

Erbel, Raimund Lehmann, Nils Schramm, Sara Schmidt, Børge Hüsing, Anika Kowall, Bernd Hermann, Dirk M. Gronewold, Janine Schmermund, Axel Möhlenkamp, Stefan Moebus, Susanne Grönemeyer, Dietrich Seibel, Rainer Stang, Andreas Jöckel, Karl-Heinz 2023 1 10.3238/arztebl.m2022.0360 Deutscher Ärzte-Verlag GmbH Deutsches Ärzteblatt international Shaw, Leslee J. Min, James K. Nasir, Khurram Xie, Joe X. Berman, Daniel S. Miedema, Michael D. Whelton, Seamus P. Dardari, Zeina A. Rozanski, Alan Rumberger, John Bairey Merz, C. Noel Al-Mallah, Mouaz H. Budoff, Matthew J. Blaha, Michael J. 2018 11 39 3727-3735 41 30212857 10.1093/EURHEARTJ/EHY534 Aims Pathologic evidence supports unique sex-specific mechanisms as precursors for acute cardiovascular (CV) events. Current evidence on long-term CV risk among women when compared with men based on measures of coronary artery calcium (CAC) remains incomplete. Methods and results A total of 63 215 asymptomatic women and men were enrolled in the multicentre, CAC Consortium with median follow-up of 12.6 years. Pooled cohort equation (PCE) risk scores and risk factor data were collected with the Agatston score and other CAC measures (number of lesions and vessels, lesion size, volume, and plaque density). Cox proportional hazard models were employed to estimate CV mortality (n = 919). Sex interactions were calculated. Women and men had average PCE risk scores of 5.8% and 9.1% (P < 0.001). Within CAC subgroups, women had fewer calcified lesions (P < 0.0001) and vessels (P = 0.017), greater lesion size (P < 0.0001), and higher plaque density (P = 0.013) when compared with men. For women and men without CAC, long-term CV mortality was similar (P = 0.67), whereas detectable CAC was associated with 1.3-higher hazard for CV death among women when compared with men (P < 0.001). Cardiovascular mortality was higher among women with more extensive, numerous, or larger CAC lesions. The relative hazard for cardiovascular disease (CVD) mortality for women and men was 8.2 vs. 5.1 for multivessel CAC, 8.6 vs. 5.9 for ≥5 CAC lesions, and 8.5 vs. 4.4 for a lesion size ≥15 mm³, respectively. Additional explorations revealed that women with larger sized and more numerous CAC lesions had 2.2-fold higher CVD mortality (P < 0.0001) as compared to men. Moreover, CAC density was not predictive of CV mortality in women (P = 0.51) but was for men (P < 0.001), when controlling for CAC volume and cardiac risk factors. Conclusion Our overall findings support that measures beyond the Agatston score provide important clues to sex differences in atherosclerotic plaque and may further refine risk detection and focus preventive strategies of care. Eur Heart J European heart journal 80 and over Adult Aged Atherosclerotic* / complications Atherosclerotic* / epidemiology Cardiovascular Diseases* / complications Cardiovascular Diseases* / mortality Extramural Female Follow-Up Studies Humans James K Min Leslee J Shaw MEDLINE Male Michael J Blaha Middle Aged N.I.H. NCBI NIH NLM National Center for Biotechnology Information National Institutes of Health National Library of Medicine PMC6209852 Plaque Prognosis PubMed Abstract Research Support Risk Factors Sex Distribution Vascular Calcification* / complications Vascular Calcification* / epidemiology doi:10.1093/eurheartj/ehy534 pmid:30212857 https://pubmed.ncbi.nlm.nih.gov/30212857/ https://www.natap.org/2018/CROI/croi_32.htm 1. Evaluate the impact of sex on morbidity and mortality from cardiovascular disease (CVD). 2. Evaluate cardiovascular risk factors to determine their relative importance in women versus men. 3. Assess the impact of gender-based biases on CVD morbidity and mortality in women. 4. Distinguish sex-based differences in cardiovascular pathophysiology, presentation, and diagnosis. 5. Formulate an opinion regarding CVD treatment disparities between men and women. 6. Apply knowledge of pharmacokinetic differences between men and women to minimize adverse drug events. 7. Apply current literature regarding treatment effectiveness in women who have coronary artery disease, with special consideration given to aspirin therapy. 8. Detect specific differences in evidence-based treatment guidelines between men and women. 9. Design an optimal pharmaceutical care plan for a woman with CVD. Ebrahim, Shah Papacosta, Olia Whincup, Peter Wannamethee, Goya Walker, Mary Nicolaidis, Andrew N. Dhanjil, Surinder Griffin, Maura Belcaro, Gianni Rumley, Ann Lowe, Gordon D.O. 1999 30 841-

