atherosclerosis

Atherosclerosis newsletter

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Volume 377, July 2023 issue

Volume 377 contains several articles which emphasize the importance of life style factors as well as the importance of interventions in risk factor management of individuals for atherosclerotic cardiovascular disease.

Cumulative tobacco consumption has a dose-dependent effect on atheromatosis burden and improves severe atheromatosis prediction in asymptomatic middle-aged individuals: The ILERVAS study

Atherosclerotic cardiovascular disease (ASCVD) is a progressive condition where atheroma plaques develop in the artery walls, and the association of the atheroma plaque with future cardiovascular events has been extensively confirmed. Sex-specific impact of cumulative tobacco consumption (CTC) on atheromatosis extension and total plaque area remains unknown. Bermúdez-López et al. aimed to determine the impact of CTC in atheromatosis localization and burden.

They conducted a cross-sectional analysis in 8330 asymptomatic middle-aged individuals. 12-territory vascular ultrasounds in carotid and femoral arteries were performed to detect atheromatous plaque presence and to measure total plaque area. Adjusted regressions and conditional predictions by smoking habit or CTC were calculated. Severe atheromatosis (SA, ≥3 territories with atheroma plaque) was predicted with the Systematic COronary Risk Evaluation 2 (SCORE2) model. The improvement of SA prediction after adding CTC was evaluated.

CTC was associated with an increased risk of atheromatosis, stronger in femoral than in carotid artery, but similar in both sexes. A dose-dependent effect of CTC on the number of territories with atheroma plaque and total plaque area was observed. Addition of CTC to the SCORE2 showed a higher sensitivity, accuracy, and negative predictive value in males, and a higher specificity and positive predictive value in females. In both sexes, the new SCORE2-CTC model showed a significant increase in AUC, and in the integrated discrimination index. Age and CTC were the most important clinical predictors of SA in both sexes.

CTC shows a dose-dependent association with atheromatosis burden, impacts more strongly in femoral arteries, and improves SA prediction.

Increased ultra-processed food consumption is associated with worsening of cardiometabolic risk factors in adults with metabolic syndrome: Longitudinal analysis from a randomized trial

Cardiovascular disease is the main cause of premature mortality and morbidity worldwide. In parallel, the number of people with cardiometabolic risk (CMR) factors, such as hypertension, high fasting plasma glucose, high LDL cholesterol, and obesity, has also increased. Different foods, specifically those with high-density energy but low nutritional value, have been associated with an increase in CMR factors. Mounting evidence relates cardiovascular diseases and CMR factors to the consumption of ultra-processed foods (UPF). However, the association between changes in ultra-processed food (UPF) consumption and cardiometabolic risk (CMR) factors remains understudied. González-Palacios et al. evaluated the association between changes in UPF consumption over 12 months of follow-up and changes in CMR factors in adults diagnosed with metabolic syndrome.

Data from 5373 adults participating in the PREvención con DIeta MEDiterránea Plus (PREDIMED-Plus) trial were assessed. Diet was evaluated at baseline, 6- and 12-month visits using a validated food frequency questionnaire, and UPF consumption (in grams/day and percentage of total daily dietary intake in grams) was categorized based on the NOVA classification system. Mixed-effects linear models with repeated measurements at baseline, 6 and 12 months of follow-up were used to assess the associations between changes in UPF consumption and changes in CMR factors adjusting for sociodemographic and lifestyles variables.

In multivariable-adjusted models, when comparing the highest *versus* the lowest quartile of UPF consumption, positive associations were found for several CMR factors: weight; waist circumference; diastolic blood pressure; fasting blood glucose; HbA1c; triglycerides and triglycerides and glucose index.

Higher UPF consumption was associated with adverse evolution of objectively measured CMR factors after 12 months of follow-up in adults with metabolic syndrome.

Associations of alcohol intake with subclinical carotid atherosclerosis in 22,000 Chinese adults

Alcohol consumption is a major risk factor for the global burden of disease. Epidemiological studies have consistently reported a lower risk of CVD associated with moderate alcohol consumption compared with not drinking, however, the causality of these associations is uncertain, and the biases of reverse causality and residual confounding often affect observational studies of alcohol intake. Recent large-scale conventional and genetic studies suggest there is no safe drinking threshold for CVD risk, but the evidence differs across CVD types. Moreover, the associations of alcohol use with

subclinical carotid arterial injury and atherosclerosis remain controversial, with both positive and J-shaped associations reported in cross-sectional studies mainly in Western populations. Mendelian randomization (MR) approaches can help assess the causal effects of alcohol, however, large-scale MR studies assessing the causal associations of alcohol intake with cIMT or carotid plaque remain limited. Zhou et al. investigated the causal relevance of alcohol intake with measures of carotid artery thickness and atherosclerosis in Chinese adults.

