Postmenopausal Women: Oral Problems & Management, a Review

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Abstract

The term natural menopause is defined as the permanent cessation of menstruation resulting from the loss of ovarian follicular activity (WHO). Following menopause, symptoms can occur due to lowering of estrogen levels in the body. General symptoms related to lowering of estrogen levels include hot flashes, night sweats, vaginal dryness, painful sexual intercourse (dyspareunia), and vaginal itching or irritation.

The oral tissues are affected and altered by the female sex hormones as are others. The oral problems that may arise due to low level of estrogen may include xerostomia, burning mouth syndrome (BMS), increase in incidence of dental caries, dysesthesis, taste alterations, atrophic gingivitis, periodontitis, and osteoporotic jaws.

The etiology of BMS is unclear and female sex hormones and neuropathic factors may be implicated, possibly through small-fiber sensory neuropathy of the oral mucosa. Xerostomia might be unrelated to lower salivary flow rates, it may in fact be a process associated with low estrogen levels.

The effect of sex steroid hormones on periodontium has escalated the interest in defining the specific relationship among androgens, estrogens and progesterin’s to the normal function and disease in the periodontium. The postmenopausal symptoms may unfavorably affect oral health and the dentists need to be aware of the symptoms and health care needs of menopausal/postmenopausal women. The inter specialty understanding and collaboration should be improved and this article makes a small step and attempt to improve the health of postmenopausal women by a comprehensive review.

ABBREVIATIONS

BMS: Burning Mouth Syndrome; HRT: Hormone Replacement Therapy; SDD: Subantimicrobial Dose Doxycycline; WHI: Women’s Health Initiative

INTRODUCTION

The term natural menopause is defined as the permanent cessation of menstruation resulting from the loss of ovarian follicular activity (WHO) [1]. The process of menopause does not occur overnight, but rather is a gradual process. This perimenopausal transition period is a different experience for each woman. The age at which a woman starts having menstrual periods is unrelated to the age of menopause onset.

“India has a humongous population, already crossing the 1 billion mark with 71 million people over 60 years of age and the number of menopausal women about 43 million.” It is difficult to make generalized recommendations due to the varied lifestyles of people in the country, the rural urban divide, the economic imbalance between the poor, middle class, affluent and the multicultural, multiethnic and multi religious composition of the population [2]. Following menopause, symptoms can occur due to lowering of estrogen levels in the body. Not every woman will experience all the symptoms, and symptoms vary among women. It is also possible for symptoms of low estrogen to appear years before the actual menopause. According to the North American Society of Menopause, the most commonly reported symptoms include hot flashes and night sweats [3]. Those can be associated with flushing and followed by intense sweating. Other symptoms related to lowering of estrogen levels include vaginal dryness, painful sexual intercourse (dyspareunia) and vaginal itching or irritation. Changes in the urinary system may lead to leakage of urine or the need to urinate frequently. A few women report changes in skin texture, worsening of acne and weight gain.

Cognitive and mood symptoms, generalized physical symptoms can accompany menopause in some women. These vary among women and can include mood changes, stress,
fatigue, irritability and difficulties with memory. Hot flashes along with night sweats can also contribute to sleep disturbances.

According to research women are at increased risk for oral health problems because of physiological changes associated with hormonal fluctuations that occur from puberty through menopause. A 2009 literature review by researchers from the Cleveland Clinic and Case Western Reserve University School of Dental Medicine concluded that postmenopausal women are even more susceptible to periodontal disease and related conditions. Oral discomfort mainly pain, burning sensations, altered taste perception and dry mouth are a common complaint among menopausal and postmenopausal women [4]. The rate of whole-body bone loss in postmenopausal women is a predictor for tooth loss. A 1996 study on the relationship between tooth loss and bone loss by Krall et al., found that “for every 1% per year decrease in whole-body bone mineral density, the risk of tooth loss increases more than four times” [5].

