Thursday June 9, 15:45-17:00

Parallel session 1

Cardiovascular diseases

Chairs: Carine Doggen & Dorien Kimenai

15:45 Identifying distinct clinical subgroups in heart failure with mildly reduced ejection fraction using clustering (O21)
Claartje Meijs

16:00 Longitudinal association of premature atrial contractions with atrial fibrillation and brain ischemia events in people with type 2 diabetes: The Hoorn Diabetes Care System cohort (O22)
Peter Harms

16:15 Non-alcoholic fatty liver disease and mortality after myocardial infarction: a prospective analysis in the Alpha Omega Cohort (O23)
Luc Heerkens

16:30 Effect of diet and lifestyle on the relationship between body mass index and cardiovascular and all-cause mortality in myocardial infarction patients from the Alpha Omega Cohort (O24)
Esther Cruijsen

16:45 Antioxidants for chronic kidney disease: a Cochrane systematic review (O25)
Julia Colombijn

O21. Identifying Distinct Clinical Subgroups in Heart Failure with Mildly Reduced Ejection Fraction using clustering.

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Background: Heart failure (HF) is a heterogeneous syndrome with three subtypes based on ejection fraction (EF): HF with reduced (HFrEF), mildly reduced (HFmrEF), and preserved EF (HFpEF). The subtypes HFmrEF and HFpEF have limited guideline recommended therapies. So far, trials have shown neutral results and it is argued that the reason for this could be the heterogeneity in these subtypes. Cluster analysis can characterize heterogeneous patient populations and could serve as a stratification and prognostic tool in clinical trials and healthcare. Several studies have undertaken cluster analysis in patients with HFpEF, but this has not yet been done in patients with HFmrEF. Therefore, the aim of this study was to identify clusters in HFmrEF and compare cluster prognosis.

Methods: Latent Class Analysis (e.g., unsupervised clustering) has been performed in a Dutch cross-sectional HF registry-based dataset (N = 2078). Number of clusters was determined combining aBIC and clinical meaning of the clusters. Identified clusters were validated in the long-term Swedish HF registry (N = 5503). In Sweden, mortality and hospitalization in the clusters was compared using a Cox proportional hazard model, with a Fine-Gray sub distribution for competing risks and adjustment for age and sex.

Results: Six clusters have been discovered: 1) a cardio-renal phenotype; 2) a female-atrial fibrillation phenotype; 3) a low-comorbidity phenotype; 4) a wide-QRS phenotype; 5) a metabolic phenotype; and 6) an ischaemic-male phenotype. Significant differences for hospitalization and mortality rates were found between all subgroups, showing lowest and highest mortality and hospitalization rates for the ischaemic-male and the metabolic phenotype, respectively.

Conclusion: The current clustering model characterized patients in HFmrEF and increases understanding of heterogeneity in HF. The found clusters were robust, have clinical meaning, and show differences in mortality and hospitalization, which means that this model could be valuable as a stratification and prognostic tool in clinical trials and healthcare.

O22. Longitudinal association of premature atrial contractions with atrial fibrillation and brain ischemia events in people with type 2 diabetes: The Hoorn Diabetes Care System cohort.

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Background: Early recognition of increased risk of atrial fibrillation (AF) or brain ischemia events in people with type 2 diabetes is relevant because opportune initiation of thrombosis prophylaxis effectively diminishes excess risk of ischemic stroke. Premature atrial contractions (PACs) on electrocardiograms (ECG) are potential markers for imminent onset of AF or (subsequently) brain ischemia events. We aimed to investigate the association of PACs on annual ECG with incident AF and brain ischemia events in people with type 2 diabetes without pre-existing AF or cerebrovascular disease.

Methods: A prospective study of 12,242 people with type 2 diabetes without known AF or brain ischemia events from the Hoorn Diabetes Care System cohort. Over 70.000 annually repeated measurements (1998-2018) included cardiovascular risk factors, an ECG, and self-reported cardiovascular events. PACs and AF were classified according to the Minnesota Classification. The association of PACs with AF and brain ischemia events, and of AF with brain ischemia events was assessed using time-dependent Cox-regression models for repeated measurements, adjusted for cardiovascular risk factors and medication use (Hazzard Ratios with 95%CIs).

Results: During a median follow-up of 7.0 (IQR 3.4-11.0) years, 1,031 (8.4%) of the participants had PACs at any study ECG, and 566 (4.6%) had incident AF at any of the median 6 (IQR 3-10) annual ECG recordings. Brain ischemia events occurred in 517 (4.2%) people (304 transient ischemic attack, 213 ischemic stroke). After adjustment, PACs were associated with incident AF (HR, 1.96 (95%CI, 1.53-2.50)), but not with brain ischemia events. AF was also not associated with brain ischemia events, probably because detection of AF led to initiation of thrombosis prophylaxis.

Conclusion: In people with type 2 diabetes without a history of AF or cerebrovascular disease, PACs (prevalent or incident) are associated with a two-fold increased risk of incident AF, but not with brain ischemia events.

O23. Non-alcoholic fatty liver disease and mortality after myocardial infarction: a prospective analysis in the Alpha Omega Cohort.

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Background: Non-alcoholic fatty liver disease (NAFLD) has been associated with a higher risk of cardiovascular disease (CVD) mortality in population-based studies. Little is known about NAFLD in relation to long-term survival after myocardial infarction (MI).
We examined the relationship of NAFLD with 12-year risk of fatal CVD and all-cause mortality among post-MI patients.

