VITAMIN D DEFICIENCY AND ITS RELATION WITH SOME DISEASES: A REVIEW

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Abstract

Vitamin D is fat soluble vitamin synthesis from isoprenoid units by condensation process in vivo when exposure to sun light (weak UV source). The main function of vitamin D is maintenance on calcium hemostasis, beside this function has important role as a protection factor from many disease such as autoimmune diseases and cancer. There are several suggestions to support the immunity such as intake vitamin D that has the ability to reduce the risk of respiratory tract infections, such as epidemiology of influenza and COVID-19. Vitamin D can reduce the risk of COVID-19 infection through the mechanisms including lowering replication of virus by induction of cathelicidins and reduced the inflammatory cytokines that produced from the lining cells of lungs which lead to pneumonia and lung fibrosis due to autoimmune diseases as well as increase the concentrations of anti-inflammatory cytokines.

Key words: Vitamin D, COVID-19, cancer, autoimmune diseases, calcium hemostasis

Introduction

Vitamin D from the fat soluble vitamins serve as prohormone because can synthesis in the body when exposure to ultraviolet light at wavelength (290-315) nm from its precursors (7-dehydrocholesterol) (Brannon et al., 2008). Vitamin D useful to conserve of many of biological functions such as metabolic and reproductive process, muscular, skeletal, cutaneous, respiratory and immune systems of men and women at any age stage (Wolf et al., 2007)(Inaguma et al., 2008). therefore according to researchers reports the lower levels of 25-(OH)D associated with risk for bone fractures (Al-Aly, 2007)(Dobnig et al., 2008), falls (Melamed et al., 2008), cardiovascular diseases (Autier, Gandini and Mullie, 2012), colorectal cancer (Judd and Tangpricha, 2008), diabetes mellitus (Mathieu et al., 2005), depression (Sloka, Grant and Newhook, 2010), cognitive decline (Mathieu et al., 2004).

Vitamin D deficiency (VDD) can be determined by measuring concentration of serum 25-(OH)D. From the difficulties in measurement of 25-(OH)D levels is presence of multiple assays (Prince et al., 2008), and lack of an international reference for measurements of vitamin D (Broe et al., 2007). Recently, the Ministry of Health and Cancer Society of New Zealand (Bischoff-Ferrari et al., 2009), Institute of Medicine (Osborne and Hutchinson, 2002) and American Academy of Dermatology (AAD) and AAD association (Freedman et al., 2007) they are agree on the minimum concentrations of 25(OH)D at least 50 nmol/L for better healthy cases. VDD is common in regions and countries of North America, Northern Europe, Saudi Arabia, the UAE, Australia, Turkey, Iraq, and Lebanon (Freedman et al., 2007).

A lot of studies have been illustrate VDD is associated with elevated levels of serum Parathyroid Hormone (PTH) due to indicative effect of secondary hyperparathyroidism (Garland et al., 2006). Also, low of vitamin D levels may be related with several factors include darker skin (pigmentation) (Heaney, 2008), lower intake of vitamin D (Ebers, 2008), insufficient exposure
to sun light (Kampman, Wilsgaard and Mellgren, 2007)(Willer et al., 2005), obesity (van der Mei et al., 2003), Older age (Holick, 2004), and female sex (Adorini and Penna, 2008), no sport exercise (Szodoray et al., 2008), and bad health status (Munger et al., 2006).

Vitamin D deficiency treatment by increase intake of vitamin D rich foods and in severe deficiency give the patients oral vitamin D in several forms (tablet or gel capsule) dosage (200-500 IU), in some times can be given in combination with calcium (Kragt et al., 2009)(van der Mei et al., 2007). The side effect of hyper dosage of vitamin D hypercalcemia, hyperphosphatemia, suppressed parathyroid hormone levels, and hypercalciuria (Soilu-Hänninen et al., 2005)(Al-Mahdawi, Al Gawwam and Al Ethawi, 2014). The following table show some studies related with vitamin D.