Female sex hormones and their effects on oral cavity

The oral tissues are affected and altered by the female sex hormones as are aging. As well as saliva, estrogen play an important role in tissue alterations [6,7]. The oral mucosa resembles vaginal mucosa in many ways as well as its response to estrogens. Sex hormone receptors have been detected in the oral mucosa as well as salivary glands. The oral mucosa can be affected by estrogen directly or through neural mechanism thus altering the periodontal health in menopausal women [8]. The oral problems may include a reduction of flow of saliva leading to xerostomia, burning mouth syndrome (BMS), increase in salivary IgA and other proteins, other studies refute such changes in salivary composition [11]. Although research [15] indicates that xerostomia might be unrelated to lower salivary flow rates, it may in fact be a process associated with low estrogen levels. Agha-Hosseini F et al. in 2009 conducted a case-control study of 38 postmenopausal women, a negative correlation was found between the severity of dry mouth sensation and the salivary concentration of 17-beta-estradiol [15]. Mirzaai-Dizagh I et al., in 2011 conducted a study comparing stimulated and un-stimulated salivary progesterone in menopausal women with oral dryness feeling showed that subjects with dry mouth had decreased un-stimulated saliva flow and salivary progesterone compared with those without dry mouth [16]. Thus, salivary progesterone level appears associated with oral dryness feeling in menopause [16].

Burning mouth syndrome (bms)

BMS, also known as glossodynia, stomatodynia, stomatopyrosis, glossopyrosis or glossalgia is a common entity in postmenopausal women manifesting as intense pain and spontaneous burning sensation affecting various areas of the oral cavity in the absence of any identifiable organic abnormalities [11]. It is often bilateral, and no pathological findings are usually present. The accompanying symptoms may include dry mouth sensation or alterations in taste sensation.

There have been suggestions that female sex hormones and neuropathic factors may be implicated, possibly through small-fiber sensory neuropathy of the oral mucosa. Many causative factors have been associated with BMS, which can be categorized within three groups: local, systemic and psychological factors. The local factors include dental anomalies, ill-fitting dentures, Para functional habits like clenching, bruxism and lip biting, myofascial pain, allergic contact stomatitis and associated with infectious or neurological etiology. The systemic factors include diabetes mellitus, menopause, gastrointestinal disorders, vitamin deficiency (Vitamins B1, B2, B6 and B12), iron and folic acid deficiency, conditions associated with hyposalivation, medications (e.g. antihyperglycemic agents, angiotensin converting enzyme inhibitors, angiotensin II receptor blockersetc.) and esophageal reflux. The psychological factors include depression, anxiety, obsessive compulsive disorder and somatoform disorder [12].

The prevalence of oral discomfort was found to be significantly higher in peri/postmenopausal women than in premenopausal women (43% against 6%) according to Wardrop et al., [13]. Gao et al., in a case-control study found that menopausal women with BMS had higher follicle stimulating hormone levels and lower estradiol levels than those without oral symptoms [14].

Salivary changes in menopause

Hyposalivation, oral dryness or xerostomia is one of the other symptoms associated with menopause. It is the perception of dry mouth and can be associated with diminution of salivary flow. The reduction of salivary flow by 40% to 50% makes the patient symptomatic and prone to develop xerostomia. Although certain studies support the claim of decrease in salivary flow with increase in salivary IgA and other proteins, other studies refute such changes in salivary composition [11]. Although research [15] indicates that xerostomia might be unrelated to lower salivary flow rates, it may in fact be a process associated with low estrogen levels. Agha-Hosseini F et al in 2009 conducted a case-control study of 38 postmenopausal women, a negative correlation was found between the severity of dry mouth sensation and the salivary concentration of 17-beta-estradiol [15]. Mirzaai-Dizagh I et al., in 2011 conducted a study comparing stimulated and un-stimulated salivary progesterone in menopausal women with oral dryness feeling showed that subjects with dry mouth had decreased un-stimulated saliva flow and salivary progesterone compared with those without dry mouth [16]. Thus, salivary progesterone level appears associated with oral dryness feeling in menopause [16].

The reduction of salivary flow should cause abnormalities in saliva quantity and/or quality [17], resulting in a loss of the antibacterial properties of saliva, and may accelerate infection by Candida albicans, as well as cavities, tooth decay and periodontal disease. Low salivary flow can profoundly affect quality of life by interfering with basic daily functions such as chewing, swallowing and speaking.

Farzaneh et al., studied salivary cortisol levels in postmenopausal women with oral dryness and they found it to be in direct proportion with severity of oral dryness [18].

Menopause and Periodontal Implications

Reports of the effects of sex steroid hormones in the periodontium, which is a unique structure composed of two fibrous (gingiva and periodontal ligament) and two mineralized (cementum and alveolar bone) tissues, have been noted since a long period of time. The effect of sex steroid hormones on periodontium has escalated the interest in defining the specific relationship among androgens, estrogens and progestins to the normal function and disease in the periodontium.

