

Evaluation of the effect of plant sterols-food supplement intake on eryptotic markers in statin-treated hypercholesterolemic patients

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INTRODUCTION & AIM

Eryptosis (suicidal programmed death of erythrocytes) is associated with elevated adhesion to the vascular endothelium, and therefore, with a worsening of cardiovascular health¹. Statins, used for hypercholesterolemia treatment, can increase eryptosis, while plant sterols (PS) have shown an anti-eryptotic effect *ex vivo*².

The aim of this study is to evaluate the differences in the eryptosis level and redox status of erythrocytes from hypercholesterolemic patients treated with low intensity statins after a 6-week treatment with a daily PS-food supplement (2 g/day, case) or a free-PS food supplement (control).

METHOD¹

Double-blind controlled parallel trial

Case (PS- food supplement)
n= 13

Control (free-PS food supplement)
n= 13

n = 26

Atorvastatin, simvastatin,
rosuvastatin, pitavastatin

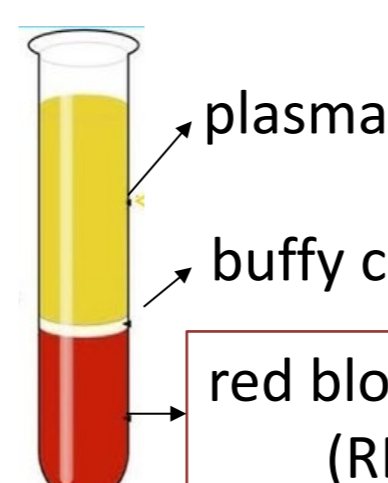
Exclusion criteria: smokers; previous episodes of cardiovascular disease; diabetes mellitus; subjects in secondary prevention; liver or renal disease; uncontrolled hypothyroidism; consumption of PS-enriched foods or supplements; other analytical abnormalities or previous illnesses; treatment with other lipid-lowering drugs.

Statistical analysis: Differences between treatments (Unpaired student's t test, $p < 0.05$). Correlations between different variables (Chi-square test $p < 0.05$)

6 weeks

1st draw
(T0)

2nd draw
(T1)



Wash and isolate

Dilute to 0.4% (v/v) with RINGER*

* 125 mM NaCl, 5 mM KCl, 1 mM MgSO₄,
32 mM HEPES, 5 mM glucose, and 1 mM CaCl₂

FITC Annexin V Kit

- Phosphatidylserine externalization
- Cell size (Forward scatter)



