Prevalence of Vitamin-D Deficiency in Patients with Acute Coronary Syndrome in Syria

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ABSTRACT

The objectives of this study were to estimate the prevalence of vitamin D deficiency in patients with acute coronary syndrome in comparison with normal individuals and study the correlation between these two conditions. We measured the plasma 25-hydroxy vitamin D (25-OH-D) levels in 60 patients with acute coronary syndromes (ACS) of both gender and in 30 age matched control individuals of both gender without any known cardiovascular or systemic diseases. The levels of 25-OH-D were measured by ELISA method and the results were statically analyzed to find out any possible correlation. We classified the cases according to their plasma 25(OH)D levels. 25(OH)D levels of ≥ 30 ng/ml were considered normal, levels < 30 and > 20 ng/ml were classified as insufficient, while levels of ≤ 20 ng/ml were classified as deficient. In the current study the prevalence of hypovitaminosis D in the patients group was much higher than it was in the control group. Vitamin D deficiency was observed in 80% and insufficiency in 13% of total patients of ACS, thereby bringing the total count to 93%. Whereas only 7% of the patients had adequate vitamin D levels. Thus, these results indicate the existence of a significant correlation between the vitamin D deficiency and ACS in comparison to healthy controls.

KEYWORDS: Vitamin D Deficiency, Cardiovascular, Acute Coronary Syndrome, Prevalence.

Introduction

Vitamin D deficiency is a worldwide health problem. A very high prevalence (96%) of vitamin D deficiency has been reported in patients of coronary artery disease (Lee et al., 2011). A growing body of evidence supports an association between vitamin D and cardiovascular disease (Welles et al., 2014). Rates of vitamin D deficiency and cardiovascular disease increase with distance from the equator, with higher rates of ischemic heart disease noted in countries with lower levels of ultraviolet B exposure (Zittermann et al., 2005). Vitamin D levels have been shown to be seasonal, with higher levels in summer (Zittermann et al., 1998), and the rate of ischemic heart disease can display similar seasonal patterns (Douglas et al., 1995). Epidemiologic studies (Grimes et al., 1996; Rostand, 1997) have reported a trend toward a higher prevalence of coronary heart disease and hypertension with increasing distance from the equator, and these higher rates are attributed to the higher rates of vitamin D deficiency in regions with less exposure to sunlight.

Vitamin D in the form of 1,25(OH)2D is a hormone, because it is produced primarily in one organ (the kidneys). Then it circulates throughout the body, where it exerts wide ranging effects. The VDR is present in most tissues, including endothelium, vascular smooth muscle, and myocardium (Zittermann., 2006). In vitro, activated 1, 25-dihydroxy vitamin D directly suppresses renin gene expression (Sigmund et al., 1990; Li et al., 2002), regulates the growth and proliferation of vascular smooth muscle cells and cardiomyocytes (O'Connell et al., 1997), and inhibits cytokine release from lymphocytes (Rigby et al., 1987). Studies in knockout mice have confirmed that the absence of vitamin D receptor activation leads to tonic upregulation of the renin-angiotensin system, along with the development of hypertension and left ventricular hypertrophy (Li et al., 2002; Wu et al., 1995; Xiang et al., 2005). Previous studies (Xiang et al., 2005; Younget al., 2011; Forman et al., 2007; Martinset al., 2007) have demonstrated associations between low vitamin D levels and increased plasma renin activity, coronary artery calcification, blood pressure, and cardiovascular diseases.

To the best of our knowledge, no study from Syria has evaluated the correlation between ACS and Vitamin D deficiency up till now. However, such data will be of immense use for the Syrian health care providers. Therefore, we designed an observational study aimed to determine the prevalence of vitamin D deficiency in patients admitted with acute coronary syndrome and to evaluate the relation between the two states.