Vitamin D Deficiency as a Risk Factor for Infected by COVID-19

The world is in the hold of the COVID-19 pandemic. There are several suggestions to support the immunity such as intake vitamin D that has the ability to reduce the risk of respiratory tract infections, such as epidemiology of influenza and COVID-19. Vitamin D can reduce the risk of COVID-19 infection through the mechanisms including lowering replication of virus by induction of

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cathelicidins and reduced the inflammatory cytokines that produced from the lining cells of lungs which lead to pneumonia and lung fibrosis due to autoimmune diseases as well as increase the concentrations of anti-inflammatory cytokines. From the evidence on the protective effect of vitamin D against COVID-19 is increase the number of patients that infected in the winter due to a decrease in the concentration of this vitamin to its lower levels and as well as the deficiency of vitamin D with older age and who have acute respiratory distress syndrome or chronic diseases. So, to minimize the risk of completions or infections, recommended for a people to intake 10,000 IU of vitamin D for a few weeks followed by 5000 IU to quickly elevated vitamin D level and reach to 40-60 ng/ml (100-150 nmol/l) (Grant, Lahore, Mcdonnell, et al., 2020).

Vitamin D Deficiency Correlation with Multiple Disorders

Vitamin D has several benefits for organism, therefore it is deficiency related with various osteoporosis due to calcium imbalance, as well as in cancer, ischemic heart diseases, diabetes, autoimmune and infectious diseases. Also increase skeletal disorders, such as elevated levels to incidence of malignancies, colon cancer, prostate and breast gland cancer (Peterlik and Cross, 2005).

The following we will discuss the eight disorders in more details as related with VVD.

Heart Disease

Monitoring levels of vitamin D in the people suspected to incidence of heart diseases is important due to correlation between them as increase risk factors such as (hypertension and diabetes) because vitamin D is related with electrolytes levels, so the patients with hemodialysis is more probability to become heart failure (Al-Kufaishi, 2015).

Evidence suggests so higher plasma concentrations on 25-hydroxy vitamin D may also minimize the gamble of hypertension (Gröber et al., 2013). Some meta analyses have recommended a gore pressure lowering effect concerning diet D supplementation, whilst other meta-analyses, into 2015, should no longer confirm these findings then confirmed no impact on vitamin D supplementation on blood pressure (Judd and Tangpricha, 2009). Further, in a recent randomized controlled trial of 200 hypertensive patients, no giant impact concerning vitamin D supplementation of 24 h gore stress could keep performed (Drechsler et al., 2010).

In addition vitamin D have suppression effect to the gene that unregulated in myocardial hypertrophy (Beveridge et al., 2015). Also, regulate1, 25-dihydroxy vitamin D might have been demonstrated to push antihypertrophic. Impacts around cardiomyocytes Furthermore decreased the outflow of a few genes. Which are unregulated Previously, myocardial hypertrophy (Al-Dujaili, Munir and Iniesta, 2016). Concealment. Of the cardiovascular Renin-Angiotensin framework (RAS) also of natriuretic peptides might incompletely intervene these antihypertrophic impacts for vitamin D. Separated starting with this; vitamin D exerts Different impacts on the development Also. Separation for cardiomyocytes. Person valuable enter component of. Vitamin D may be will restrain unreasonable burgeoning from claiming cardiomyocytes (Chen et al., 2011). Pilz et al. Elucidated if insufflate vitamin D status is connected with heart disappointment Furthermore sudden demise cardiovascular passing.

Real finding of the contemplate might have been that low levels for 25-hydroxy vitamin D Also 1,25-dihydroxy vitamin D were connected with predominant. Myocardial dysfunction because of heart failure (Chen et al., 2011).

Those low pervasiveness from claiming patients with extreme vitamin D insufficiency Also. Those generally short medicine period show up with be those limits. For this consider as writers were unabated will avoid noteworthy impacts about (Al-Kufaishi, 2016). Vitamin D clinched alongside populaces with low vitamin D levels and for longer. Medicine or diverse doses about vitamin D. It is be noted that the point when supplementing vitamin D, it as a rule takes about 3 months will achieve a enduring state to circle 25-hydroxy vitamin D concentrations; Be that as. In this study medicine time might have been moderately short, which expands those. Segregation racial inclination for effects (Pilz et al., 2015).

