Follicle Stimulating Hormone Levels and Subclinical Atherosclerosis in Older Postmenopausal Women

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Introduction

- Recent studies suggest that follicle stimulating hormone (FSH) may play a role in cardiovascular health, independent of estradiol (E2).
- Previous studies have evaluated FSH and atherosclerosis in women during the menopausal transition, when levels are highly dynamic.
- Whether FSH after menopause is associated with atherosclerosis is unknown.

Objectives

- We assessed the relation of postmenopausal FSH and E2 levels with carotid artery intima-media thickness (IMT), a measure of atherosclerosis.
- Study participants were members of the Kuopio Ischaemic Heart Disease (KIHD) Risk Factor Study, a prospective study of risk factors for cardiovascular disease in men and women in eastern Finland.

Methods

- Participants were 588 female KIHD members, aged 53-73 at baseline (1998-2001) and not using hormone therapy (HT).
- Women completed a clinical examination, during which common carotid artery (CCA) IMT was measured via high resolution B-mode ultrasonography. Mean IMT was averaged from 100 measures of the left and 100 of the right CCA.
- Fasting blood samples were assayed for FSH and E2, along with testosterone, plasma lipids, insulin and glucose.
- Participants self-reported data on demographics, behavioral, reproductive and health factors via questionnaire.
- Height and weight were directly measured, and study physicians recorded prevalent cardiovascular and metabolic disease.
- Multivariable linear regression was used to assess relations of FSH and E2 with mean IMT.

Results

- Mean IMT in women in quartiles 1-4 of FSH were 0.94, 0.91, 0.87 and 0.85mm, respectively (P_trend < 0.001; Table 1).
- FSH levels remained inversely associated with IMT in multivariable models (P_trend = 0.01; Figure 1).
  - Models were adjusted for age, enrollment year, E2, body mass index, waist to hip ratio, physical activity, past HT use, duration of HT use, smoking status, pack-years of smoking, alcohol use, parity, age at menopause, systolic & diastolic blood pressure, testosterone, lipid levels (total, LDL, & HDL cholesterol & triglycerides), fasting glucose, fasting insulin, history of hypertension, diabetes, symptomatich heart disease and stroke, and current use of medications for hypertension, diabetes, high cholesterol and heart disease.
  - Findings differed by age (P_interaction = 0.01; Figures 2a & 2b) and were strongest for women aged 64-73 (P_trend = 0.005).
  - In contrast, E2 levels were unrelated to IMT (P > 0.05). Additionally, findings did not vary by body mass index (PInteraction > 0.05).

Conclusions

- Postmenopausal FSH levels were significantly and inversely associated with common carotid artery intima-media thickness.
- Relations were strongest among older postmenopausal women (ages 64-73).
- Associations of FSH and IMT were not explained by confounding or effect modification by adiposity, estradiol levels, or prevalent cardiometabolic disorders.
- Prospective studies of postmenopausal FSH and atherosclerosis progression are warranted to better understand these relations and clarify potential underlying physiology.

References: