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EDITORIAL

Coffee or caffeine intake and effects on menopausal symptoms: unsolved issue

Despite very limited research and publications on coffee intake and its effects on menopausal symptoms, caffeine has been largely promoted by healthcare providers as having a negative impact on vasomotor symptoms. Lifestyle and dietary modifications prevail as part of menopausal counseling. However, guidelines on menopause and brochures for women issued by national and international societies, such as The North American Menopause Society, International Menopause Society, SIGMA Canadian Menopause Society, and Society of Obstetricians and Gynecologists of Canada, provide scant information on caffeine and hot flashes.

In a 2005 US report, the average caffeine intake by men and women aged 35 to 64 years was calculated as 250 mg/day, equivalent to three cups of brewed coffee per day.[1] Coffee is one of the most popular beverages worldwide. Nevertheless, tea, soda, energy drinks, and specific foods also contain a significant amount of caffeine, which may result in specific biologic effects on humans. Type of coffee and method of coffee preparation may modify caffeine content in a cup of coffee.[2]

Coffee includes a vast variety of compounds that, individually or in association, may affect menopausal symptoms. Coffee beans originate from a complex plant and are composed of many chemical elements that may induce benefits and risks to the human body. Coffee beans are sources of polyphenols and lignans and are also recognized as a major source of caffeine, its major and active ingredient. Polyphenols such as chlorogenic acid, caffeic acid, and flavonoids are potent antioxidants that may protect the human body by neutralizing free radicals.[3] Cafestol and kahweol, two coffee-specific diterpenes, have been shown to produce anticarcinogenic activity by preventing DNA damage (thus protecting against H_2O_2 oxidative stress) and by acting as antioxidants.[4,5] Lignans in coffee beans are classified as phytoestrogens, which may decrease menopausal symptoms. On the other hand, decaffeinated coffee is manufactured using a procedure that includes washing green coffee beans with industrial solvents. This industrial process could potentially expose consumers to chemical solvents that may induce negative biologic effects and reduce antioxidant properties.

Caffeine is metabolized by cytochrome *P*450 1A2, which also metabolizes estrogen. By competing for the same enzyme, postmenopausal estrogen therapy and caffeine intake can induce different reactions within the body.[6] Some individuals can also be carriers of an allele (AA) in their genome that can modify metabolism of caffeine. This modification induces a rapid elimination of caffeine from the body, resulting in a diminution of time exposure to caffeine.[6] Polymorphisms of cytochrome *P*450 1A2 are linked to varied caffeine clearances that induce different adverse health outcomes.[7]

In research settings, the number of cups of coffee per day is frequently used as a surrogate marker for caffeine exposure.[8] However, this marker is imprecise because caffeine intake varies significantly by type of coffee (espresso, instant coffee, and brewed coffee), by manufacturing method, and from other beverages (such as tea, energy drinks, and sodas). It has been well documented that coffee consumption and caffeine consumption are related to increased plasma sex hormone–binding globulin levels and decreased free estradiol levels.[9,10] Moreover, studies have also shown that menopause status and race can interfere with the effects of caffeine on estradiol concentrations. To further demonstrate the complexity of this issue, Schliep et al[11] demonstrated that although caffeine intake was related to reduced estradiol concentrations among white premenopausal women, caffeinated soda and green tea were positively associated with increased estradiol concentrations among all races. Caffeine exposure varies greatly among products depending on brand and size. Assessing caffeine intake can be very challenging in part because of differences in the caffeine content of beverages and variations in metabolism of caffeine among individuals.

Curiously, two recent studies addressing the effects of caffeine or coffee intake and hot beverage intake on hot flashes demonstrated contradictory results—one showed increased hot flashes with caffeine intake, whereas the other study found a beneficial effect.[12,13] In this issue of *Menopause*, Faubion et al[14] reported on the association between caffeine and menopausal symptoms. In a large cohort study of 1,806 women attending the Women's Health Clinic at Mayo Clinic, data on 33 bothersome items were obtained using the Menopausal Health Questionnaire. A simple question concerning caffeine intake was administered. Data on race, body mass index, and menopausal hormone treatment were not included for this cohort. Likewise, quantity and source of caffeine were not collected. The group was recruited from among premenopausal and postmenopausal women aged 40 years or older. In this study, results showed that caffeine intake was positively associated with an increase in bothersome vasomotor symptoms. Faubion et al[14] reported less neurocognitive symptoms in premenopausal women who were caffeine users compared with nonusers. Surprisingly, this result was not demonstrated in

postmenopausal women. Caffeine has been shown to antagonize the effects of endogenous adenosine, a potent inhibitor of the release of neurotransmitters involved in the firing rate of central neurons. Low-dose ingestion of caffeine acts positively on mood, with individuals feeling energetic, imaginative, efficient, and self-confident.[15,16] It is plausible that caffeine acts as an important factor for reducing modifications in neurocognitive symptoms, as demonstrated by Faubion et al.[14] Why the effect was not demonstrated in postmenopausal women remains an unsolved issue.

A valid method for assessing caffeine exposure is mandatory before results confirming its effects on menopausal symptoms can be obtained.[9] For a better understanding of the influence of caffeine intake on menopausal symptoms, further studies should analyze and differentiate four separate exposure variables (caffeinated coffee, decaffeinated coffee, total coffee [caffeinated and decaffeinated], and total caffeine [caffeine from all food and beverage sources]), as has been suggested by Lueth et al,[17] for risk of ovarian cancer and caffeine intake. It would also be interesting to obtain DNA samples from individuals to evaluate potential gene-diet interactions.

Consumption of coffee is increasing worldwide, and caffeine is largely consumed by women of all ages. Faubion et al[14] have conducted a significant exploratory study of caffeine intake in premenopausal and postmenopausal women. Their conclusions will surely encourage researchers to further investigate the impact of coffee, caffeinated beverages, and diet on menopausal symptoms, allowing increased awareness and more scientific counseling for women.

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