ADVERSE STRESS REACTIONS IN MAGNESIUM DEFICIENCY: PREVENTIVE AND THERAPEUTIC IMPLICATIONS. *Seelig MS.* Community and Preventive Medicine, New York Medical College, Valhalla, NY; Department of Nutrition, School of Public Health, University of North Carolina, Chapel Hill, NC USA.

Stress hormones (catecholamines and corticosteroids) that evoke responses allowing for increased survival in life-threatening situations, can increase the risk of sudden cardiac death (SCD) in the presence of Mg deficiency. They mediate release and utilization of substrates for production of energy and for improved skeletal and cardiac muscle performance, and mobilize tissue Mg. The resultant (transitory) increase of serum Mg protects against arrhythmias and intravascular coagulation in the short-term. However, plasma Mg at levels exceeding the renal threshold is excreted, and free fatty acids that are released through the lipolytic effect of catecholamines, inactivate Mg. Both stress hormones mobilize bone minerals, with resultant increase in the plasma Ca/Mg ratio, which increases risks of both intravascular coagulation, and arrhythmia. High Ca/Mg ratios also stimulate, and high Mg/Ca ratios suppress catecholamine secretion by the adrenal medulla and by secretory granules at nerve endings and in the myocardium. Low Mg also increases output of mineralocorticoids, which in turn directly enhance urinary excretion of Mg and intensify cardiopathogenicity of both Mg deficiency and catecholamine excess. Furthermore, reduced arterial tissue Mg can lead to coronary constriction—directly and through humoral vasopressors. Reduced myocardial Mg increases vulnerability to cardiac damage. With marginal Mg intakes, athletes undergoing exhausting physical exertion and athletic competition, experiencing stress-induced Mg loss can exhibit impaired performance and endurance, and muscle cramps. Adolescent athletes may be at high risk because they require more Mg for development and growth. Genetic differences in Mg homeostasis may be responsible for differences in susceptibility to pathologic reactions to stress. Mg deficiency and stress mutually enhance one another.

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