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Extended Abstract
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Cardiology-2018 : Why is Cardiac Morbidity and Mortality Greater Around Christmas, New Year's, Monday Mornings and in the Morning Hours : Potential Roles of Unrecognized Ionized Hypomagnesemia and Release of Ceramides? - Burton M Altura - Downstate Medical Center

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Introduction:

There is a growing incidence of lethal cardiac events around Christmas, New Year's and in the morning hours from 4:00 to 10:00 a.m. which is well-established in the USA and in The Southern Hemisphere. In addition, many cardiac deaths often occur on Mondays with no satisfactory explanation. Many of these deaths are, for the most part, unexplained and listed as "death from "natural causes". Although in the USA, the deaths which occur around Christmas and New Years happen in the cold – winter months, this does not account for many cardiac incidences which occur throughout the year in the early a.m. hours or on Mondays.

A number of explanations have been offered to explain the higher morbidities and mortalities at these special times of the year, morning hours and on Mondays, such as emotional stresses, too much ingestion of alcoholic beverages, improper medical facilities, diet, and/or changes in the physical environments.

Role of Magnesium in Cardiac Morbidity and Mortality

Ever since our laboratories first reported that magnesium (Mg) deficiency results in vasospasms of small and large coronary arteries, and that these events could be responsible for a great deal of sudden death ischemic heart disease (SDIHD), a number of clinical studies have appeared which have confirmed and extended these findings. We originally speculated that low dietary Mg intake and /or errors in Mg metabolism could be responsible for a large number of sudden cardiac deaths (SCD) and heart attacks in the Western world.

In the early 1980's, some clinical studies appeared which suggested that of all electrolytes measured in the blood of hospitalized patients, total serum magnesium (Mg) levels often showed lowered levels, e.g., from 80-50% of normal. However, in general, patients admitted to the intensive or coronary care units often demonstrated 60-30% of normal total blood levels of Mg. When the blood/sera/plasma from these patients are examined for ionized Mg levels, in addition to the latter measured total Mg levels, these numbers rise to 80-70% in the patients admitted to intensive and coronary care units. In addition, the red blood cells obtained from these patients are severely deficient in ionized Mg (e.g., 60-40% of normal; Resnick, Altura, and Altura, unpublished studies). Why is it so important to measure ionized Mg levels, not only total blood Mg levels?

Mg is a co-factor for more than 500 enzyme systems, and is the second most abundant intracellular cation after potassium. It is critical in numerous physiological, cellular and biochemical functions and systems, running the gamut from hormone-receptor binding, transmembrane fluxes of cations and anions, cellular energy generation, muscle contraction, regulation of DNA and RNA structure, regulation of lipid and carbohydrate metabolism, regulation of plasma lipid levels (i.e., cholesterol, triglycerides, and LDL-cholesterol), regulation of cell and tissue growth, nerve conduction, diverse cardiac functions and cardiac stability, control of vasomotor tone and distribution of blood flows to all organ systems, and cell death (i.e., apoptosis and necroptosis), among many others. Mg is depleted in normal methods of food preparation (e.g., boiling, frying, etc.) and processing.

The daily intake of Mg has been declining since 1900, from where it was about 500-600 mg/day to about 150-225 mg/day, in many USA and European geographic regions, at the present time. Mg is known to exist in three forms; free or ionized, complexed, and protein – bound. These three fractions constitute the total serum

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and cell Mg. In addition, up until our studies, there were no reliable methods to measure ionized Mg on whole blood, serum , and plasma rapidly (within 1-2 min) in the OR and critical-coronary care units

ur results, so far, bolster the idea that water intake (e.g., from tap waters, well waters, beverages using tap/well/spring , or desalinated waters) in humans should contain at least 25-40 mg/liter/day of Mg^{2+}. A number of studies, done in our labs, indicate that most, if not all the cardiovascular manifestations observed in experimental animals (discussed above) found to be MgD can be avoided by supplementing drinking waters with appropriate amounts of Mg^{2+}. Supplementation of diets with adequate amounts of Mg, in our youth, should help to prevent the beginning of atherosclerotic plaques seen in growing children. The inclusion of adequate amounts of Mg in our diets , drinking waters, and beverages should cut-down, tremendously, the risks of SDIHD, SCD, CHF, and CADs, ,and, in the process, should greatly reduce the current 350 billion dollars/ year spent in the USA, alone, to treat cardiovascular diseases.

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Biography:

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