850 4 10187889 10.1161/01.STR.30.4.841 Background and Purpose-B-mode ultrasound is a noninvasive method of examining the walls of peripheral arteries and provides measures of the intima-media thickness (IMT) at various sites (common carotid artery, bifurcation, internal carotid artery) and of plaques that may indicate early presymptomatic disease. The reported associations between cardiovascular risk factors, clinical disease, IMT, and plaques are inconsistent. We sought to clarify these relationships in a large, representative sample of men and women living in 2 British towns. Methods-The study was performed during 1996 in 2 towns (Dewsbury and Maidstone) of the British Regional Heart Study that have an \approx 2-fold difference in coronary heart disease risk. The male participants were drawn from the British Regional Heart Study and were recruited in 1978-1980 and form part of a national cohort study of 7735 men. A random sample of women of similar age to the men (55 to 77 years) was also selected from the age-sex register of the general practices used in the original survey. A wide range of data on social, lifestyle, and physiological factors, cardiovascular disease symptoms, and diagnoses was collected. Measures of right and left common carotid IMT (IMT(cca)) and bifurcation IMT (IMT(bif)) were made, and the arteries were examined for plaques 1.5 cm above and below the flow divider. Results-Totals of 425 men and 375 women were surveyed (mean age, 66 years; range, 56 to 77 years). The mean (SD) IMT(cca) observed were 0.84 (0.21) and 0.75 (0.16) mm for men and women, respectively. The mean (SD) IMT(bif) were 1.69 (0.61) and 1.50 (0.77) mm for men and women, respectively. The correlation between IMT(cca) and IMT(bif) was similar in men ($r=0.36$) and women ($r=0.38$). There were no differences in mean IMT(cca) or IMT(bif) between the 2 towns. Carotid plaques were very common, affecting 57% ($n=239$) of men and 58% ($n=211$) of women. Severe carotid plaques with flow disturbance were rare, affecting 9 men (2%) and 6 women (1.6%). Plaques increased in prevalence with age, affecting 49% men and 39% of women aged <60 years and 65% and 75% of men and women, respectively, aged >70 years. Plaques were most common among men in Dewsbury (79% affected) and least common among men in Maidstone (34% affected). IMT(cca) showed a different pattern of association with cardiovascular risk factors from IMT(bif) and was associated with age, SBP, and FEV1 but not with social, lifestyle, or other physiological risk factors. IMT(bif) and carotid plaques were associated with smoking, manual social class, and plasma fibrinogen. IMT(bif) and carotid plaques were associated with symptoms and diagnoses of cardiovascular diseases. IMT(bif) associations with cardiovascular risk factors and prevalent cardiovascular disease appeared to be explained by the presence of plaques in regression models and in analyses stratified by plaque status. Conclusions-IMT(cca), IMT(bif), and plaque are correlated with each other but show differing patterns of association with risk factors and prevalent disease. IMT(cca) is strongly associated with risk factors for stroke and with prevalent stroke, whereas IMT(bif) and plaque are more directly associated with ischemic heart disease risk factors and prevalent ischemic heart disease. Our analyses suggest that presence of plaque, rather than the thickness of