In contrast to pregnancy, when hormone levels are significantly elevated, during menopause, there is a decline in ovarian function and a decrease in production and secretion of sex steroid hormones. Various estrogen receptors are present in osteoblasts and fibroblasts of periodontal tissues, which respond to the varying levels of hormones in different stages of reproductive life and thus affect the health of the periodontium [19,20]. The deficiency of estrogen is one of the most frequent
causes of postmenopausal osteoporosis. Estrogen plays an important role in the growth and maturation of bone and in the regulation of bone turnover in adult bone. Highly increased bone resorption in cancellous bone leads to general bone loss and destruction of local architecture because of penetrative resorption and micro fractures. The first response of estrogen withdrawal is enhanced endocortical resorption in the cortical bone. Following that, intracortical porosity increases. These lead to decreased bone mass, disturbed architecture and reduced bone strength. At cellular level in bone estrogen inhibits differentiation of osteoclasts thus decreasing their number and reducing the amount of active remodeling units. This effect is probably mediated through some cytokines, IL-1 and IL-6 being prime candidates. Estrogen receptor impairs interleukin-6 expression by preventing protein binding on the NF-kappaB site [22].

The mechanism by which estrogen deficiency causes bone loss remains largely unknown. Estrogen deficiency leads to an increase in the immune function, which culminates in an increased production of TNF by activated T cells. This tumor necrosis factor (TNF) increases osteoclast formation and bone resorption both directly and by augmenting the sensitivity of maturing osteoclasts to the essential osteoclastogenic factor RANKL. Increased T cell production of TNF is induced by estrogen deficiency via a complex mechanism mediated by antigen-presenting cells and involving the cytokines IFN-gamma, IL-7, and TGF-beta. The experimental evidence that suggests that estrogen prevents bone loss by regulating T cell function and immune cell bone interactions [21].

Systemic bone loss may be a risk indicator for periodontal destruction, and augmented rates of bone mineral density loss after menopause are coupled with greater risk of tooth loss [23,24]. A number of studies have shown that bone changes in osteoporosis are associated with loss of periodontal attachment, loss of teeth, and height of residual ridge [25-29]. Based on these findings, it has been hypothesized that osteoporosis may be a risk factor for the progression of periodontitis. Both the entities, osteoporosis and periodontitis, in fact, are bone resorptive diseases sharing common etiologic agents/risk factor (e.g., sex, cigarette smoking, alcohol consumption, systemic diseases, heredity) that may either modulate or alleviate the process of both diseases. Therefore, avoidance and management of osteoporosis after menopause could also have enhanced future oral health consequences.

Although elevated levels of ovarian hormones, as seen in pregnancy and oral contraceptive usage, can lead to an increase of gingival inflammation with an accompanying increase in gingival exudates [30], conversely, after menopause - the absence of ovarian sex steroids - has been related to a worsening in gingival health, and hormonal replacement therapy seems to ameliorate this trend.

How to overcome these symptoms

The postmenopausal symptoms may unfavorably affect oral health and the dental health care providers need to be aware of the symptoms and health care needs of menopausal/postmenopausal women. The oral changes observed at menopause are mostly related to hormonal changes although a physiological aging of the oral tissues also plays a contributing role in it.

The underlying etiology of BMS remains unclear with hormonal changes and small-fiber sensory neuropathy of the oral mucosa suggested as possible underlying causes [12]. Variable results have been obtained following treatment of BMS in menopausal women with HRT and psychological counseling. Low dosages of doxycycline, chlorhexidine and tricyclic antidepressants (e.g., amitriptyline) have been found to be beneficial in management of BMS. Evidence also supports the utility of a low dosage of gabapentin [31]. No benefit has been seen from treatment with selective serotonin reuptake inhibitors or serotoninergic antidepressants (e.g. trazodone).

Xerostomia associated with postmenopausal women can be countered with frequent sipping of water, artificial salivary substitutes, sugar free gums/lozenges, xylitol tablets and sialogogues such as pilocarpine, bromhexine, cevimeline, and bethanecol can be included in the management of xerostomia. Chlorhexidine rinses can also help reduce the incidence of caries.

The susceptibility to progressive periodontitis and osteoporosis is increased following menopause [32]. The correlation between residual ridge resorption and menopause is still unclear, though it has been proved in a study by Friedlander et al. in 2002 that postmenopausal women have to face greater residual ridge resorption following extractions, thus making it difficult to construct conventional dentures and placing dental implants [8].

