Vitamin D and Menopause

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Abstract

Menopause is the transition period in female life cycle. Resultant hormonal changes lead to adverse health effects. Women may seek treatment due to significant impairment in quality of life. Vitamin D deficiency is a globally prevalent problem. Vitamin D deficiency in menopausal women may aggravate the adverse health risks associated with menopause. In this article, the authors discuss endocrinology and clinical features of menopause, Vitamin D and its links with menopause, and the potential role of Vitamin D supplementation to combat detrimental multi-organ system effects of menopause.

Keywords: Vitamin D, menopause, Vitamin D supplementation.

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Introduction

Menopause is a transitional period from reproductive to post-reproductive phase in the female life cycle. It is a physiological process defined by cessation of menstrual cycles for a minimum of 12 months. It is experienced by all women at some point and is a difficult transition period marked by various challenges and trials. The average age of attaining menopause is 51 years in developed nations. This varies depending on a number of factors, including demographics like socioeconomic status, race, and ethnicity; menstrual and reproductive history. Lifestyle choices like smoking, physical activity, body weight and diet also play a role.[1,2] Early menopause is described as occurring between the ages of 40 and 45. Premature menopause occurs before the age of 40 caused by chromosomal anomalies or surgically induced by bilateral oophorectomy. Such women are more susceptible to the undesirable negative health changes after menopause.[3]

Endocrinology Of Menopause

During menopausal transition, the number of ovarian follicles decreases, leading to changes in reproductive hormones and irregular menstrual cycles, which eventually stop altogether. Depletion of follicles leads to a decline in oestrogen levels. This raises the secretion of luteinizing hormone (LH) and follicle-stimulating hormone (FSH) by the pituitary gland, as inhibitory feedback is lost. This decline in oestrogen levels has various adverse health effects in the postmenopausal period.[1] These physiological changes may span several years before the final menstrual period (FMP) and persist well beyond the FMP.

Clinical features

During the transitional period, women experience a wide range of symptoms. The most common are vasomotor symptoms (VMS) presenting as hot flashes and night sweats. VMS are seen in up to 80% of women. On average, women experiencing frequent VMS have symptoms for more than 7 years.[4] Menopause results in genitourinary changes referred as genitourinary syndrome of menopause (GSM). Changes include vaginal dryness and atrophy, and narrowing of vaginal canal. Psychogenic symptoms like decreased libido, depression, anxiety, sleep disturbances, and cognitive decline are common. A frequent complaint is musculoskeletal pain linked to an increased rate of bone density loss.[5] Apart from the transient symptoms experienced during menopause, there are many long-term outcomes. These include deranged lipid metabolism, metabolic syndrome, cardiovascular disease, osteoporosis, osteoarthritis. An increased risk of dementia, dermatologic conditions, cataract, ovarian cancer, and colon cancer is observed.[2] Menopause impairs quality of life in a significant proportion of women, resulting in them seeking medical care and treatment for its management.

Management spectrum

Physicians can choose from multiple classes of drugs to prescribe for perimenopausal women including Hormonal Therapy and Selective Estrogen Receptor Modulators (SERMs). Nonhormonal treatments are Selective serotonin reuptake inhibitors (SSRIs), Serotonin and norepinephrine reuptake inhibitors (SNRIs), clonidine, and gabapentin.[5,6] Non pharmacological treatments comprise omega-3 fatty acids, vitamin E, vaginal lubricants and moisturisers. Lifestyle modifications and cognitive behavioural therapy (CBT)

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Table: Vitamin D And Menopause: Clinical Links

Organ system	Effect of menopause	Link with Vitamin D
Bio-metabolism	Increased total body fat mass, hypertriglyceridaemia, weight gain. Increased risk of metabolic syndrome and cardiovascular disease.	Increased risk of VD deficiency with weight gain.VD Supplementation reduces central fat deposition, lowers risk of Metabolic syndrome and cardiovascular disease.
Insulin action	Decreased Insulin action and sensitivity.	VD Supplementation reduces progression to T2DM.
Musculoskeletal system	Decreased bone density, musculoskeletal pain.	VD Increases bone density, Fracture prevention.
Neuropsychiatric health	Cognitive decline and mood disorders.	VD has positive effect on memory and cognition, reduced risk of dementia.
Malignancy	Increased susceptibility to breast and colon cancer.	High VD levels lower mortality rates in breast and colon cancer.
Genitourinary health	Genitourinary syndrome of menopause (GSM).	VD produces positive changes in vulvovaginal health.

cause reduction of stress and insomnia. For treatment of musculoskeletal symptoms, bisphosphonates, and calcium and Vitamin D supplementation is being utilized.[5,7]

Vitamin D

Vitamin D is a hormone that acts on nuclear receptor and alters gene expression. Majority is endogenously produced via skin exposure to Ultraviolet-B (UV-B) radiation. Some amount can be acquired via dietary animal fats found in dairy, eggs and fish. The Endocrine society recommends using levels of the circulating form i.e., 25-hydroxy form of Vitamin D (VD) to categorise individuals. Levels between 21-29 ng/ml are considered insufficient and below 20 ng/ml are considered deficient. Low levels of VD are a problem widely prevalent across the globe. It affects both developed and developing nations impacting various demographic groups including children, pregnant and lactating women and the elderly. This widespread deficiency may be the result of modern-day lifestyles with limited sun exposure.[8] Apart from its well-established action in bone turnover and metabolism, it is now accepted that Vitamin D acts on multiple organ systems. It is evident via wide expression of Vitamin D Receptors in tissues other than those involved in calcium and phosphate metabolism.[9]

Vitamin D and menopause

Metabolic changes during menopause lead to an increase in total body fat mass and weight gain. This puts perimenopausal women at an increased risk of VD deficiency. The adverse long term health effects of VD deficiency have considerable overlap with adverse menopausal changes. Thus, concurrent VD deficiency can aggravate the negative health outcomes of menopause. VD has a role in fracture prevention in postmenopausal females by improving bone density and muscular health. VD levels in peripheral tissues are known to influence multiple metabolic functions like insulin action and sensitivity. This prevents progression to T2DM, and causes a modest reduction in blood pressure.[10] Vitamin D insufficiency increases the risk of Metabolic syndrome and cardiovascular disease, to which menopausal women are already predisposed to. VD supplementation may reduce central fat deposition lowering the risk of hypertriglyceridaemia and Metabolic syndrome.[9,11] Another common symptom shared by VD deficiency and menopause is cognitive decline and mood disorders. Adequate VD levels exert a positive effect on memory and cognition thereby reducing the risk of dementia. High VD levels are associated with lower mortality rates in breast and colon cancer, that postmenopausal women are more susceptible to develop.[10] High doses of VD supplementation produce positive changes in vulvovaginal health of menopausal women combating the effects of GSM.[12] The various links between menopause and VD are described in Table 1.

Clinical approach

High prevalence of VD deficiency and the positive effects of VD supplementation suggest a need for screening post-menopausal women for VD levels and adequate supplementation. The prescribed doses should be individualised according to body mass index, current VD serum levels, or risks to be prevented. VD levels should be assessed at an interval of 3 to 6 months to treat deficiency and maintain levels above the recommended threshold. The recommended daily dose for asymptomatic individuals is 800 to 2000 IU. For symptomatic cases with low VD levels daily dosage can be up to 6000 IU.[13] Individually prescribed supplementation may not be sufficient for correction of VD status in the general population. Public health measures like fortification of food substances may be necessary to tackle this widespread problem. This has already been implemented in countries like USA, Canada, Finland, and, India. Though

cost effective and beneficial to the general population, the risk of hypervitaminosis D must also be kept in mind while introducing such large scaled programmes.[14]

The way forward

There is a paucity of large scaled studies and randomised controlled trials to find conclusive evidence of efficacy of VD as a treatment for multitude of menopausal symptoms and health risks. The prevalence of VD deficiency is high, and the general population is aging globally. As a result, the number of women going through menopause will increase, making it a significant public health concern. We must investigate this subject thoroughly with the aim to incorporate this innovative and unexplored intervention as an established form of management for menopausal women.

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