IMT(bif), appears to be the major criterion of high risk of disease, but confirmation of these findings in other populations and in prospective studies is required. The association of fibrinogen with plaque appears to be similar to its association with incident cardiovascular disease. Further work elucidating the composition of plaques using ultrasound imaging would be helpful, and more data, analyzed to distinguish plaque from IMT(bif) and IMT(cca), are required to understand the significance of thicker IMT in the absence of plaque. Stroke Stroke Age Distribution Aged Carotid Artery Carotid Artery Diseases / diagnostic imaging Carotid Artery Diseases / epidemiology* Carotid Artery Diseases / pathology* Cohort Studies Common / diagnostic imaging Common / pathology Exercise Female G D Lowe Humans Internal / diagnostic imaging Internal / pathology Life Style MEDLINE Male Middle Aged NCBI NIH NLM National Center for Biotechnology Information National Institutes of Health National Library of Medicine Non-U.S. Gov't O Papacosta Prevalence PubMed Abstract Research Support Risk Factors S Ebrahim Sex Distribution Smoking Tunica Intima / pathology Ultrasonography doi:10.1161/01.str.30.4.841 pmid:10187889 <https://pubmed.ncbi.nlm.nih>

.gov/10187889/ Mathiesen, Ellisiv B. Johnsen, Stein Harald Wilsgaard, Tom Bønaa, Kaare H. Løchen, Maja Lisa Njølstad, Inger 2011 4 42 972-978 4 21311059 10.1161/STROKEAHA.110.589754 Background and Purpose- Carotid plaque and intima-media thickness (IMT) are recognized as risk factors for ischemic stroke, but their predictive value has been debated and varies between studies. The purpose of this longitudinal population-based study was to assess the risk of ischemic stroke associated with plaque area and IMT in the carotid artery. Methods- IMT and total plaque area in the right carotid artery were measured with ultrasound in 3240 men and 3344 women aged 25 to 84 years who participated in a population health study in 1994 to 1995. First-ever ischemic strokes were identified through linkage to hospital and national diagnosis registries, with follow-up until December 31, 2005. Results- Incident ischemic strokes occurred in 7.3% (n=235) of men and 4.8% (n=162) of women. The hazard ratio for 1 SD increase in square-root-transformed plaque area was 1.23 (95% CI, 1.09-1.38; P=0.0009) in men and 1.19 (95% CI, 1.01-1.41; P=0.04) in women when adjusted for other cardiovascular risk factors. The multivariable-adjusted hazard ratio in the highest quartile of plaque area versus no plaque was 1.73 (95% CI, 1.19-2.52; P=0.004) in men and 1.62 (95% CI, 1.04-2.53; P=0.03) in women. The multivariable-adjusted hazard ratio for 1 SD increase in IMT was 1.08 (95% CI, 0.95-1.22; P=0.2) in men and 1.24 (95% CI, 1.05-1.48; P=0.01) in women. There were no differences in stroke risk across quartiles of IMT in multivariable analysis. Conclusions- In the present study, total plaque area appears to be a stronger predictor than IMT for first-ever ischemic stroke. © 2011 American Heart Association. All rights reserved. Stroke Stroke Aged Brain Ischemia / diagnosis Brain Ischemia / diagnostic imaging* Brain Ischemia / epidemiology Carotid Arteries / diagnostic imaging* Carotid Arteries / pathology Carotid Stenosis / diagnosis Carotid Stenosis / diagnostic imaging* Carotid Stenosis / epidemiology Cohort Studies Comorbidity Ellisiv B Mathiesen Female Follow-Up Studies Humans Inger Njølstad MEDLINE Male Middle Aged NCBI NIH NLM National Center for Biotechnology Information National Institutes of Health National Library of Medicine Non-U.S. Gov't Norway / epidemiology Predictive Value of Tests PubMed Abstract Research Support Stein Harald Johnsen Stroke / diagnosis Stroke / diagnostic imaging* Stroke / epidemiology Tunica Intima / diagnostic imaging* Tunica Intima / pathology Tunica Media / diagnostic imaging* Tunica Media / pathology Ultrasonography doi:10.1161/STROKEAHA.110.589754 pmid:21311059 