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Editorial

Coffee and Platelets: An Unsolved Problem

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Coffee is the most popular beverage worldwide, is an important component in diet, and contains several ingredients that interact with health status.[1]

The clinical importance of the systematic review carried out by Gache and Almeida-de-Souza[2] is related to the increasing spread of antiplatelet drugs that are used in the therapy of cardiovascular diseases and, in particular, of ischemic heart disease. This raises questions about whether there may be an interrelation between coffee and platelets that can influence the effectiveness of the therapy as occurs for anticoagulants, vitamin K inhibitors.

The systematic review by Gache and Almeida-de-Souza analyzed many articles without reaching a final conclusion.[2] They found that some articles detect a positive effect on platelet activity and others, on the contrary, demonstrated that neither coffee nor caffeine affected platelet aggregation.

This dichotomy is caused by several factors.

It is well known that the different ways of preparing coffee affect the concentration of active components. For instance, the increase in plasmatic lipids level is attributed to diterpene esters, kahweol, and cafestol, which are naturally present in coffee oils. Kahweol and cafestol increased the activity levels of cholesteryl ester transfer protein and phospholipid transfer protein while decreasing the activity level of lecithin–cholesterol acyltrans-ferase, contributing to a rise in low density lypoprotein cholesterol (LDL-C). The method of coffee preparation is an important factor in the amount of kahweol and cafestol in the beverage because these esters are removed when coffee is brewed through a paper filter. Espresso machines, which use high pressure to force very hot water through the coffee beans to extract the flavor and coffee oils, do not use paper filters. However, the low volumes of coffee that characterize the espresso coffee greatly limit the amount of kahweol and cafestol included in the beverage, leading to very limited effects on plasmatic levels of LDL-C.[3]

Different aspects of lifestyle (physical activity, diet, sleep quality, and smoking) can directly affect platelets. Interference with other foods consumed with the diet can modify the effects of coffee on platelet activity.[4]

Gache and Almeida-de-Souza emphasized this aspect that emerged in the articles they examined. This is a fundamental point because dietary habits and lifestyle influence the absorption and bioavailability of the active ingredients contained in the coffee. For example, in the countries of the Mediterranean basin, espresso coffee and mocha coffee are often taken after a meal and this can determine a synergy with the foods eaten.[4]

Coffee consumption might be associated with unhealthy lifestyle habits, such as smoking, and the beneficial effect of coffee consumption on coronary heart disease risk in men could be attenuated by the negative effects of unhealthy behaviors. Woodward and Tunstall-Pedoe found that a higher coffee consumption was associated with a lower risk of cardiovascular disease in men but not in women.[5]

Moreover, the different components present in coffee have some effects on platelets. Coffee could be an excellent functional beverage, containing many polyphenolic compounds that display high antioxidant activity. Several studies suggested that polyphenols have a protective effect in the early stages of atherosclerosis development. Polyphenols improve endothelial function, modulate inflammation, and protect against platelet aggregation.[6]

An important issue is whether the antioxidants derived from coffee are bioactive and bioavailable. Several studies demonstrated bioactivity of coffee and support coffee contribution to antioxidant process and platelet's function.[7]

In addition to the effects of coffee on platelets, Gache and Almeida-de-Souza also analyzed the effects of caffeine on platelets. However, when we analyze the effects of caffeine, we must remember that there are several factors influencing caffeine intake, absorption, metabolism,

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and physiological and functional effects, which all could affect caffeine plasma levels, such as age, gender, hormonal status, diet, smoking, exposure to drugs, and genetic background.[7]

That is, grapefruit juice decreases caffeine clearance by 23% and prolongs caffeine half-life by 31%. The flavonoid quercetin affects the metabolism of caffeine and paraxanthine and mainly decreases the urinary excretion of the latter compound by 32%; it changes also the excretion of several other metabolites of caffeine.

Furthermore, gender differences exert an important influence on the response of biological functions to food and beverages including coffee. The effects of food components on biological function are influenced by hormones and metabolism.[8–10] Obesity is an important cardiovascular risk factor in women, especially visceral obesity that develops during menopause and is associated with high levels of inflammation. Obesity differs in different genders and seems to interact with platelets and also with coffee.[9,10]

Several studies confirm the efficacy of coffee extract's application for weight loss and treatment of some metabolic disorders (diabetes, obesity, etc.). The differences in lifestyle between the genders can also influence the effects of coffee on platelet activity.[6,8,10] The most obvious example is the complex relationship between smoking, coffee, and platelet aggregation. This association must be deepened with a view to gender differences.

In conclusion, Gache and Almeida-de-Souza[2] dealt with a topic of extreme importance even though they did not reach a conclusion. However, they highlighted the interference and interactions of lifestyle and food on health. Further studies will lead to elucidate the effects of coffee and caffeine on platelets.

Author's Contribution

A.V.M. conceived of the idea at the basis of the article, developed the different parts of the article, and performed the final supervision.

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References

1. Mattioli AV. Effects of caffeine and coffee consumption on cardiovascular disease and risk factors. Future Cardiol. 2007;3:203–212.
2. Gache L, Almeida-de-Souza J. Systematic review of the effects of coffee or its components on platelets and their regulators. J Caffeine Adenosine. 2021 (in press).
3. Cheung RJ, Gupta EK, Ito MK. Acute coffee ingestion does not affect LDL cholesterol level. Ann Pharmacother. 2005;39:1209–1213.
4. Truzzi ML, Ballerini Puviani M, Tripodi A, *et al.* Mediterranean diet as a model of sustainable, resilient and healthy diet. Prog Nutr. 2020;22:388–394.
5. Woodward M, Tunstall-Pedoe H. Coffee and tea consumption in the Scottish Heart Health Study follow-up: Conflicting relations with coronary risk factors, coronary disease, and all cause mortality. J Epidemiol Community Health. 1999;53:481–487.
6. Mattioli AV, Migaldi M, Farinetti A. Coffee in hypertensive women with asymptomatic peripheral arterial disease: A potential nutraceutical effect. J Cardiovasc Med (Hagerstown). 2018;19:183–185.
7. Hutachok N, Angkasith P, Chumpun C, *et al.* Antiplatelet aggregation and anti-cyclooxygenase activities for a range of coffee extracts (*Coffea arabica*). Molecules. 2020;26:10.
8. Mattioli AV, Sciomer S, Moscucci F, *et al.* Cardiovascular prevention in women: A narrative review from the Italian Society of Cardiology working groups on 'cardiovascular prevention, hypertension and peripheral circulation' and on 'women disease.' J Cardiovasc Med. 2019; 20:575–583.
9. Sirotkin AV, Kolesárová A. The anti-obesity and health-promoting effects of tea and coffee. Physiol Res. 2021; 70:161–168.
10. Purdy JC, Shatzel JJ. The hematologic consequences of obesity. Eur J Haematol. 2021;106:306–319.

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