood samples will be collect from an arm vein at 30, 60, 90 and 120min after the oral glucose load. The sample of blood glucose will be analyze whit spectrophotometry,, after one day these subjects will go from sea level to high altitude at 3820m by road (4h journey), and in the first 6 hours of stay at HA, we will take the first sample after 8h of fast, them all subjects in the study will drink 500 ml of solution containing 75g of glucose and blood samples will be collect from an arm vein at 30, 60, 90 and 120min after the oral glucose load, and the blood will be analyze whit spectrophotometry.