https://pubmed.ncbi.nlm.nih.gov/21311059/ Roeters Van Lennep, Jeanine E. Westerveld, H. Tineke Erkelens, D. Willem Van Der Wall, Ernst E. 2002 2 53 538-549 3 11861024 10.1016/S0008-6363(01)00388-1 It has been recognized over the past years that women form a distinct subpopulation within patients with coronary heart disease. This phenomenon should be acknowledged in the management and in the assessment of coronary heart disease. Over the past years remarkable progress has been made concerning our knowledge of cardiovascular risk factors related to gender. For instance, diabetes, high density lipoproteins and triglycerides levels have been found to have a greater impact on coronary heart disease risk in women compared to men. On the other hand, evidence showing that lipoprotein (a) is a cardiovascular risk factor seems to be stronger in men than in women. For optimal treatment and prevention of coronary heart disease it is necessary to acknowledge that it is not self-evident that women and men show similar responses to risk factors or to treatment. This review article addresses the role of cardiovascular risk factors focusing on the differential impact they might have on men and women. © 2002 Elsevier Science B.V. All rights reserved. Oxford Academic Cardiovascular Research Coronary disease Epidemiology Gender https://academic.oup.com/cardiovasces/article/53/3/538/324835 Cheng, Qi Zhou, Dan Wang, Jiabin Nie, Zhiqiang Feng, Xiaoxuan Huang, Yuqing Liang, Qiaomin Feng, Yingqing 2023 1 46 22-31 1 2019B020227005 36229937 10.1002/CLC.23931 Background: The progression of carotid intima-media thickness (cIMT) and plaques are associated with cardiovascular health, especially for high-risk population of cardiovascular disease (CVD). Hypothesis: Risk factors for atherosclerosis may vary by sex. This study aimed to investigate the sex-specific risk factors of cIMT

and plaque progression. Methods: We selected subjects who were identified as high-risk population of CVD, and collected their carotid ultrasound data and baseline characteristics. Linear regression and logistic regression analyses were used to identify risk factors for cIMT and plaque progression. Sex-specific risk factors were identified respectively. Results: A total of 7908 participants were included. The mean age was 57.75 ± 9.45 years and 61.51% were female. During mean follow-up of 1.92 ± 0.89 years, the median annual cIMT change rate was $-7.25 \mu\text{m}/\text{year}$. Seven hundred and fifteen subjects free from plaques at baseline developed plaque. Age, smoking, hypertension, and diabetes were common risk factors for carotid atherosclerosis progression in all participants. Smoking and alcohol drinking were significantly associated with increased cIMT change in women, while hypertension and antihypertensive medication were significant in men. Increased total cholesterol and diabetes were significantly associated with new plaque presence in women, while smoking, increased triglyceride, and dyslipidemia were significant in men ($p < .05$ for all cases). The association of baseline cIMT and smoking with annual cIMT change rate and increased total cholesterol with new plaque presence were significantly differentiated between both sexes (p for interaction $< .05$). Conclusions: The risk factors for cIMT and plaque progression differed by sex. John Wiley & Sons, Ltd Clinical Cardiology atherosclerosis carotid intima carotid plaque media thickness risk factors <https://onlinelibrary.wiley.com/doi/full/10.1002/clc.23931> <https://onlinelibrary.wiley.com/doi/abs/10.1002/clc.23931> <https://onlinelibrary.wiley.com/doi/10.1002/clc.23931> Georgiopoulou, Georgios Delialis, Dimitrios Aivalioti, Evmorfia Georgakis, Vasileios Mavraganis, Georgios Angelidakis, Lasthenis Bampatsias, Dimitrios Armeni, Elena Maneta, Eleni Patras, Raphael Dimopoulou, Maria Angeliki Oikonomou, Ermioni Kanakakis, Ioannis Lambrinouadaki, Irene Lagiou, Areti Xenos, Panos