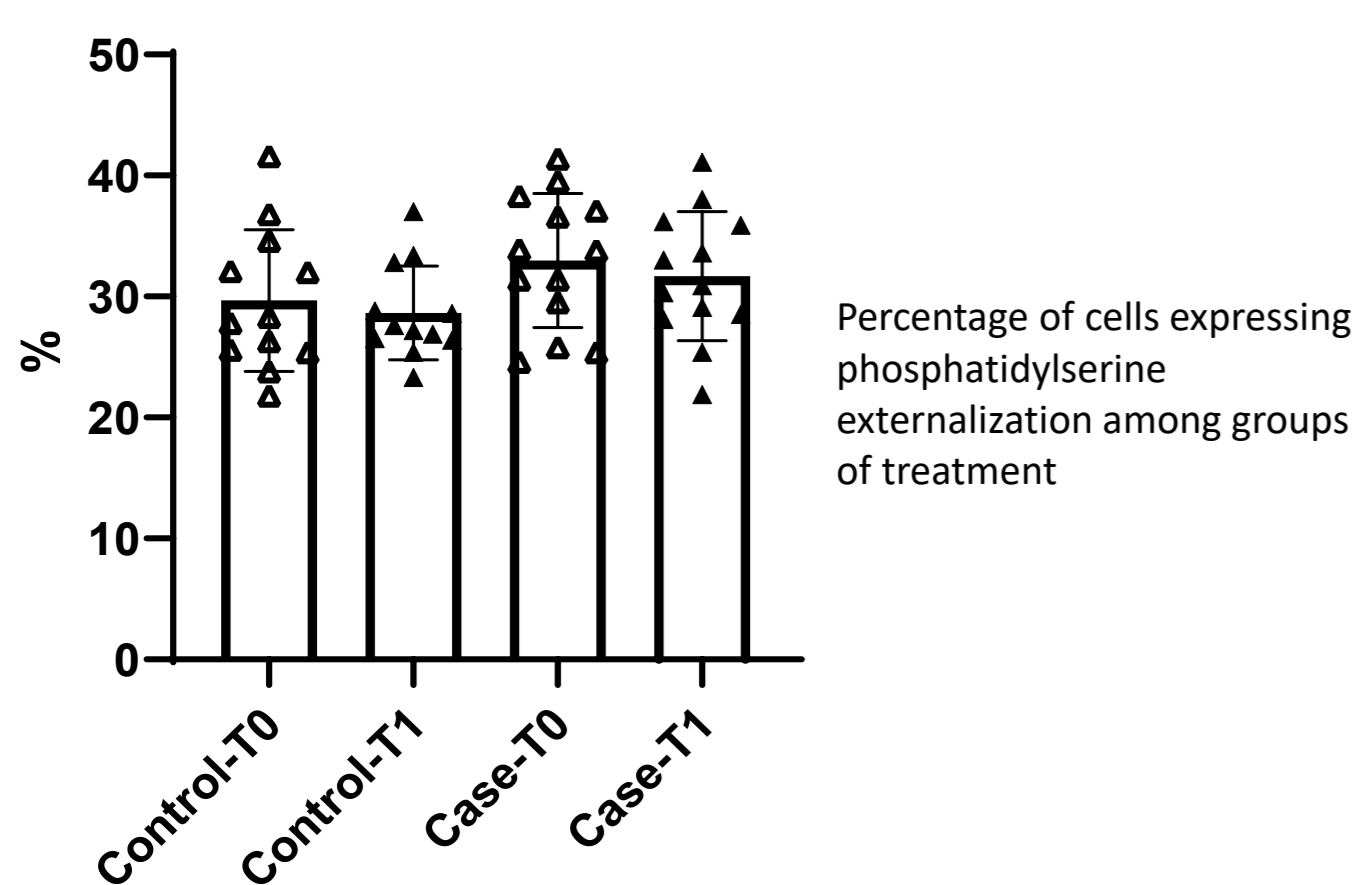
Flow cytometry

Green CMFDA

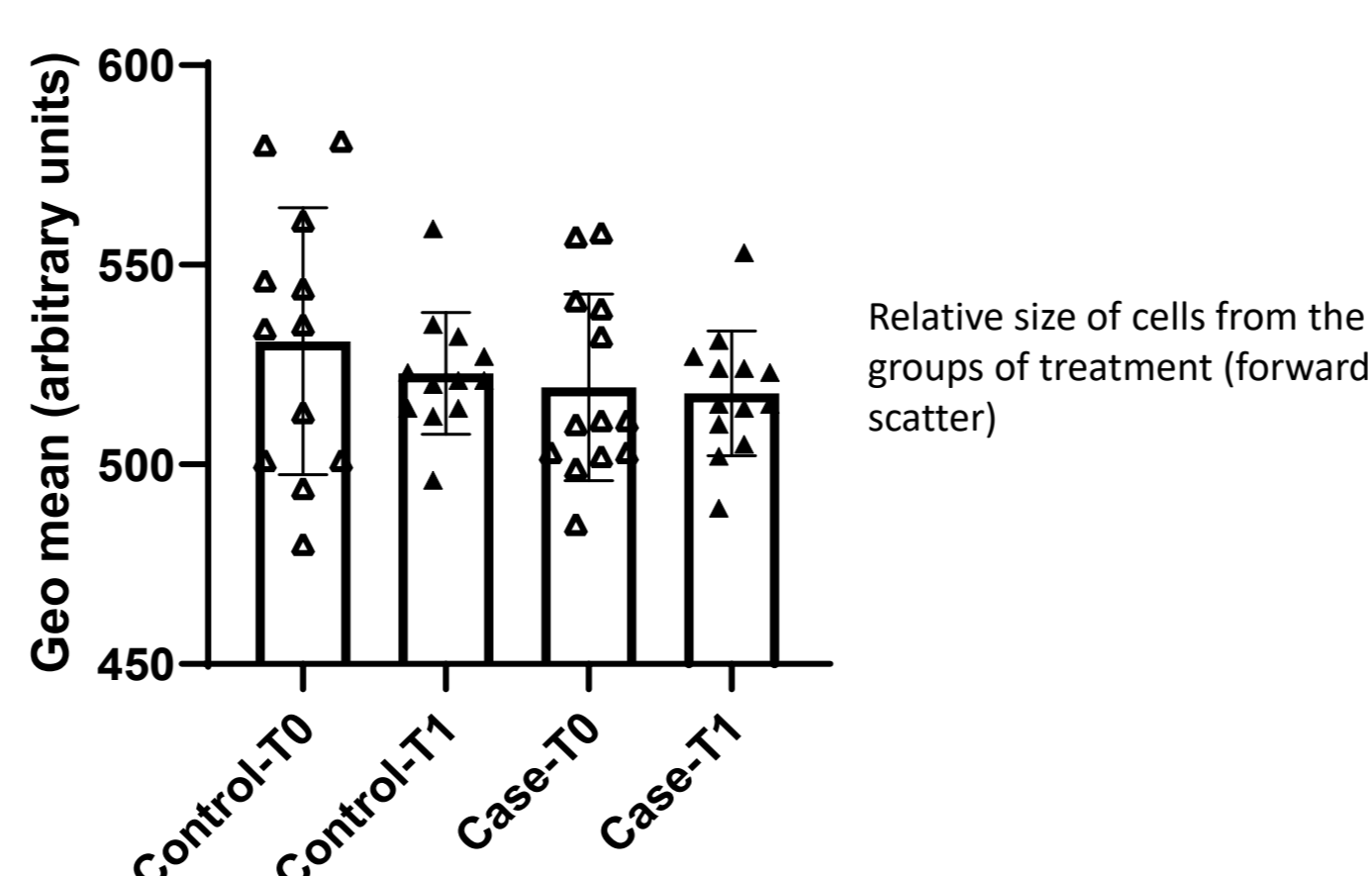
- Reduced glutathione

RESULTS & DISCUSSION

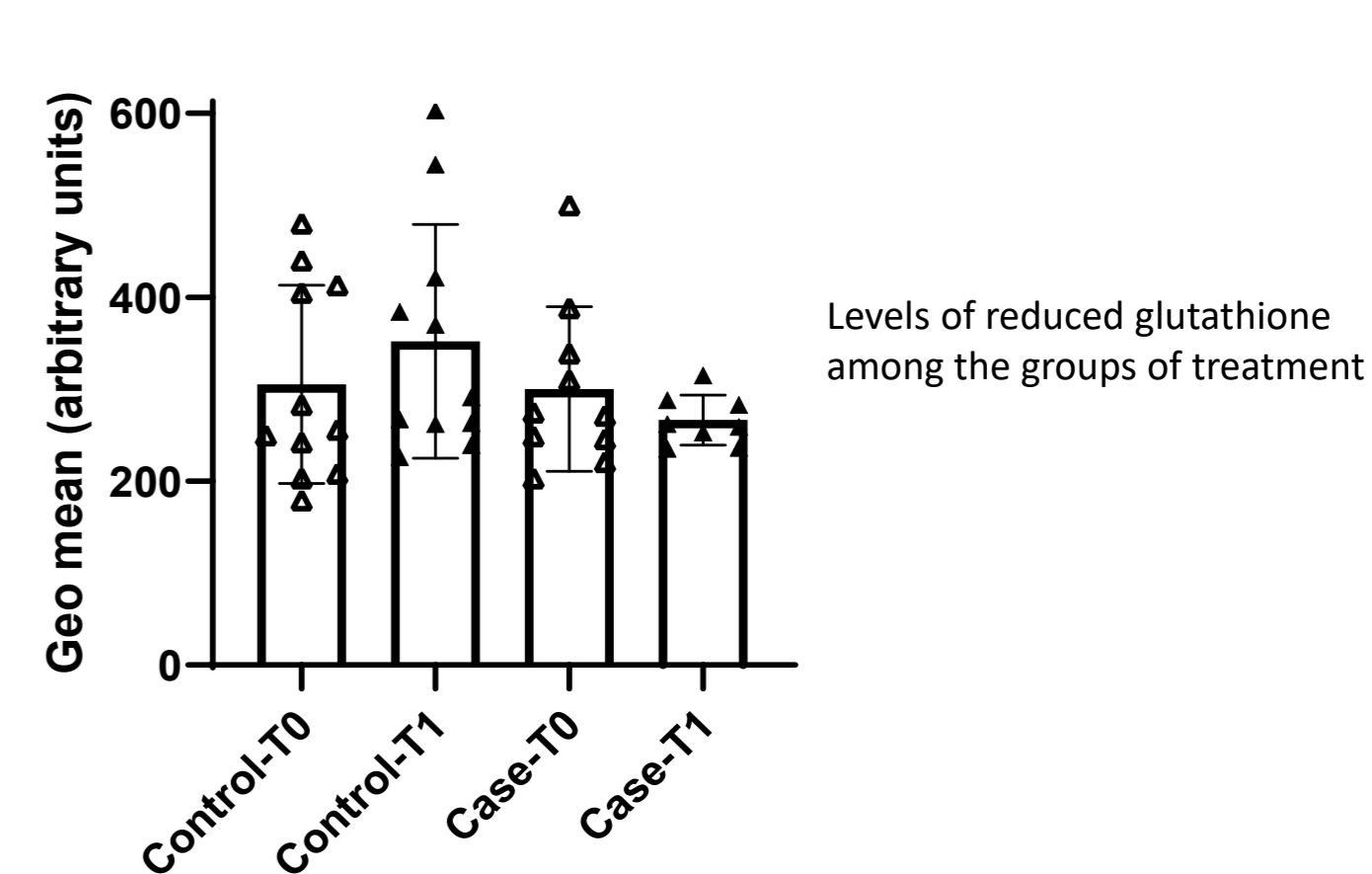
Annexin



Forward scatter



Reduced glutathione



No significant differences ($p > 0.05$) were observed in any measure after the 6-week period of intervention. Neither the placebo nor the PS-supplement changed the outcome. This means that the eryptotic status is not affected by the intervention.

Nevertheless, different stratifications were carried out to evaluate if the data is correlated with some population group. Age, sex, body mass index and the treatment adherence were considered, but none of them was significant correlation ($p > 0.05$) with the externalization of phosphatidylserine.

Due to a high difficulty to fill the inclusion and exclusion criteria, a relative low population ($n=26$) was recruited. This aspect could be of relevance, as interindividual variability difficult the observation of potential beneficial effects of PS upon by eryptosis.

CONCLUSION

A chronic intake of plant sterol-food supplement may not reduce the degree of eryptosis in statin-treated hypercholesterolemic patients, although their well-known cholesterol-lowering effect may be beneficial for this population group. Furthermore, other markers of cardiovascular health and the degree of adhesion of eryptotic erythrocytes to the endothelium should be investigated to delve deeper into the subject.

REFERENCES

¹ Cilla et al. Int J Clin Pract, 2021, 75, e14771. ² Álvarez-Sala et al. J Agric Food Chem, 2018, 66, 1157-1166.

ACKNOWLEDGEMENTS

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