Pilz et al. performed in turn ponder for those point will gatherings give. A review of the pathophysiological instruments and the, Epidemiological information concerning vitamin D lack What’s more myocardial. Sickesses (Pilz et al., 2010). A few body of evidence reports highlight pediatric cardiomyopathies, which are connected with vitamin D lack or rickets (Elidrissy, Munawarah and Alharbi, 2013)(Elidrissy, Munawarah and Alharbi, 2013). All the more. Importantly, kids with vitamin D insufficiency connected heart disappointment. Indicated By and large An huge clinical change after vitamin D Also calcium supplementation (Fanari et al., 2015). A post mortem examination of a. Child, who kicked the bucket because of vitamin D insufficiency connected cardiomyopathy. Indicated an expansive pericardial radiation Furthermore an developed heart for An widened. Furthermore concentric hypertrophic left ventricle. There might have been An gentle build. For interstitial stringy
tissue, especially in the subendocardial districts. And the cardiomyocytes were dainty and lengthened clinched alongside keeping with widened cardiomyopathy (Kienreich et al., 2013).

Zittermann et al. Discovered fundamentally diminished 25-hydroxy vitamin D What’s more 1,25-dihydroxy vitamin D levels over 54 heart disappointment patients. At compared with 34 age, sex, What’s more BMI-matched controls (Ajabshir, Asif and Nayer, 2014).

For An investigation Around 102 African Americans, vitamin D insufficiency might have been. Watched On 84-96% of heart disappointment patients, while main one-third. Of the sound controls were vitamin D insufficient (Teotia and Teotia, 2008). Two All the more. Investigations “around African Americans Additionally indicated a secondary predominance of. Vitamin D lack done patients for heart disappointment. Interestingly, not. The sum heart disappointment patients for vitamin D lack show elevations in. PTH levels, Be that the individuals with optional hyperparathyroidism need more. Extreme types of heart disappointment (Mitri and Pittas, 2014).

In the national wellbeing Furthermore sustenance examination study. (NHANES), An population-based ponder in the us including 8351. Persons, 25-hydroxy vitamin D levels were fundamentally decreased Previously,. Patients with self-reported heart disappointment with those most noteworthy predominance for. Vitamin D lack done patients for heart disappointment. Interestingly, not. The sum heart disappointment patients for vitamin D lack show elevations in. PTH levels, Be that the individuals with optional hyperparathyroidism need more. Extreme types of heart disappointment (Mitri and Pittas, 2014).

Bone Defect
Vitamin D play important role in bone maintenance, because its prevent several chronic diseases as ostateomalacia and rickets beyond osteoporosis (Sunyecz, 2008). Although calcium level within normal value, but calcium hemostasis disturbed due to VVD (McKay et al., 2009) (Pilz et al., 2013). A low level of vitamin D associated with osteoporosis is unclear (Pilz et al., 2013). One from the responsible mechanism to investigate osteoporosis is regulatory effect of vitamin D to parathyroid hormone, which responsible about calcium hemostasis (Adams and Hewison, 2012).

Vitamin D and Cancer
In 2009 the National Cancer Institute represented vitamin D reduced the possibility to cancer incident such as prostate, breast, and other malignancy (Donaldson, 2004). This effect occur by inhibiting cell proliferation by vitamin D receptor (VDR) (Sun, 2010). Also, through inhibiting gene that responsible about cancer by polymorphism process (Dusso, 2011).

Immunological Role of Vitamin D
Vitamin D act as potent modulator for immunological cell as macrophage, B-cells, and T-cells (Hyppönen et al., 2000). Therefore the low levels of vitamin D lead to impairment for macrophage activation, and function to prevent infectious diseases (Zerwekh, 2008).

VVD increase the risk for autoimmune diseases as rheumatoid arthritis, SLE, multiple sclerosis and type I diabetes (Bacon et al., 2010).

Conclusion
In brief, vitamin D has multifunctional inside human body. Therefore must be monitoring his levels by biochemical tests. The lower levels of vitamin D association with several diseases such as cardiac, autoimmune and bone diseases. The oral administration of vitamin D capsule 400 IU per day to protect people from risk infected by COVID-19. Whereas the numerous
experiments for a clinical trial reported a vitamin D supplementation could reduce the risk of influenza.

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