

Impact of menopausal status on the postprandial TAG response in healthy women

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Recent evidence has shown postprandial TAG concentrations to be an independent risk factor for CHD^(1,2) and to be more discriminatory than fasting TAG in women than men⁽¹⁾. In light of this greater impact of TAG as a lipid risk factor in women, and the observation that post-menopausal women have a greater CHD risk than pre-menopausal women, it is surprising that little is known about the impact of the natural menopause on postprandial lipaemia.

Following a 12 h overnight fast thirty-seven pre-menopausal (mean age 42 (SD 7) years and BMI 25 (SD 3) kg/m²) and sixty-one post-menopausal women (mean age 60 (SD 6) years and BMI 26 (SD 3) kg/m²) underwent a sequential-meal postprandial investigation, in which blood samples were taken at regular intervals after a test breakfast (51 g fat) and lunch (30 g fat) given at 0 and 330 min respectively. Lipids and glucose were measured in the fasting sample and TAG analysed in the postprandial samples using automated enzyme-based colorimetric assays. Fasting LDL-cholesterol (LDL-C) was calculated using the Friedewald formula⁽³⁾.

Post-menopausal women were shown to have higher fasting total cholesterol, LDL-C and glucose ($P < 0.02$). Although fasting TAG concentrations were similar between the two menopausal groups, marked differences were observed in the postprandial TAG response, with a greater incremental area under the curve (IAUC) and maximum TAG concentration (maxC) in the post-menopausal women ($P < 0.04$). Multivariate regression analysis revealed both age and fasting TAG to be independently associated with the TAG-IAUC, maxC and time to reach maxC in the pre-menopausal women only ($P < 0.009$). Interestingly, subdivision of the women into both younger and older pre-menopausal and post-menopausal subgroups showed the most marked difference in TAG-IAUC to be between the younger and the older pre-menopausal women, whereas differences in fasting LDL-C were most evident between the older pre-menopausal and the younger post-menopausal women (Figure).

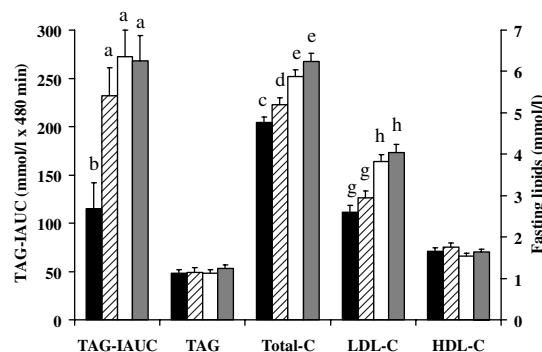


Figure. The postprandial TAG-IAUC and fasting lipid levels in the younger ($n = 18$; ■) and older ($n = 19$; ▨) pre-menopausal women and the younger ($n = 30$; □) and older ($n = 31$; ▩) post-menopausal women. Values are means with their standard errors represented by vertical bars. ^{a,b,c,d,e,g,h} For each measured variable means with unlike subscript letters were significantly different between the female groups: ^{a,b} $P < 0.006$, ^{c,d} $P = 0.048$, ^{e,e} $P < 0.007$, ^{d,e} $P < 0.007$, ^{g,h} $P < 0.0005$.

The results suggest a divergence in the relationship between fasting LDL-C and postprandial TAG with age and menopausal status that may reflect differences in the metabolic effects of age and the menopause on these lipid risk markers or a greater impact of early oestrogen decline on pathways of TAG rather than LDL metabolism. Further work is therefore required to elucidate the impact of the menopause on lipid regulation and CHD risk.

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2. Nordestgaard BG, Benn M, Schnohr P *et al.* (2007) *JAMA* **298**, 299–308.
3. Friedewald WT, Levy RI & Fredrickson PS (1972) *Clin Chem* **18**, 499–502.