

The effect of a healthy diet and the consumption of wine on the procoagulant activity of endothelial microparticles

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Abstract:

Background: Microparticles are critical in cardiovascular disease (CVD) development, linked to chronic inflammation, endothelial damage, and thrombosis. While diet is key in CVD prevention, its effects on microparticles remain understudied.

Objectives: This study investigated the impact of an intensive weight-loss intervention using an energy-reduced Mediterranean diet (eMedDiet) with physical activity promotion on microparticle procoagulant properties in adults with metabolic syndrome (MetS). Additionally, it assessed whether wine consumption offered added protection.

Methods: A total of 132 older adults with overweight/obesity and MetS (49% women, mean age 67.8 ± 4.2 years) were analyzed in the PREDIMED-Plus study (ISRCTN89898870). Participants were classified as wine drinkers or non-drinkers (31 and 101, respectively). The sub-study, conducted at Hospital Clínic-IDIBAPS, measured microparticle procoagulant activity at baseline and after one year using the Zymuphen™ MP-ACTIVITY kit. Thrombin activity was quantified by absorbance at 405 nm. Plasma microparticle concentrations were expressed as nanomolar (nM) phosphatidylserine (PS) equivalents.

Results: After 12 months, microparticle concentrations (nM PS) increased in both eMedDiet (from 15.7 ± 1.0 to 24.7 ± 2.5 ; $P < 0.001$) and control groups (from 17.1 ± 1.1 to 29.5 ± 1.5 ; $P < 0.001$). While between-group changes were not significant, a significant interaction was observed after one year ($P_{int} = 0.042$). Stratified analysis revealed wine drinkers in the eMedDiet group were more protected compared to control-group drinkers ($P_{int} = 0.035$). No significant differences were found between eMedDiet and control groups overall (-4.0 nM PS, CI: -9.2 to 1.4).

Conclusions: After 12 months of intervention, the increase in microparticle release and procoagulant activity observed in the MedDiet group was significantly attenuated compared with the control group. These findings suggest a potential mechanistic role for MedDiet and wine in modulating procoagulant processes associated with CVD risk.

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Summary of the CV: Dr Rosa M. Casas has been a CIBER researcher since 2007, assuming the role of postdoctoral researcher in June 2016. At present, she is the head of the laboratory of the Cardiovascular Risk, Nutrition and Healthy Aging group at the IDIBAPS, a consolidated research center (2021 SGR 01194) under the direction of Dr. Ramon Estruch. Dr Casas (h-index: 40, >144 articles, Scopus) has played a key role in the coordination of national intervention studies focusing on dietary and lifestyle modification, including the IMPACT study (involving 1,200 pregnant women with intrauterine growth retardation), the PREDIMED study (involving 7,447 participants at high cardiovascular risk with a 5-year follow-up) and

the PREDIMED-PLUS study (involving 6,874 participants with metabolic syndrome with a 6-year follow-up). She is currently leading the international PEANUTY study, which is investigating the effects of regular peanut consumption on neurocognitive performance in 200 healthy Spanish adolescents.