Sex differences in direct diagnostic and prognostic comparison of carotid plaques (Total Plaque Area) with coronary calcifications (Agatston Score)

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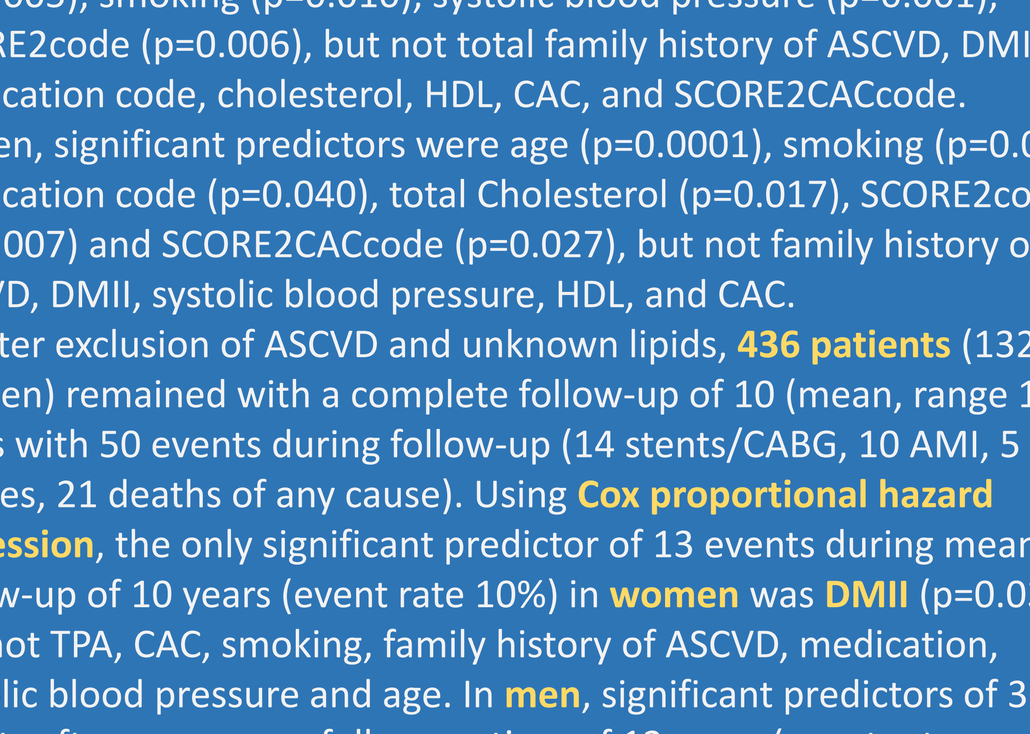
Introduction

There are only few studies that compare the diagnostic and prognostic meaning of carotid plaques and coronary calcifications in both sexes.

Results

1) Total patients were 942 with 148 (16%) known cardiovascular disease (ASCVD), average age 59 (range 22-89) years with 305 (32%) women (average age 62 years) and 637 (78%) men (average age 58 years) and 41% had preventive therapies (blood pressure and lipid lowering medications at study entry).
TPA<22mm^2 and CAC=0: 22% women and 12% men (p=0.0001)
TPA>21mm^2 and CAC=0: 24% women and 16% in men (p=0.002)
TPA<22mm^2 and CAC>0: 11% of women and 15% of men (p=NS)
2) After exclusion of ASCVD history and unknown lipids, **578 patients** remained with SCORE2 low risk (N=239, 41%), intermediate risk (N=295, 51%) and high risk (N=44, 8%). **Outcome measure:** TPA posttest high risk (cases) was present in 64 (35%) women and 238 (60%) men. Using **ROC analysis**, AUC of **CAC posttest risk** categories (low, intermediate, high) was **0,612** (95%CI: 0,537 to 0,683) in **women** and was **0,642** (95%CI: 0,592 to 0,689) in men (p=NS). Using **logistic regression**, significant predictors of cases in women were age (p=0.005), smoking (p=0.010), systolic blood pressure (p=0.001), SCORE2code (p=0.006), but not total family history of ASCVD, DMII, medication code, cholesterol, HDL, CAC, and SCORE2CACcode.
In men, significant predictors were age (p=0.0001), smoking (p=0.004), medication code (p=0.040), total Cholesterol (p=0.017), SCORE2code (p=0.007) and SCORE2CACcode (p=0.027), but not family history of ASCVD, DMII, systolic blood pressure, HDL, and CAC.
3) After exclusion of ASCVD and unknown lipids, **436 patients** (132 women) remained with a complete follow-up of 10 (mean, range 1-20) years with 50 events during follow-up (14 stents/CABG, 10 AMI, 5 strokes, 21 deaths of any cause). Using **Cox proportional hazard regression**, the only significant predictor of 13 events during mean follow-up of 10 years (event rate 10%) in **women** was **DMII** (p=0.031), but not TPA, CAC, smoking, family history of ASCVD, medication, systolic blood pressure and age. In **men**, significant predictors of 37 events after an average follow-up time of 12 years (event rate were 12%) **TPA (p=0.018), DMII (p=0.011) and age (p=0.021),** but not CAC, smoking, blood pressure, use of drugs for hypertension and/or hypercholesterolemia and family history of ASCVD.



Methods

Dual center cardiology and occupational medicine practice assessed patients between 2002-2022 with a standard procedure of carotid plaque measurements (sum of all carotid plaques obtained from longitudinal plaque-surfaces = TPA) and gated plain chest computed tomography to obtain the Agatston Score of the coronary arteries based on clinical indications. Follow-up was obtained by recall of patients, questionnaires or clinical records from treating physicians and hospitals. Comparison was made for SCORE2 and plaque posttest calculations using the Bayes theorem, ROC analysis, logistic regression, and Cox proportional hazard functions.

Conclusion

1) More frequently in women than in men, significant amounts of carotid plaque may be present despite absence of coronary calcifications (24% vs 16%, p=0.002). Significant coronary calcifications without TPA was 1:10 in women and was 1:7 in men.
2) Congruently significant predictors of high risk SCORE2TPA in women and men were age, smoking, and SCORE2. In contrast to men, in women, SCORE2CAC was not a significant predictor of SCORE2TPA.
3) Predictors of 13 clinical events and death was only diabetes in women, whereas in men, significant predictors of 37 events were age, diabetes, and TPA, but not CAC using Cox proportional hazard regression.

TPA >21mm^2 is highly prevalent (67%) in female (men: 73%) cardiological patients and of these, 24% had significantly more frequently no CAC than men (16%, p=0.002). CAC posttest risk categories based on SCORE2 performed slightly worse in women (AUC: 0.61) than in men (AUC: 0.64, p=NS). Preliminary outcome results suggest that TPA is at least non-inferior to CAC in men, but inconclusive in women (due to small numbers). Further research is required to establish the relative prognostic importance of carotid plaques over coronary calcifications especially in women.

References

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