Apart from regular oral hygiene recalls and strict and meticulous oral hygiene maintenance, it has been found that estrogen therapy can be helpful in building up mandibular bone mass and diminishing the severity of periodontal disease [33]. Bisphosphonates, particularly Risedronate and Alendronate, have been beneficial in preventing systemic bone resorption and decreasing the incidence of vertebral fractures in postmenopausal women, also they have been found effective in improving periodontal status [33]. Recent study by Bhavsar et al., found that bisphosphonate therapy, when used as an adjunct to scaling and root planing, may have beneficial effects on periodontium of postmenopausal women with moderate or severe chronic periodontitis [34]. Some cases have also been associated the use of bisphosphonates to occurrence of osteonecrosis of jaw, though the chances are rare as the dosage of bisphosphonates are administered orally as compared to its use intravenously in multiple myeloma or metastatic bone disease [33]. Sub antimicrobial dose doxycycline when used as an adjunct with oral prophylaxis has shown promising results in improving probing depths, clinical attachment level and also lowering gingival inflammation [35,36]. Reinhardt RA et al., in 2007 conducted a clinical trial assessing the efficacy of sub antimicrobial dose doxycycline (20mg BD) in postmenopausal, osteopenic, estrogen-deficient women on periodontal maintenance over a period of 2 years and they found it beneficial in reducing progressive attachment loss [37]. While Payne et al. in 2007 did a clinical trial to assess the efficacy of sub antimicrobial dose doxycycline effects on alveolar bone loss in postmenopausal women; they found that doxycycline holds no significant benefit or advantage over placebo [38]. Thus additional research is required to postulate the definite advantages of using SDD in postmenopausal women.
Hormone replacement therapy

Until recently, HRT was considered the single most effective treatment for menopausal symptoms and its use was recommended for the prevention of diseases associated with estrogen deficiency [10,39,40]. After the Women’s Health Initiative (WHI) findings were published in 2002 and 2004 [41,42], the use of HRT at menopause has become a matter of debate and its utility has been questioned [43,44]. The recent analysis of the WHI data and other randomized controlled trials, however, have suggested that the potential risks involved in taking HRT (increased risk of breast cancer, cardiovascular outcomes and stroke) may largely depend on the estrogen and progesterone/progesterin formulation, dosage, mode of administration, patient’s age, associated diseases, and duration of treatment [45].

In the past years, various studies have been conducted to evaluate the effect of HRT in modifying the periodontal conditions in postmenopausal women due to a possible connection between osteoporosis and the progression or severity of periodontitis [46-48]. However, the clinical significance of HRT in periodontal health is not well established. According to some studies, HRT was associated with a reduction of alveolar bone loss [26,48,49], but a number of studies could not find an inverse correlation between alveolar bone density and severity of periodontal disease [50-52]. Also, some authors failed to demonstrate any particular beneficial effect of HRT on alveolar bone density/height [53,54].

It has been reported that women treated with HRT exhibited lower gingival bleeding than estrogen deficient women [46,55]. It has been suggested that estrogen may have an inhibitory effect on gingival inflammation by inhibiting mediators (IL-1, TNF-α, IL-6, IL-1β, IL-8) and cellular mechanism of inflammation (PMN recruitment, lymphocyte activation) [56]. Similarly, estrogen supplementation may modulate the rate of breakdown of periodontal tissue through a mechanism involving downregulation of matrix metalloproteinases (MMP-8 and MMP-13) and cytokines involved in bone resorption [57]. Conflicting results exist on the effects of HRT on probing pocket depth and attachment level [46,55,58]. Furthermore, the risk of tooth loss was found to be lower in women who used HRT than those who did not use it [23,53,59]. Tooth loss, however, could not be used as a surrogate evaluation for periodontal disease, since there can be other reasons for tooth loss like caries or trauma. Thus, postmenopausal women with periodontal disease should undergo periodontal screening examinations in order to detect changes in periodontal status and support them with periodontal treatment.

CONCLUSION

Menopause affects a woman’s oral and dental health for the same reasons as for other body systems. An improved comprehension of the systemic and oral manifestations at menopause shall improve the response of the physician, endocrinologist, gynecologist as well as dentist, to the needs of the patients. A proper understanding of the symptoms may thus help for appropriate referrals to the concerned specialties for supplemental therapy alleviating to some extent the distress menopausal women are going through. The inter specially understanding and collaboration should be improved and this article makes a small step and attempt to improve the health of postmenopausal women by a comprehensive review.

REFERENCES

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