The study included 22,384 adults from the China Kadoorie Biobank, with self-reported alcohol use at baseline and resurvey, carotid artery ultrasound measurements, and genotyping data for aldehyde dehydrogenase type 2 (*ALDH2*)-rs671 and alcohol dehydrogenase 1B (*ADH1B*)-rs1229984. Associations of carotid intima media thickness (cIMT), any carotid plaque, and total plaque burden (derived from plaque number and size) with self-reported (conventional analyses) and genotype-predicted mean alcohol intake (Mendelian randomization) were assessed using linear and logistic regression models.

Overall, 34.2% men and 2.1% women drank alcohol regularly at baseline. Mean cIMT was 0.70 mm in men and 0.64 mm in women, with 39.1% and 26.5% having carotid plaque, respectively. Among men, cIMT was not associated with self-reported or genotype-predicted mean alcohol intake. The risk of plaque increased significantly with self-reported intake among current drinkers, with directionally consistent findings with genotype-predicted mean intake. Higher alcohol intake was significantly associated with higher carotid plaque burden in both conventional and genetic analyses. Genetic findings suggested the association of genotype-predicted alcohol with carotid plaque burden in men was likely to due to alcohol itself, rather than pleiotropic genotypic effects.

Higher alcohol intake was associated with a higher carotid plaque burden, but not with cIMT, providing support for a potential causal association of alcohol intake with carotid atherosclerosis.

High fat in blood and body and increased risk of clinically diagnosed non-alcoholic fatty liver disease in 105,981 individuals

High caloric diets rich in fat and carbohydrates lead to increased fat accumulation in adipose tissue and blood. This may lead to increased risk of non-alcoholic fatty liver disease. Kyhl et al. hypothesized that baseline high nonfasting plasma triglycerides, body mass index (BMI), and waist circumference, individually and combined, associate with increased risk of clinically diagnosed non-alcoholic fatty liver disease (NAFLD) during follow-up.

To confirm such hypothesis the authors studied 105,981 asymptomatic individuals from the Copenhagen General Population Study and followed them for up to 15 years for development of clinically diagnosed NAFLD. Mean follow-up was 9.2 years, during which time 418 subjects were clinically diagnosed at hospitals.

Risk of clinically diagnosed NAFLD increased with higher plasma triglycerides, higher BMI, and higher waist circumference, continuously and stepwise using multivariable adjusted hazard ratios and cumulative incidences. Combining clinical categories of plasma triglycerides with BMI or waist circumference categories, illustrated an almost additive risk with increasing categories. Compared with plasma triglycerides <1 mmol/L and BMI <25 kg/m^2, the multivariable adjusted hazard ratio was 5.2 for individuals with both plasma triglycerides ≥5 mmol/L and BMI ≥35 kg/m^2. The corresponding hazard ratio for individuals with plasma triglycerides ≥5 mmol/L and waist circumference was >88 cm for women and >102 cm for men was 4.8. Triglyceride results were more pronounced in women *versus* men.

High fat in blood and body measured by plasma triglycerides, BMI, and waist circumference, individually and combined, is associated with up to 5-fold increased risk of clinically diagnosed NAFLD.

Effectiveness of Internet-based health management in patients with dyslipidemia: A four-year longitudinal study

Dyslipidemia is an important risk factor for coronary artery disease and stroke, and it has emerged as a major public health issue worldwide. Telemedicine and eHealth, developed from the Internet and other related technologies, play a crucial role in promoting health care. Telemedicine has also proven to be effective in monitoring and tracking various chronic diseases (such as diabetes, asthma, heart failure, and hypertension), as well as weight loss. This support is readily available in times of need may offer a new approach to health management. Dou et al. conducted this study to provide health guidance and education to people with dyslipidemia using an Internet health management platform and to assess the effectiveness of Internet health management and intervention in improving health-related behaviors and controlling blood lipids.

Starting in 2013, a Western longitudinal study was performed in China, and all interventional objects were provided with Internet health management. Health checkups were conducted annually, and questionnaires were administered every two years to analyze changes in health behaviors two years (2015) and four years (2017) following the intervention. In addition, factors affecting behavioral changes and lipid control were analyzed in the dyslipidemic population to understand the effectiveness and influencing factors of Internet health management on lipid control.

By guiding interventional objects through the Internet health management platform, the awareness rate of dyslipidemia increased from 19.1% in 2013 to 34.4% in 2017; and the control rate of dyslipidemia increased from 9.1% at baseline to 18.5%. Certain health-related behaviors beneficial to health (tobacco use, physical activity, and partial dietary) were gradually improved over the intervention time. For patients with dyslipidemia, triglyceride decreased from 2.90 mmol/L (2013) to 2.77 mmol/L (2017) as the years went by. Analysis of factors affecting lipid control showed that non-

compliance with health instructions affected lipid control; in addition to these, being female was found to be a protective factor for effective lipid control.

The basic Internet-based health management platform in this study appears to be moderately successful and is a valuable and feasible application. Tobacco, dietary, and physical activity interventions provided significant protection against dyslipidemia in patients.