Stamatelopoulos, Kimon 2023 2 10.1016/J.HJC.2023.02.006 Elsevier Hellenic Journal of Cardiology <https://linkinghub.elsevier.com/retrieve/pii/S1109966623000295> Harald Johnsen, Stein Mathiesen, Ellisiv B Joakimsen, Oddmund Stensland, Eva Wilsgaard, Tom Løchen, Maja-Lisa Njølstad, Inger Arnesen, Egil 2007 10.1161/STROKEAHA.107.487264 Background and Purpose-Ultrasound of carotid arteries provides measures of intima media thickness (IMT) and plaque, both widely used as surrogate measures of cardiovascular disease. Although IMT and plaques are highly intercorrelated, the relationship between carotid plaque and IMT and cardiovascular disease has been conflicting. In this prospective, population-based study, we measured carotid IMT, total plaque area, and plaque echogenicity as predictors for first-ever myocardial infarction (MI). Methods-IMT, total plaque area, and plaque echogenicity were measured in 6226 men and women aged 25 to 84 years with no previous MI. The subjects were followed for 6 years and incident MI was registered. Results-During follow-up, MI occurred in 6.6% of men and 3.0% of women. The adjusted relative risk (RR; 95% CI) between the highest plaque area tertile versus no plaque was 1.56 (1.04 to 2.36) in men and 3.95 (2.16 to 7.19) in women. In women, there was a significant trend toward a higher MI risk with more echolucent plaque. The adjusted RR (95% CI) in the highest versus lowest IMT quartile was 1.73 (0.98 to 3.06) in men and 2.86 (1.07 to 7.65) in women. When we excluded bulb IMT from analyses, IMT did not predict MI in either sex. Conclusions-In a general population, carotid plaque area was a stronger predictor of first-ever MI than was IMT. Carotid atherosclerosis was a stronger risk factor for MI in women than in men. In women, the risk of MI increased with plaque echolucency. (Stroke. 2007;38:2873-2880.) <http://stroke.ahajournals.org> Gudmundsson, Elias Freyr Björnsdottir, Gudlaug Sigurdsson, Sigurdur Andersen, Karl Thorsson, Bolli Aspelund, Thor Gudnason, Vilmondur 2022 4 346 117-123 35120729 10.1016/j.atherosclerosis.2022.01.018 Background and aims: Coronary artery calcium (CAC) and carotid plaque are markers of atherosclerosis and predict future coronary heart disease (CHD) events. The aim of this study was to investigate associations between CAC and carotid plaque in asymptomatic individuals, also in relation to predicted CHD-risk and incident events. A secondary aim was to compare predictive value between CAC, carotid plaque, and total carotid plaque area (TPA) as predictors for future CHD-events. Methods: The REFINE-Reykjavik study is prospective and population-based with CAC-scoring and carotid plaque ultrasound

assessment, both presence and area. A total of 948 individuals without clinical CHD were included in the study. CAC scores were categorized into 0, 1–100, 101–300 and > 300, and carotid plaque into none, minimal and significant. Three models were applied adjusted for age, sex, and each of the Framingham risk score (FRS), local CHD risk score and established CHD risk factors. Results: Combined carotid plaque- and CAC-presence was highly prevalent, 69.5% for males and 41.7% for females (54.5% overall). TPA outperformed base models in CHD prediction, resulting in statistically significant area under the receiver operator characteristic curve (AUC) increase ranging from 0.02 to 0.05. Most CHD-events in females occurred in individuals classified as low-risk with respect to traditional risk factors but with a gradient in observed risk across carotid plaque categories. Conclusions: Carotid plaque was strongly associated with the presence and extent of CAC in asymptomatic individuals in a population-based cohort. Carotid plaque predicts incident CHD events over risk scores and may be useful for refined risk prediction in females. Elsevier Ireland Ltd Atherosclerosis CAC Carotid plaque Coronary artery calcium Coronary heart disease Population-based Predicted risk