Methods: We included 4347 Dutch patients from the Alpha Omega Cohort aged 60-80 years who had an MI ≤10 years prior to study enrolment. As a marker for NAFLD, we used the Fatty Liver Index (FLI) ≥60 which is based on ultrasonography. Patients were followed for cause-specific mortality from enrolment (2002-2006) through December 2018. Hazard ratios for CVD and all-cause mortality were obtained by Cox regression using FLI <30 (indicating absence of NAFLD) as reference and adjusted for age, sex, systolic blood pressure, statin use, smoking status, alcohol consumption, and time since MI. Analyses were repeated excluding patients with obesity and diabetes.

Results: Sixty percent of the patients had an FLI ≥60 who were more likely to be male and more often had diabetes, high blood pressure and high serum cholesterol levels. During a median follow-up of 12 years we observed 2042 deaths of which 846 were due to CVD. Patients with FLI ≥60 had a 55% higher risk of CVD mortality (HR: 1.55 [1.19, 2.03]) and 21% higher risk of all-cause mortality (HR: 1.21 [1.03; 1.41]) compared to patients with an FLI <30. Results remained similar after excluding patients with obesity (HR: 1.50 [1.13, 1.99] for CVD mortality; HR: 1.20 [1.01; 1.41] for all-cause mortality) or diabetes (HR: 1.44 [1.08, 1.93] for CVD mortality; HR: 1.25 [1.05, 1.49] for all-cause mortality).

Conclusion: NAFLD, based on FLI ≥60, was a predictor for CVD and all-cause mortality in post-MI patients, independent of other cardiometabolic risk factors.

O24. Effect of diet and lifestyle on the relationship between body mass index and cardiovascular and all-cause mortality in myocardial infarction patients from the Alpha Omega Cohort.

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Background:The association between BMI and mortality has been frequently studied and usually follows a J-shaped curve. However, less is known about the influence of lifestyle and diet on this association. We aimed to gain insight in potential lifestyle-related effect modifiers on the association between BMI and all-cause mortality and cardiovascular disease (CVD) mortality in myocardial infarction (MI) patients.

Methods:We included 4,837 Dutch patients from the Alpha Omega Cohort with a MI <10y prior enrolment. BMI was assessed at baseline (2002-2006) using body weight and height. Patients were followed through December 2018 for vital status and cause-specific mortality. Continuous associations between BMI and all-cause and CVD mortality were estimated using Cox proportional hazards models with restricted cubic splines. A BMI of 25 kg/m2 was used as the reference. Age and sex adjusted associations were stratified for diet quality (DHD15-index), physical activity, prevalent diabetes, education, self-rated health and smoking.

Results: Of the study population (60-80 years), 17% smoked, 21% had diabetes, 22% were female and >85% used any type of cardiovascular medication. During 12.4 [8.5-13.8] years of follow-up (53,199 person years), 2,287 deaths occurred of which 1,010 due to CVD. A non-linear, J-shaped continuous association was observed between BMI and mortality with inverse associations for a BMI between 25-30 kg/m2, compared to 25 kg/m2. The nadirs (HR, 95% CI) were 27.6 kg/m2 (HR:0.93, 0.95%CI: 0.89, 0.98) for all-cause mortality and 27.4 kg/m2 (HR: 0.94, 95%CI: 0.88, 1.00) for CVD mortality. Results were similar in patients with low versus high diet quality and in patients with low versus high physical activity and in other subgroups.

Conclusion: In MI patients, a BMI between 25-30 kg/m2 was associated with the lowest risk of all-cause and CVD mortality. The observed associations manifested independently of diet quality and physical activity level and other lifestyle factors.

O25. Antioxidants for chronic kidney disease: a Cochrane systematic review.

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Background: People with chronic kidney disease (CKD) are at high risk for cardiovascular disease and death. Antioxidants may protect against cardiovascular disease and mortality by attenuating oxidative stress. This review examines the effects of antioxidants on cardiovascular and kidney endpoints in patients with CKD 3-5, patients undergoing dialysis (CKD 5D) and kidney transplant patients (CKD 5-nTx).

Methods: We searched the Cochrane Kidney and Transplant Register of Studies through searches of CENTRAL, MEDLINE, and EMBASE, conference proceedings, the International Clinical Trials Register (ICTRP) Search Portal, and ClinicalTrials.gov to December 2021. We included randomised controlled trials investigating the use of antioxidants, compared with placebo, usual care or other antioxidants, for people with CKD on cardiovascular and kidney endpoints. Two authors independently screened abstracts, full texts and performed data extraction using standardised extraction forms. Results were pooled using random effects models and expressed as risk ratios (RR) or mean difference (MD) with 95% confidence intervals (CI).

Results: We included studies 88 studies (9884 patients) that assessed antioxidants in patients with CKD 3-5 (30 studies, 5320 patients), CKD 5-D (37 studies, 3060 patients), and CKD-nTx (21 studies, 1504 patients). Of included studies, 18 assessed the effects of vitamin antioxidants and 60 the effects of non-vitamin antioxidants. Antioxidants are unlikely to reduce all-cause mortality (RR 0.96, 95%CI 0.82-1.11) and cardiovascular mortality (RR 0.94, 95%CI 0.64-1.40). Antioxidants may reduce cardiovascular disease (RR 0.80, 95%CI 0.64-1.00) and end-stage kidney disease (RR 0.65, 95%CI 0.41-1.02). Antioxidants may increase estimated glomerular filtration rate (MD 3.84 95%CI 3.00-4.68) and slightly reduce serum creatinine (MD -52.44µmol/L, 95%CI -67.99, -36.88). The evidence for all outcomes is considered low to very low due to concerns on risk of bias, inconsistency, imprecision, and publication bias.

Conclusion: Antioxidants are unlikely to reduce (cardiovascular) mortality and may reduce cardiovascular and kidney morbidity but evidence is uncertain.